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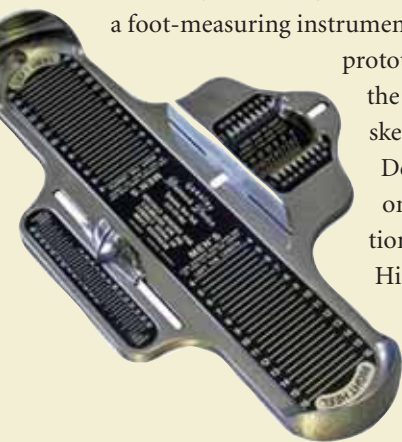
SCIENCE, HISTORY AND THE ARTS
NUMBER 22 • AUTUMN 2008

Hamza. Giants, sorcerers, villains, dragons, spies and heroes all converge in *The Hamzanama*, a series of spellbinding tales from Persian oral tradition that date back more than 1,000 years. Amir (commander) Hamza, uncle of the Prophet Muhammad, traveled the world with his soldiers spreading the teachings of Islam, battling infidels and gaining converts with displays of strength, such as lifting elephants as easily as pillows. So fantastic were the exploits of Hamza and his men that the Indian Mughal emperor Akbar, who ruled from 1556 to 1605, ordered the tales to be the subject of the first royal manuscript illustrated during his reign. “The Adventures of Hamza,” a Web site from the Smithsonian’s Arthur M. Sackler Gallery, is an introduction to this grand epic through the fascinating illustrations commissioned by Akbar. Here, visitors meet Hamza’s steed, Ashqar, a scarlet three-eyed horse born of a demon and fairy; Umar, a cunning and brilliant spy; and Zumurrud Shah, a deadly giant who is Hamza’s perennial enemy. —www.asia.si.edu/exhibitions/online.htm



In this illustration (detail), Prince Farrukh-Nizhad, Hamza’s ally, so astonishes two brothers by lifting an elephant that they convert to Islam. (India, Mughal Dynasty, ca. 1570)

Industrial drawings. It’s anyone’s guess just how many millions of pinched toes, corns, callouses and other painful foot problems have been averted over the years by Charles Brannock (1903-1992). Born into the shoe business, Brannock sketched out his ideas for a foot-measuring instrument while still in college and, with an Erector set, made a



prototype. The Brannock Device (patented 1928) soon became the industry standard for measuring feet. Brannock’s initial sketches of his invention are featured in “Doodles, Drafts and Designs: Industrial Drawings from the Smithsonian,” an online exhibition featuring industrial drawings in the collections of the Smithsonian’s National Museum of American History and Smithsonian Institution Libraries. Industrial drawings, as this Web site points out, are used for working out ideas, convincing others of the worthiness of an invention, organizing and controlling manufacturing and recording ideas—such as in patent applications.

“Doodles, Drafts and Designs” explains how industrial drawings visually document American creativity. In addition to Brannock, other innovators featured on this site include

The Brannock Device Howard Head, founder of the Head Ski Co.; Ida Cohen Rosenthal, inventor of the “Maidenform” bra; Earl Tupper, inventor of Tupperware; and Edwin Binney and C. Harold Smith, creators of “Crayola” crayons. —www.sil.si.edu/exhibitions/doodles/

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On the cover: A male Przewalski’s horse, born July 1 at the Smithsonian National Zoological Park’s Conservation and Research Center in Front Royal, Va., grazes under the watchful eye of his mother, Emma. The foal, three days old when this photo was taken, will remain at the National Zoo until the Przewalski’s Horse Species Survival Plan places him at another institution for future breeding. Native to the steppes and deserts of southern Asia, the Przewalski’s horse was declared extinct in the wild in 1970. Thanks to international breeding efforts, approximately 50 of these horses have been reintroduced to the wild in China. See story, Page 8. (Photo by Jessie Cohen)



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World's ocean revealed as one vast and complex system in new Sant Ocean Hall

By Harvey Leifert
Special to Inside Smithsonian Research

Today Phoenix is healthy and strong, but more than a decade ago in 1997, this 45-foot female North Atlantic right whale (*Eubalaena glacialis*) became so entangled in fishing gear that scientists feared she would die. She dragged a fishing net behind her through the ocean for nearly two years before it broke free.

Phoenix's ability to survive earned her her name and a place in the hearts of the researchers who had been tracking her since her birth in 1987. In the newly opened Sant Ocean Hall at the Smithsonian's National Museum of Natural History, visitors are greeted by an exact replica of Phoenix, suspended from the ceiling and plunging downward with mouth agape. The model is accurate down to the whale's crusty skin patches—called callosities—and the scars on her tail and jaw caused by the fishing gear.

The Smithsonian's new 23,000-square-foot exhibition is the centerpiece of an initiative focused on bringing international attention to the complexity and importance of the ocean. Sant Ocean Hall, created in partnership with the National Oceanic and Atmospheric Administration, features mounted specimens and exhibits paired with innovative technology to provide a vibrant and educational look at the richness of the world's oceans.

The North Atlantic right whale is an endangered species, and the model serves as the Sant Ocean Hall's ambassador, linking the exhibition's major themes for visitors. "The message is that the ocean is a global



The Sant Ocean Hall is a 23,000-square-foot exhibition featuring some 674 marine specimens and models, high-definition video experiences and one-of-a-kind exhibits that explore the ocean's past, present and future as never before. (Photo by John Steiner)

system, essential to all life, including yours," Exhibit Developer Jill Johnson says.

For some visitors, the most dramatic whale on display may not be the full-size

right whale but a species some 40 to 50 million years old, provisionally labeled *Maiacetus inuus*, the earliest mammal to live a majority of its life in the ocean. Dis-
(continued)

covered in the deserts of Pakistan in 2002 by Philip Gingerich of the University of Michigan, this creature had well-developed limbs with feet and toes better adapted for swimming than for walking. Its lower backbone also was more flexible than the backbones of its hoofed-mammal ancestors, suggesting that it swam with assistance from its tail. A cast of this fossil in the Sant Ocean Hall is the first public display of *M. inuus* anywhere.

“The discovery of this very old species is significant in that it helps place whales in their proper evolutionary niche,” Brian Huber, a Smithsonian paleontologist and Sant Ocean Hall co-curator, says.

“About 40 to 50 million years ago, the ocean was very rich with life, fish and other creatures, in shallow water. Mammals were diversifying on land, and there was a lot of competition for food. So, some mammals began living part of their lives in the ocean, just to feed. At some point, they began living *all* of their lives in the ocean,” Huber explains.

The next major evolutionary development for whales was their change from carnivores, with teeth for ripping and tearing flesh, to plankton feeders. It also is a climate change story, Huber says. “We have a fantastic prehistoric specimen from Antarctica, *Llanocetus denticrenatus*, to tell that story. Its teeth are widely spaced and very crenulate.”

Based on scars on the upper part of the mouth between the teeth, Ewen Fordyce, the New Zealand scientist who studied and prepared the specimen, suggests that there were “very short strands of baleen between those teeth.”



Above: This image of a glowing sucker octopod from the Sant Ocean Hall was taken by David Shale. This animal lives at depths of between 1,600 to 13,123 feet.

Bottom: These two images of *Rypticus subbifrenatus*, a coral reef soapfish of the sea bass family, show the disparity in appearance between a larva and adult in this species. (Photos courtesy Carole Baldwin)

Opposite top: A coelacanth (*Latimeria chalumnae*) and its pup on exhibit in the Sant Ocean Hall. This odd prehistoric fish was once thought to be extinct. (Photo by John Steiner)

Opposite bottom: This Devonian trilobite, *Walliserops sp.*, from the “Journey Through Time” section of Sant Ocean Hall, may have used its trident appendage for sexual display or to dig for food. (Chip Clark photo)



Fordyce has identified this as the first filter-feeding whale, whose diet was plankton, rather than fish. “The specimen is 38 to 36 million years old, from a time when Antarctica was starting to get cold,” Huber says. “Ice sheets started forming in Antarctica, and phytoplankton started proliferating in the ocean. Plankton became a new food resource because of the cooling climate. Whales adapted to this new food source by forming baleen, a flexible horn-like substance that allows whales to strain large quantities of plankton from seawater and eat it. And this specimen, discovered in 1985, is fantastic!”

Giant squid

Equally fantastic is the specimen of a modern-day giant squid. The Sant Ocean Hall is the only place where visitors can see both a 24-foot female and a much smaller male giant squid preserved for display. Long a staple of science fiction, precisely because so little is known about them, giant squids have never been seen alive in the ocean depths, although one was captured in still photographs. In fact, says curator Michael Vecchione, the number-one question he gets is, “Are they real?”

Vecchione heads NOAA’s National Systematics Lab, located in the National Museum of Natural History. He assures visitors that giant squids are indeed real and live at depths of 2,000 to 3,000 feet, often in canyons on the continental slope. The squids on exhibit were collected off Spain.

Displaying the giant squids was problematic. In recent years, the District of Columbia fire marshal severely limited the amount of flammable alcohol preservative that can be used in the Natural History Museum. Many specimens stored in alcohol for study had to be moved off site. Only 10 gallons of alcohol were authorized for use in the entire Sant Ocean Hall. The female squid alone requires 1,200 gallons of fluid, Project Manager Elizabeth Musteen points out.

The solution, in both senses of the word, was provided by the 3M Co. and its



product Novec 7100 Engineered Fluid, a liquid used for cleaning and heat transfer applications in the electronics industry. It is crystal clear, nonflammable, nontoxic and nonexplosive. It preserves specimens with a protective coating rather than being absorbed by the specimen, as happens with the fluids alcohol and formalin. 3M Co. donated 12,000 pounds of Novec 7100 EF, enough to display the giant squids and other large specimens.

Larval fish

Carole Baldwin, curator of fishes at the museum and a Sant Ocean Hall curator, has devised a display in which visitors can match adult fish with their tiny larvae by using colored bar codes, comparable to those in supermarkets, related to elements of the animal's DNA. Larvae of fish and other marine organisms, Baldwin explains, often look nothing like what they will become as adults. Also, larvae and adults often inhabit totally different parts of the ocean.

Fish larvae may measure just 0.2 to 0.6 inches, Baldwin says, and often have strange-looking adaptations not found in adults. At the Smithsonian's research station in Belize, Baldwin and colleagues are

working to identify the larvae of as many of the 500 local fish species as possible. In the past, after capturing live larvae, the researchers had to raise them in tanks and watch them slowly grow into juveniles to determine their species.

"Using this genetic technique, our success in identifying larvae skyrocketed," Baldwin says. "Up until 2004, we had identified fewer than 50 fish species during a 10-year period by rearing them. In the next two years alone, using bar codes, we added 70 species. Even more exciting, our DNA data are suggesting that there may be many more species of coral-reef fishes in the Caribbean than previously documented."

Baldwin and the other members of the Sant Ocean Hall team hope that the exhibition will cause visitors to think more about the ocean and its significance to life on Earth and perhaps inspire some students to become ocean scientists. Researchers from the Smithsonian, NOAA and other institutions were involved in every detail of the exhibit, she notes, to assure the accuracy of the information presented. A special kiosk will provide constantly updated results of the latest ocean research and news about the ocean.

"The main message is that there is just one ocean, a global system," Baldwin says. "Some of the facts are mind-boggling. It's well known that 70 percent of Earth's surface is covered by the ocean, but when you start looking at volume, it turns out that approximately 95 percent of the livable space on the planet is in the ocean, because of its huge depth." The kicker, she adds, is that so far, "it's estimated that less than five percent of the ocean has been explored." ❖



Lincoln portraits hide as much as they reveal

By Topper Sherwood
Special to Inside Smithsonian Research

Hours before delivering a brilliant speech on slavery at New York’s Cooper Union, Abraham Lincoln walked into the Broadway studios of Republican supporter Mathew Brady. There, on Feb. 27, 1860, the rumpled and ungainly attorney submitted to the photographer’s efforts to make him appear presidential. In producing the image, Brady applied a new technology that printed the candidate’s almost full-length portrait onto thousands of pocket-sized calling cards. After the 1860 election, Lincoln credited Cooper Union—and Brady’s work—for putting him in the White House.

“Lincoln and photography came of age at roughly the same time,” observes Smithsonian National Portrait Gallery Curator David Ward. “Lincoln rose to prominence during the 1850s, when photography was becoming portable, cheap and technologically simpler.”

A 25-year veteran of the Portrait Gallery, Ward is curating a special exhibition of Lincoln portraiture to coincide with the 200th anniversary of Lincoln’s birth on Feb. 12, 2009. In a single room, visitors will see more than 30 artifacts related to Lincoln—items rarely, if ever, assembled in one place.

The exhibition’s title, “The Mask of Lincoln,” is, most obviously, a reference to two life castings of Lincoln’s face, one done in 1860 by sculptor Leonard Volk and the other done in 1865 by Clark Mills, also a sculptor. The plaster masks serve as physiognomic book-ends to Lincoln’s presidency, the earlier mask showing “a face full of life, of energy, of vivid aspiration,” according to White House secretary John Hay. Hay described the later mask as having the features of “one on whom sorrow and care had done their worst...”

Contrary to popular belief, no death mask was made of Lincoln’s face after his assassination. The two “life” masks both required Lincoln to lie down, have his face covered in wet plaster, and remain motionless as it dried.

“Anything but agreeable,” Lincoln said of the process. He was pleased with the first mask, declaring it “the animal himself.”

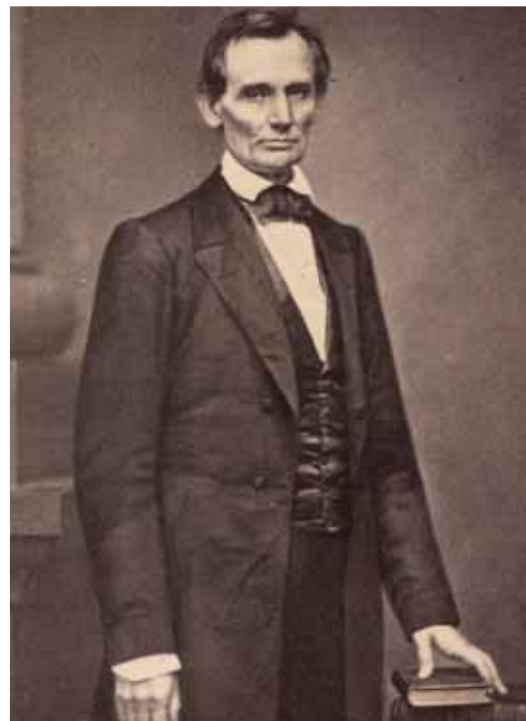
Volk used the 1860 mask as the basis of a number of renderings of Lincoln, including a full-length statue commissioned for the Illinois State Capitol in Springfield.

Plaster life masks were popular in the 19th century prior to the widespread use of photography, Ward explains. It was a time when “people wanted to see who they were dealing with. Handshake deals were still common, and everyone knew their bankers personally—people didn’t get their money from ATMs.”

Phrenology and physiognomical science also were in vogue, and many believed that the physical features of a face revealed such personal characteristics as intelligence, honesty, determination—and their opposites.

Least understood

“The Mask of Lincoln” also refers to the fact that Lincoln, among all U.S. presidents, remains one of the least understood—perhaps by his own design, Ward explains. Facing a deeply divided electorate and cabinet, Lincoln often chose not to speak his thoughts. When he did make public remarks, they were rarely extemporaneous.



Still, Lincoln knew it was important to be seen by the public. Advances in the technology of photography were allowing a burgeoning U.S. population to see images that were dramatically more true-to-life than traditional paintings and prints. Lincoln visited the studios of Brady and Brady's associate Alexander Gardner relatively often—starting almost immediately on his arrival in Washington, D.C., to take office in February 1861.

One of the earliest of these images, Ward says, shows Lincoln seated at a writing desk. It is the first photo in which Lincoln is shown wearing a beard.

“Lincoln had this photograph taken not only to show people what he looked like,” Ward explains, “but to project himself as a figure of power and authority—to establish himself as president. At the same time, he knew the limitations of the art, and was hiding himself behind the ubiquity of these pictures.” According to Ward, Lincoln's photographs seem to hide as much as they reveal.

Historic location

The National Portrait Gallery is well situated for a Lincoln exhibition. It is housed in the landmark Donald W. Reynolds Center for American Art and Portraiture, formerly the National Patent Office Building where Lincoln's second inaugural ball was held in March 1865. Gardner's studio, where the president sat for so many of his photographs, was just down the street. Still, Ward says, Abraham Lincoln remains a difficult and elusive subject.

“Even as we stand here, Lincoln is receding deeper into the past,” the curator says, referring to the process of wading through generations of evidence and interpretation to research the exhibition.

Cracked plate

One of the most noteworthy of the Portrait Gallery's Lincoln images is Gardner's “cracked plate” photograph. The 1865 portrait shows the president's face, tired and deeply lined—yet with greater detail and revealing an individual more accessible to the viewer than in any other Lincoln image. Despite the obvious strain that shows on Lincoln's face, he wears a subtle, enigmatic smile. The photo, Ward says, plays a central role in “The Mask of Lincoln.”

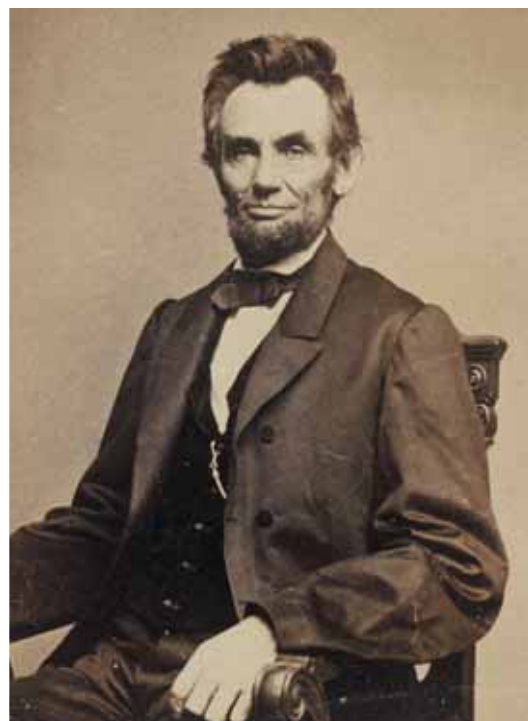
“I think this is one of the most mysterious and moving pictures in the world,” he says. “Lincoln is at end of his career. We see the folds of his skin, the careworn lines of his face, the thinning beard. He commanded during the worst crisis in American history with little help.... And then, you see this small smile...”

The plate was damaged (though some might say “embellished”) when it broke in two when Gardner took it out of the camera, creating the “crack” that runs through the top of Lincoln's head when the pieces were combined. The smooth line has come to symbolize, Ward says, “everything from secession to the bullet the president would receive” at Ford's Theater a few weeks after the image was taken.

“What is Abe Lincoln thinking in February 1865?” the curator asks. “We'll never know. But I believe that he didn't want us to know. Lincoln knew the risk of revealing himself too greatly. He was not going to let Americans really know him. He would remain mysterious. He was an exceptional human being.” ❖

“The Mask of Lincoln,” will be on view at the Smithsonian's National Portrait Gallery from Nov. 7, 2008 through July 5, 2009.

These images of Abraham Lincoln from “The Mask of Lincoln” exhibition (clockwise from top left) were taken by Mathew Brady on Feb. 27, 1860; Alexander Gardner, 1865; Mathew Brady, 1864; and Alexander Gardner, 1861. (All images courtesy National Portrait Gallery, Smithsonian Institution)



International breeding program allows the Przewalski's horse a return to the wild

By Topper Sherwood
Special to Inside Smithsonian Research

A squat, brown horse named Brandy quickly pulls away from the other “girls” in the harem. Ambling straight up to two familiar visitors—veterinarian Wynne Collins and wildlife biologist Melissa Songer—Brandy accepts a pat on the muzzle. She searches open hands for snacks as her four female companions, all sporting caramel-and-gray coats topped by push-broom manes, watch from a distance.

“We’re keeping them in groups of four and five,” Collins explains. “A group of nine tends to fight more.”

At home in the lush Blue Ridge Mountain fields of the Smithsonian National Zoological Park’s Conservation and Research Center in Front Royal, Va., Brandy and her “sisters” are a world away from their native land. They are rare Przewalski’s horses (*Equus ferus przewalskii*), native to the steppes and deserts of central Asia and a true breed apart. Descended from a primitive and hardy line that represents a discrete species, Przewalski’s (pronounced sheh-val-skees) horses have 66 chromosomes, two more than the common domestic horse.

Extinct in the wild since 1970, today some 1,600 of these horses live in small captive populations around the world. Their growing numbers—built up from 14 wild horses captured at the beginning of the 20th century—are the result of a carefully managed breeding program, called the Przewalski’s Horse Species Sur-

vival Plan, organized by a number of zoos and wildlife organizations around the globe. Brandy is on loan from the Bronx Zoo, and other members of her group hail from partner organizations in San Diego, Nevada and Germany.



Top: A male Przewalski’s horse at the National Zoological Park’s Conservation and Research Center in Front Royal, Va. (Photo by Jessie Cohen)

Above: Working with a local veterinarian, Melissa Songer attaches a satellite collar to a free-roaming Przewalski’s horse at the Kalameili Nature Reserve.



The Przewalski’s horse-breeding program keeps meticulous track of the lineage of each animal. Males and females are paired so their offspring will maximize the genetic diversity of the species. In July, two foals were born at the Conservation and Research Center, sired by a nine-year-old stallion considered the most genetically valuable Przewalski’s horse in North America.

Back to the wild

One benefit of the growing numbers of Przewalski’s horses in captivity is that researchers are able to send horses to sites in China, Mongolia and Kazakhstan for reintroduction to the wild. In China’s Kalameili Nature Reserve, for example, 50 horses have been released. Using battery-powered transmitters and Global Positioning System coordinates, Songer and her Chinese colleagues are tracking the movements of these horses through the reserve, collecting information that may increase the odds for their survival in the wild.

Examining a topographical map of the Kalameili Nature Reserve, Songer pores over details of this rugged 4.2 million-acre expanse in far-western China. A blue square marks the location of the Chinese Wild Horse Breeding Centre, where about 140 horses live, bred from 25 captive horses from around the world. Of the 50 horses released to date to run wild in the reserve, six are wearing tracking collars that Songer and colleagues attached to

them in China. Each collar collects daily locations through GPS; positions are transmitted via satellite and received at the Zoo lab in Front Royal by e-mail.

The map only hints at the Kalameili's unsettled landscape of rocky hills and sparse vegetation, but it does allow Songer to track two wandering horse harems, revealed in a series of different-colored dots showing their positions over time.

On the map, a group of yellow dots meanders back and forth across a bright-red line—a relatively new road populated with heavy trucks and carloads of nature-loving Chinese travelers. For Songer, the road is a cause for concern, in part because its roadside ditches may offer hard-to-find watering holes for Przewalski's horses.

"We also think people might be stopping to feed them," Songer says. Once the horses get attracted to the road as a potential food source, they run the risk of being hit by cars.

Sheep and goats

Scarce water, searing summers, harsh winters, livestock development and hunting all contributed to the 20th-century demise of the Przewalski's horse in Asia's Gobi Desert. Today, encroachment by humans tops the list of threats to its future survival. Aside from trucks and well-meaning tourists, scores of nomadic Kazakh families drive some 300,000 sheep, goats and other livestock through the reserve each winter, Songer explains. These domestic ruminants take a heavy toll on wild-grass forage available to the wild horses.

In addition, the Kazakhs ride and keep domestic horses, which must be kept from the Przewalski's horses if the latter are to stay genetically pure. The good news is that international and Chinese conservationists are working closely with local herdsmen, who are enthusiastic about the Przewalski's return.

"The local Kazakh families are interested in and excited about the reintroduction of Przewalski's horses," explains Peter Leimgruber, director of the National



Above: Melissa Songer and Peter Leimgruber pay a visit to the small breeding population of Przewalski's horses at the National Zoological Park's Conservation and Research Center in Front Royal, Va. (Photo by Meghan Murphy)

Zoo's Conservation Geographic Information Systems Lab. "The Kazakhs are horse people. Horses are so much a part of their culture that, for them, the wild horses are a representation of their heritage."

Competing uses

A zoologist with a high-tech background, Leimgruber is fascinated by the movement of animals across a landscape and by the relationships they maintain with one another. He is particularly interested in grassland desert ecosystems, the animals that live there, and what holds each animal to a place and what makes it migrate.

"The Mongolian steppes are the only remaining large-scale temperate grasslands in the world," Leimgruber says. "They are really very similar to what the American prairie once was before it gave way to agriculture. Our own migrating organisms, such as bison and pronghorn, are now gone because land management didn't allow for this kind of coexistence."

Today, Chinese authorities are weighing multiple, potentially competing uses for the lands of the Kalameili Nature Reserve. Valuable water, is being diverted for live-

stock and agriculture; and, not too far away, coal, oil and gas reserves are being mined. Still, perhaps inspired by a Przewalski's horse ecotourist program in Mongolia, the Chinese have added a tourist center and gift shop to the horse-breeding station.

"The Chinese have a large, growing population," Leimgruber observes. "They have huge energy and natural-resource demands to fulfill. How can this be combined with nature conservation? That's going to be a challenge."

Songer adds that zoos and other organizations around the world have maintained substantial public interest in the welfare of Brandy and her kin, and Chinese conservationists reportedly compare the potential "star power" of the Przewalski's horse to that of the hugely popular giant panda—another Chinese native. Like the panda, Songer says, Przewalski's horses will likely remain a "conservation-dependent species" for some time. She and Leimgruber are optimistic, however, about this spirited creature's future in the wild. ❖

Historian chronicles America's changing attitudes toward forested wetlands

By Jennifer Endick

Special to Inside Smithsonian Research

When European settlers arrived on the North American continent, they considered the forested wetlands they found to be disease-producing wastelands. Such negative attitudes toward these ecologically robust and diverse landscapes persisted well into the 20th century. Even today, the fight to protect and restore such places remains a highly contentious area of environmental and land-use policy.

America's Forested Wetlands: From Wasteland to Valued Resource, a new book by Jeffrey Stine, a historian at the Smithsonian's National Museum of American History, explores the long history of American perceptions of—and behavior toward—wetlands, outlining how gradual changes in attitudes and values came to shape public policies on wetlands today. The Forest History Society published Stine's 81-page book as part of its Issues Series. The publication seeks not to advocate for specific programs but to offer historical perspective, Stine explains. "The series is meant to inform policymakers, as well as environmentalists, timber agencies, landowners and students."

Dismal swamp

Stine's research included interviews with scientists, regulators, foresters and environmental activists, as well as archival and library investigations. He also conducted field studies in places such as the Parker Tract on North Carolina's Albemarle Peninsula—a hardwood swamp forest that represents one of the last rem-



Logging railroads expanded commercial lumber operations into wetland forests in the United States in the late 19th century.

nants of the once-extensive East Dismal Swamp. The Tract is the site of a precedent-setting environmental court case involving the legal limits of converting forested wetlands into highly managed pine plantations.

Stine sought to synthesize the substantial literature dealing with various aspects of wetlands, from hydrology and biology to economics, law, history and popular culture. "I wanted to show how society's attitudes and understanding have changed over time, and why wetlands are such a contested political subject today," he says. The book traces how the interplay of agriculture, forestry, land develop-

ment, hunting, the science of ecology, economics, the environmental movement and the tradition of private property rights all have influenced the fate of these fragile and diminishing landscapes.

Sport hunters

Early public policy, beginning in the mid-1800s, worked to transform these seemingly useless and dangerous areas into workable and livable terrain. Wetlands were widely "seen in a negative light, and the government helped and encouraged people to drain and fill these lands so that they might be made economically productive," Stine explains. Although the

book addresses wetlands of all types, *America's Forested Wetlands* is primarily focused on wetlands with trees 20 feet or taller covering at least 30 percent of their expanse.

A modest shift in federal policy toward the conservation of key wetland habitat came in the early 1930s when, according to Stine, significant declines in the population of migratory waterfowl occurred—a matter of grave concern to the nation's legions of sport hunters. Public advocacy for wetlands protection thus began not as a partisan issue, but gathered support from both sides of the aisle, Stine says.

Biologists also began to demonstrate the ecological services provided by wetlands, such as their contributions to water quality. This knowledge helped to foster an awareness of the economic trade-off between preserving a wetland as a natural water filter and converting the land for development, which often requires a water-treatment facility.

Private property

During the 1960s, the desire for more outdoor recreation opportunities rose along with the country's population. This led to increased pressure to preserve forested wetlands for fishing, hunting, boating and hiking. Soon wetlands—along with wilderness areas and whales—became a rallying point for environmental activists. Given the country's long tradition of upholding the rights of private-property owners, policymakers have had to balance the use of these lands for development with their importance to wildlife preservation, watershed protection and similar long-term social goals.

"Wetlands regulation may be the most controversial issue in environmental law," observed legal scholars Oliver Houck and Michael Rolland in 1995. "It pits America's most biologically productive and most rapidly diminishing ecosystems against rights of private ownership and property development in more than 10,000 individual permit decisions a year."

Wetlands regulation may be the most controversial issue in environmental law.

Ivory bill

The reported sighting of an ivory-billed woodpecker in 2005 served as an inspiration and guide to Stine when he was completing his book. The bird, whose last confirmed sighting took place in the 1940s, had long been assumed to be extinct.

"Prior to the fragmentation of the nation's far-reaching bottomland forests, the ivory bill's range extended from Texas to

North Carolina and from Missouri to Florida and on south to Cuba," Stine says. The bird's possible rediscovery in the swamp forests of eastern Arkansas spurred conservation of its likely habitats. Similarly, Hurricanes Katrina and Rita "showed the practical value of wetlands" Stine adds. Aerial reconnaissance after the storms revealed that areas where marshes were preserved suffered far less damage than where marshes had been filled in and used for development.

Stine explains that his task as a historian is not to provide answers to public policy questions but to further comprehension of how the policies evolved. "Understanding the history of society's attitudes and actions toward these irreplaceable landscapes may not resolve the challenges facing society," he says, "but it is essential for assisting in that effort and helping to avoid the pitfalls of the past." ❖



The Bowie Lumber Co. operated this quarterboat and dredge in Louisiana in the early 20th century. Southern lumber companies built canals that enabled them to harvest trees in cypress swamps via pullboats. (Photographs courtesy of the Forest History Society Photo Collection)

Stamp collection. A well-known collection of rare stamps held for decades by the Franklin Institute in Philadelphia was recently transferred to the collections of the Smithsonian's National Postal Museum. Known as the Harry L. Jefferys collection, it consists of U.S. stamps, covers, proofs and essays and is particularly strong in stamps issued from 1851 to 1857. The collection includes full panes of the U.S. one-cent and three-cent 1851 issue; the U.S. 12-cent 1857 issue; scarce positions of the U.S. one-cent 1851 issue and several printing errors, including plate position number 2 of the 1918 inverted Jenny airmail stamp.

Bats and insects. Using nets to cover common species of tropical plants only by day and only by night, scientists at the Smithsonian's Tropical Research Institute in Panama recently demonstrated that bats are more effective than birds in reducing the numbers of plant-eating in-

sects, such as caterpillars, katydids and beetles. Uncovered plants that commonly lose 4.3 percent of their leaf area to insect herbivores lost a striking 13.3 percent of their leaf area when bats were prevented, with nighttime nets, from feeding on or near the plants. When birds were prevented from feeding near the plants in the daytime, the plants lost 7.2 percent of their leaf area to insects. The scientists concluded that bats consume roughly twice as many plant-eating insects in the tropical forest understory than do birds.

Patent medicines. A collection of more than 375 patent medicines spanning 150 years and containing products used in the western United States and Canada was recently donated to the Smithsonian's National Museum of American History by Richard Pollay, professor emeritus of commerce for the Sauder School of Business at the University of British Columbia. Also included in the Pollay donation are toiletry items, 75 almanacs and eight advertising signs. These new items augment the more than 4,000 nonprescription name-brand medicines dating from the 19th century to the present that are already in the collections of the American History Museum's Division of Medicine and Science.

Jack Mitchell donation. Renowned arts photographer Jack Mitchell recently donated to the Smithsonian's Archives of American Art a group of his vintage photographs, including 54 large-format photographs of painters and sculptors taken in New York City between 1966 and 1977. Mitchell's gift includes stunning portraits of the artists Red Grooms, Duane Hanson, Robert Indiana, Jasper Johns, Roy Lichtenstein, Louise Nevelson, Claes Old-



A 1918 inverted Jenny airmail stamp from the Harry L. Jefferys collection.

enburg, Nam June Paik, Larry Rivers, James Rosenquist, George Segal, Andy Warhol and others. Mitchell's photographs of visual artists, film and theater personalities, musicians and writers have graced the covers and pages of many publications, including *The New York Times*, *Harper's Bazaar*, *Life*, *Newsweek*, *People Magazine*, *Rolling Stone*, *Time*, *Vanity Fair* and *Vogue*.

Fossil forest. A team of scientists that included Bill DiMichele, paleontologist at the Smithsonian's National Museum of Natural History, recently discovered the remains of a 300 million-year-old tropical rain forest in eastern Illinois that is preserved in the ceiling of a coal mine some 250 feet below the surface. This fossilized forest extends for more than four square miles as the roof of two adjacent coal mines and consists of lycopsid tree and tree fern fossils, as well as horsetails, seed ferns and cordaitales. The forest was preserved when an earthquake dropped it below sea level and flooding buried it in sediment. Mud and silt preserved the stumps and logs in a layer that eventually turned into shale.



Photographer Jack Mitchell (left) and artist Robert Rauschenberg in 1966. (Photo by Jack Mitchell)

Smithsonian researchers discover new species of robin in the forests of Gabon, Africa

From bee-eaters to parrots, cuckoos, owls, cranes, rails, spoonbills, eagles, ducks and sparrows, the country of Gabon is home to a great diversity of birds. Some 752 different species have been described in this west central African country. This summer, a team of Smithsonian scientists added one more bird to that list, the olive-backed forest robin (*Stiphrornis pyrrholae-mus*), found in the primary lowland forests in southwest Gabon.

First observed in 2001 during a field expedition of the Smithsonian National Zoological Park's Monitoring and Assessment of Biodiversity Program, the robins have a fiery orange throat and breast, yellow belly, an olive back and black head feathers. Both sexes have a distinctive white dot of tiny feathers in front of each eye.

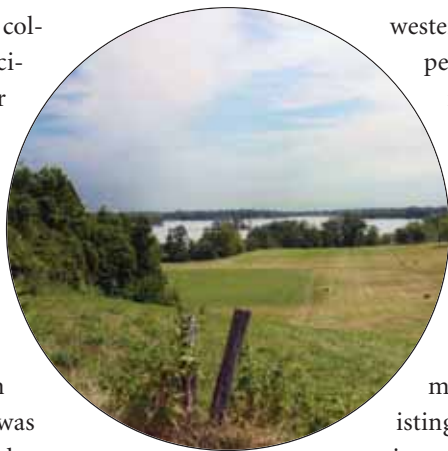
Brian Schmidt, an ornithologist at the Smithsonian's National Museum of Natural History and a member of the Monitoring and Assessment of Biodiversity team, collected the first specimen of the bird for the museum in 2001. In 2003 more specimens were collected. "Once I was able to compare them side by side to other specimens in our collections, it was clear that these birds were special," Schmidt says.

While Schmidt studied and described the physical morphology of the robin, geneticists at the National Zoo compared its DNA to the DNA of four known forest robin species. Genetic testing confirmed that the new robin was a species previously unknown to science.

Robert Fleischer, head of the National Zoo's Center for Conservation and Evolu-

tionary Genetics; National Zoo researchers Jeffrey Foster and Kate Durrant; and George Angehr of the Smithsonian Tropical Research Institute were co-authors with Schmidt of the paper describing the new bird. It was published in the journal *Zootaxa* in August.

The Monitoring and Assessment of Biodiversity Program, which facilitated the discovery of this new bird, is part of the National Zoo's Center for Conservation Education and Sustainability. The program is working with the Gabonese government and Shell Gabon to integrate biodiversity conservation into energy development.



Farm purchase allows research, program expansion

The Smithsonian Environmental Research Center, located on the western shoreline of the Chesapeake Bay in Edgewater, Md., recently purchased 575 acres of forests and fields that adjoin its property, a site known as the Contee Farm, for \$6.2 million.

The Contee Farm acquisition and the Environmental Research Center's existing land holdings form a contiguous watershed landscape of 2,650 acres across four miles of fields, forests and wetlands to the Chesapeake Bay.

The ecological and natural conservation of the property provides extensive habitats for a diverse array of game and nongame species, including deer, eagles, turkey, geese, waterfowl, forest birds, foxes and myriad amphibians and reptiles.

The mostly forested Contee Farm is the



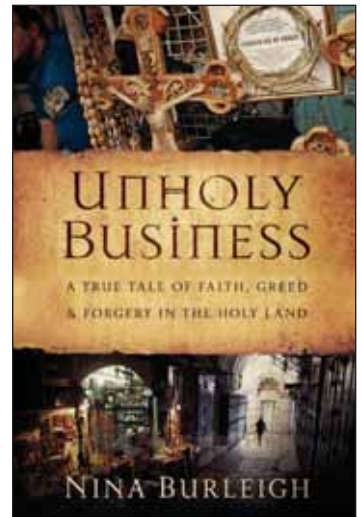
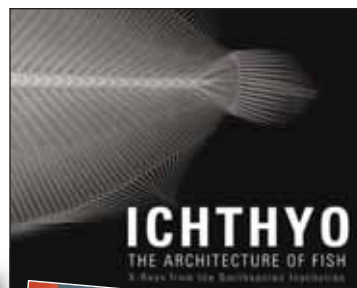
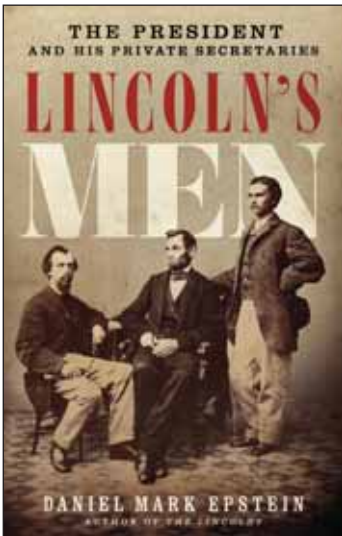
Above: Brian Schmidt holds an olive-backed forest robin. (Photo by Carlton Ward Jr.)

Below: Contee Farm on the Chesapeake Bay. (Photo by Kimbra Cutlip)

largest area under a Forest Stewardship Plan in central Maryland. It contains numerous important archaeological sites, from Piscataway Indian campsites to the ruins of the colonial Contee plantation, which overlooked the Rhode River.

A wide array of experiments conducted by Environmental Research Center scientists on the farm in collaboration with its former owners, the Kirkpatrick-Howat family, has provided numerous long-term scientific measurements and data.

Upon its purchase of the Contee Farm, the Smithsonian granted a custom conservation easement to the Maryland Environmental Trust in partnership with the Scenic River Land Trust. Under this easement, the staff of the Environmental Research Center will use the property to expand public programs and education as well as to sustain long-term research. Year-round activities will be held at the site, such as educational programs focusing on natural history, land stewardship, cultural history and archaeology. —Kimbra Cutlip



Ichthyo, The Architecture of Fish: X-rays from the Smithsonian Institution, by Jean-Michel Cousteau, Daniel Pauly and Lynne R. Parenti (Chronicle Books, 2008, \$35). Created to preserve a record of scientific samples, the black-and-white X-rays of fish specimens in the collections of the Smithsonian's National Museum of Natural History emerge in this book as works of art.

Unholy Business: A True Tale of Faith, Greed & Forgery in the Holy Land, by Nina Burleigh (Smithsonian Books, 2008, \$29.50). A real-life thriller about the high-stakes world of biblical antiquities forgery and what Israeli authorities have called "the fraud of the century."

Do Cats Hear with Their Feet? Where Cats Come from, What We Know about Them and What They Think about Us, by Jake Page (Smithsonian Books, 2008, \$24.95). A look at what natural history can tell us about one of America's most popular pets and its wild cousins. This book traces the evolution of cats from the time they first adapted their feline form about 20 million years ago.

Worlds of Sound: The Story of Smithsonian Folkways, by Richard Carlin in association with Smithsonian Folkways Recordings (Smithsonian Books, 2008, \$35). A vivid account of how Folkways founder Moses Asch captured a diverse array of folk, bluegrass, jazz, poetry and other sounds with a microphone and the belief that all things the human ear hears are worth preserving.

Every Living Thing: Man's Obsessive Quest to Catalog Life, from Nanobacteria to New Monkeys, by Rob Dunn (Smithsonian Books, 2008, \$28.95). A biologist tells the fascinating story of the unending quest to discover, name and describe all life on earth—from classification in the 18th century to today's attempts to find life in space.

Lincoln's Men: The President and his Private Secretaries, by Daniel Mark Epstein (Smithsonian Books, 2009, \$26.95). A fresh angle on Lincoln as seen by his three young private secretaries—the men who knew him better than anyone outside his immediate family.

Territory: Tony Trischka (Smithsonian Folkways Recordings, 2008, \$15). With fearless musical curiosity as his guiding force, Tony Trischka roams widely through the banjo's creative terrain.

Classic Piano Blues from Smithsonian Folkways (Smithsonian Folkways Recordings, 2008, \$15). Born of ragtime and hard times, this release revisits boogie-woogie and blues legends Memphis Slim, Willie Dixon, Speckled Red, Roosevelt Sykes and more.

Cephas & Wiggins: Richmond Blues (Smithsonian Folkways Recordings, 2008, \$15). Guitarist-singer John Cephas and his harmonica-player partner Phil Wiggins play the century-old blues of the Piedmont, the Appalachian foothills running from Richmond to Atlanta.

Books listed on Pages 14 and 15 can be ordered through online book vendors or purchased in bookstores nationwide.

Recordings can be ordered from Smithsonian Folkways Mail Order, Smithsonian Folkways Recordings Dept. 0607, Washington, D.C. 20073-0607. To order by phone, call (800) 410-9815 or (202) 275-1143.

Down to the Sea: An Epic Story of Naval Disaster and Heroism in World War II

By Bruce Henderson (Smithsonian Books, 2007, \$26.95 cloth; \$14.95 paper)

With most of his clothes torn off and bleeding badly from a wounded foot, gunner's mate Joe Guio of the U.S. Navy destroyer USS Monaghan thanked his fellow sailors for trying to keep him warm and afloat on the mountainous Pacific swells that several hours earlier on Dec. 18, 1944, had swallowed their ship.

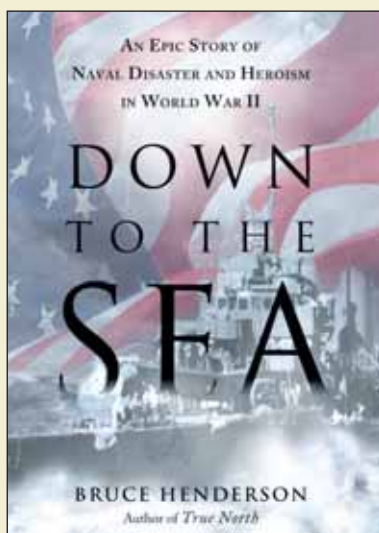
Water Tender Joe McCrane knew he and the 11 other men clinging to the emergency life raft owed their lives to Guio, a tough coal miner from Holliday's Cove, W.Va. Guio had leaned over a gun shelter hatch on the capsized ship and pulled each man, one at a time, up and out of the Monaghan, which had rolled onto its starboard side in the heavy seas. And it was Guio who had untangled the only lifeboat not previously washed overboard by 90-foot seas and 160 mph winds that the sailors now clung to. Slipping in and out of consciousness, Guio finally lay his head on "Mother" McCrane's shoulder and went to sleep. Half an hour later, McCrane tried to awaken Guio, but Guio was dead.

"McCrane told the others, then decided to 'hold for a little longer' the man who had rescued from the sinking ship so many others..." writes Bruce Henderson in *Down to the Sea: An Epic Story of Naval Disaster and Heroism in World War II*.

In December 1944, Adm. William "Bull" Halsey—on a hell-bent course to support Gen. MacArthur's invasion of the Philippines—ordered the mighty U.S.

Third Fleet, including the Monaghan, directly into a deadly typhoon.

In 312 pages, with dozens of vintage photographs, *Down to the Sea* is a nail-biting and deeply moving military drama. It chronicles the wartime victories of the seamen aboard the USS Hull, USS Monaghan, USS Spence and USS Tabberer and how the crews of three of those vessels



were defeated by the antiquated design of their ships.

Through painstaking research drawing on interviews with nearly every survivor and rescuer, families of lost sailors, transcripts from two naval courts of inquiry, ships' logs, action reports and personal letters and diaries, Henderson offers an exhaustively detailed and riveting history. A great many of the sailors in the Third Fleet had joined the Navy after the surprise attack by Japan on Pearl Harbor on Dec. 7, 1941. *Down to the Sea* opens on that day of infamy and follows the men of the Third Fleet through three years of battles against the Japanese.

After the attack on Pearl Harbor, American men and women joined the military in

droves; those turned away when one branch had met its quota enlisted in another. Patriotism and morale were at an all-time high. "Greatest-Generation" Americans were leaving their farms, the mines, banks, even dropping out of college to serve.

The Third Fleet was one of the most powerful ever assembled under any flag. But the dated Farragut-class destroyers Hull, Monaghan and Spence—top-heavy by design and made more so with additions of new equipment—were no match for one of the most powerful storms the U.S. Navy had ever encountered. At the time they met the typhoon, the Hull, Monaghan and Spence were dangerously low on fuel, causing them to ride high, worsening their top-heavy rolls of 70 degrees in turbulent seas.

But Halsey, viewed in the press as a national hero for his wartime victories, was keyed up to engage the Japanese while MacArthur was on the Philippine island of Luzon in December 1944. After Pearl Harbor, Halsey was quoted by staff officers as saying, "Before we're through with 'em, the Japanese language will be spoken only in hell."

Navy weather experts close to Halsey told the admiral they didn't believe the storm would develop into a typhoon, despite several reports to the contrary from other Navy experts and even an intercepted Japanese report.

By the time the storm subsided, three ships had sunk, 28 were damaged, 146 aircraft were destroyed and 756 men had been lost at sea.

Of the 900 men aboard Hull, Monaghan and Spence, 92 survived. The stories of their valiant battle against monstrous seas, complete mental and physical exhaustion and even shark attacks are vividly revealed in *Down to the Sea*.

—Daniel Friend

Hobart model 410 meat slicer is a successful marriage of style and function

Just how many slices of Swiss cheese, pastrami and roast turkey were portioned out by the 1940s-era Hobart model 410 meat slicer now on view at the Smithsonian's Cooper-Hewitt, National Design Museum is anybody's guess. This machine certainly played a central role in more than a few Reuben and Monte Cristo sandwiches.

Called the "streamliner" by those who have fallen in love with its look, the Hobart 410 slicer was donated recently to the Cooper-Hewitt's Industrial Design collection in the museum's Product Design and Decorative Arts Department. It will be on view through March 1, 2009, in the exhibition "Curators Select: Recent Acquisitions, 2003–2008."

Why would a renowned design museum add such a common commercial kitchen object to its collection? This model is a classic example of the successful marriage of function and style, explains Cynthia Trope, an assistant curator at the Cooper-Hewitt. The Hobart 410's curvaceous, tear-drop shape and smooth surfaces reflect the Modernist streamline style of the 1930s and 1940s, a style that originated in aerodynamics and efforts to reduce wind resistance on airplanes, trains and other moving vehicles. Even sitting quietly on a deli counter, the Hobart 410's grace-



ful, rhythmic form suggests movement and speed. Yet its simple beauty also makes the 410 easy to clean, Trope says. Its smooth aluminum surface and compact design are durable and easy to wipe down—a huge benefit for restaurant and deli workers.

Egmont Arens (1889-1966), designer of the Hobart 410, concealed the slicer's motor and gears safely beneath a smooth-walled housing that looks "reminiscent of an airplane cowling," Trope says. "The only exposed moving parts are the simple forms of the circular steel blade and the pivoting holder and sled-like bed that secure the meat to be sliced." This was a revolutionary departure from the designs of earlier commercial meat slicers. Not surprisingly, Aren's career included stints at both General Electric and Fairchild Aircraft.

Among his other widely recognizable designs are the Hobart 1937 Kitchen Aid Model K stand mixer and the familiar package for Eight O'Clock Coffee. The Hobart 410 was in production from the 1940s until 1985.

—John Barrat

This Hobart 410 slicer is in the Industrial Design collections of the Smithsonian's Cooper-Hewitt, National Design Museum.

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