

# Inside

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Smithsonian  
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**Sustainable seafood.** From an environmental perspective, not all fish and shellfish sold in today's markets and restaurants are good choices. The Earth's oceans were once thought to be inexhaustible sources of food, but today scientists realize the oceans cannot sustain the demands humans have placed on them. The "Smithsonian Sustainable Seafood Web Site" is an online resource that allows seafood lovers to make environmentally sound choices about what marine species to eat—regardless if it is bought at a restaurant, seafood market or local grocery store.

Based on years of research by scientists at the Smithsonian's National Museum of Natural History, this site will give visitors insight into seafood species that are caught in an environmentally responsible manner, those not in danger of significant depletion and those cultivated using acceptable farming practices.

Commercial fish that present environmental problems or are in decline are identified and alternate species suggested. Bluefin

tuna, for example, is highly prized for sushi yet is becoming scarce due to overfishing. Yellowfin or blackfin tuna are more responsible choices. This site complements the recently published *One Fish, Two Fish, Crawfish, Bluefish—The Smithsonian Sustainable Seafood Cookbook*, by Carole Baldwin, an ichthyologist at the Smithsonian's National Museum of Natural History, and Smithsonian research assistant Julie Mounts.

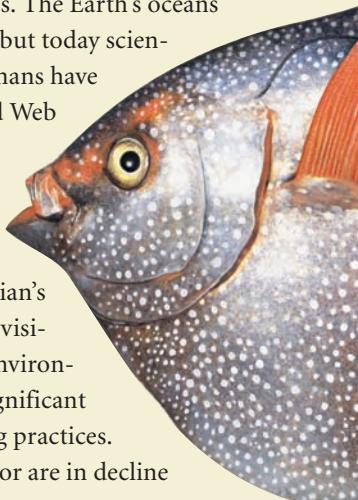
—www.mnh.si.edu/seafood/

**Sample books.** Be it wallcoverings, flooring, drapery or ceramics, the world of design relies upon the sample book—large notebooks containing samples of a company's

products. "Multiple Choice: From Sample to Product" is a new Web site from the Smithsonian's Cooper-Hewitt National Design Museum that takes a close look at the history of the sample book, using examples from the Smithsonian's extensive collections. Multipurpose, and often with an accidental beauty, sample books provide a detailed view into the manufacturing processes, technological innovations, design tastes, styles and color sensibilities of other eras. In medieval times, model books with vellum pages were used as portable portfolios by itinerant artists and served as a repository of stock motifs that could be applied to sculpture, architectural ornament and textile design. The sampling formats in the Smithsonian's collections are a resource with both historic and aesthetic value, and offer an unusual window into the past.—www.cooperhewitt.org/exhibitions/multiple\_choice/

This sample plate showing available colors was Manufactured by Royal Copenhagen Porcelain Manufactory, Denmark in the 1930s.

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An opha, or moonfish  
(Charlotte Knox illustration)



This sample plate showing available colors was Manufactured by Royal Copenhagen Porcelain Manufactory, Denmark in the 1930s.

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*On the cover: This botanical type specimen of the Panamanian orchid Oncidium allenii Dressler, collected in 1942, is one of tens of thousands of dried and pressed botanical type specimens in the U.S. National Herbarium maintained by the Department of Botany at the Smithsonian's National Museum of Natural History. Recently, digital images of some 88,000 type specimens from the National Herbarium have been made available on the Internet by the Smithsonian. See story Page 3.*



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# New electronic field guide uses leaf shapes to identify plant species

By Michael Lipske  
Special to Inside Smithsonian Research

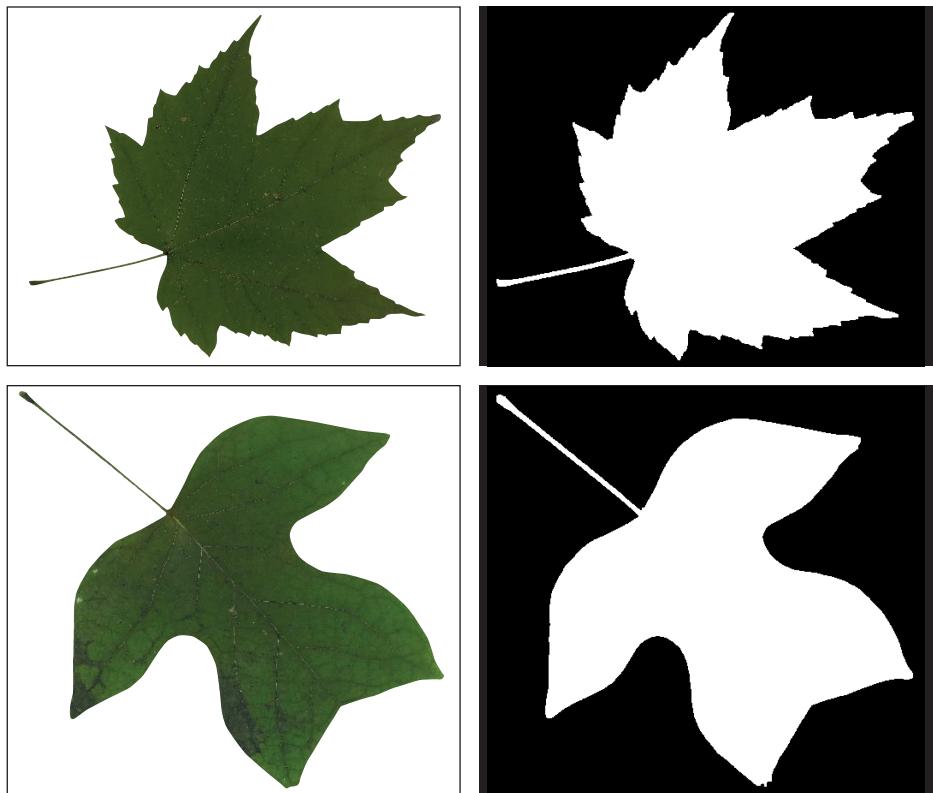
Type a word or phrase into an Internet search engine such as Google or Yahoo, hit return and in an instant, dozens of “hits”—Web sites containing words that match your query—appear on the computer screen. Now, imagine a similar database that operates not with words but with shapes, specifically, leaf shapes.

It would work like this: carry a camera cell phone into a forest, pick a leaf from a tree and snap its portrait. In an instant, the phone transmits the image to a computer that matches a silhouette of the leaf against a database of leaf shapes from thousands of plant species around the world. Exact matches for the leaf are returned to the screen of your phone along with species names and detailed botanical information.

Sound farfetched? Such a device is already very close to reality, thanks to recent collaboration between the Department of Botany at the Smithsonian's National Museum of Natural History and the computer science departments of Columbia University and the University of Maryland. Tentatively called the Image Identification System or IIS, the invention has the potential to revolutionize the identification of plant species in the field and greatly accelerate the naming of new plant species.

## Electronic field guide

For Peter Belhumeur, a computer scientist at Columbia who studies the use of computer vision to identify human faces, it all started years ago in the Connecticut woods. Belhumeur recalls just how hard it was to use a standard field guide to iden-



**Using a photograph of a leaf taken on a plain background, the Image Identification System makes a silhouette of the leaf that is then analyzed by a mathematical algorithm. Shown here are images of a maple leaf, top, and a tulip tree leaf, bottom.**

tify different tree species during walks with his children. “I rarely found the right answer on the first try,” he says.

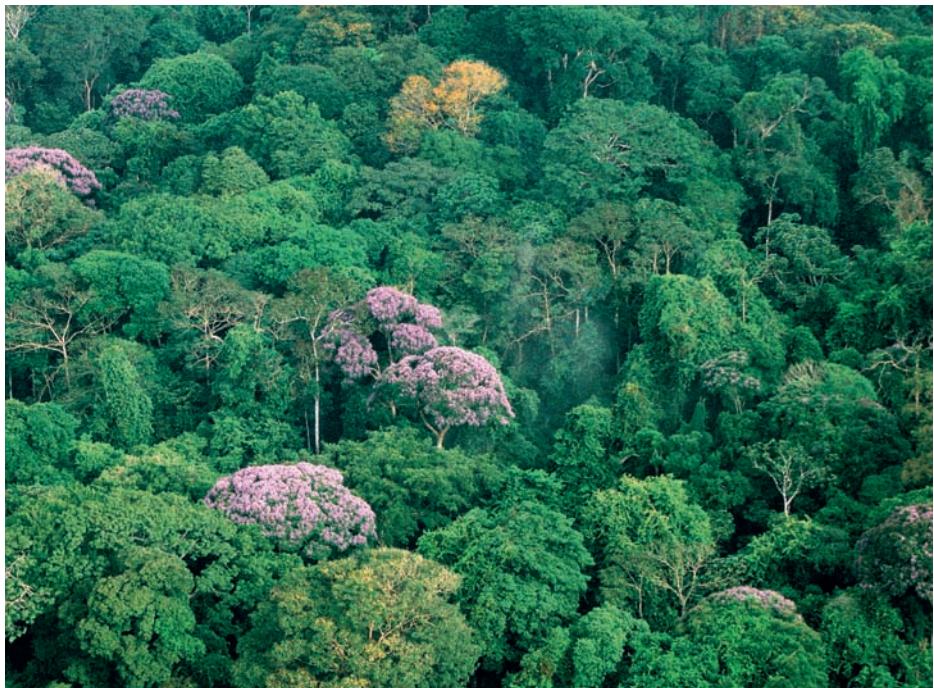
Brainstorming with computer scientist David Jacobs of the University of Maryland about possible new uses for computer object recognition, “We both thought of leaves,” Belhumeur recalls.

So in 2001, Belhumeur and Jacobs came to visit John Kress, a curator in the Natural History Museum’s Botany Department, which houses the National Herbar-

ium, a resource with 95,000 catalogued botanical type specimens—the definitive reference specimens used to identify new plant species—and an additional 4.8 million representatives of plant species from around the world.

What the scientists came up with was an ambitious plan to develop an electronic field guide—a portable system that could automatically identify a tree species

(continued)



**Above top:** A portable computer with a built-in camera easily snaps a photo of a leaf and downloads it to the Image Identification System computer. The shape of the leaf is then matched to the shape of leaves in the system's database. Matches and species details are then transmitted back to the computer. (Photo by Ida Lopez)

**Above bottom:** Many different tree species make up the forest canopy on Barro Colorado Island in Panama, which is part of the Smithsonian Tropical Research Institute. Researchers are now working to create an electronic guide to the trees and other plants on this island. (Photo by Christian Ziegler)

from the shape of one leaf. They also wanted the device to simultaneously provide researchers in remote locations Internet access to botanical data on species in the Smithsonian's database.

Soon after, the IIS prototype was born. The device operates on a mathematical formula known as the "inner distance shape context algorithm." Specifically developed for the project, the computer uses the algorithm to analyze 64 uniformly spaced points along the boundary of any given leaf. It measures and matches the distances between the points on a leaf specimen with the same data from leaves in the computer's database.

To use it, a botanist takes a digital photograph of a leaf, transfers the image to a small portable computer and, in seconds, the computer matches the photo to a series of images of similarly shaped specimens.

"In the lab, we get about 96 percent correct identifications," Kress explains. In the woods, "it's more like 75 to 80 percent."

### Race to catalog

Ultimately, the project's biologists and computer experts would like the device to be able to determine, almost instantly, if a plant is new to science.

"Speeding things up is advantageous, to say the least," Kress says. Naturalists around the world are in a race to catalog and understand biological diversity before many endangered habitats and species disappear. According to Kress, of an estimated 400,000 species of plants on Earth, as many as 10 percent have yet to be identified.

Traditional methods of identifying and describing a new species can take years. Often, a taxonomist must compare new specimens with published literature and preserved plant specimens in museums around the world.

"Comparing a new plant to all known plants, that's the time-consuming part," Kress explains. By harnessing computers to make specimen comparisons, the electronic field guide promises to greatly accelerate new species identification.

## Online archive

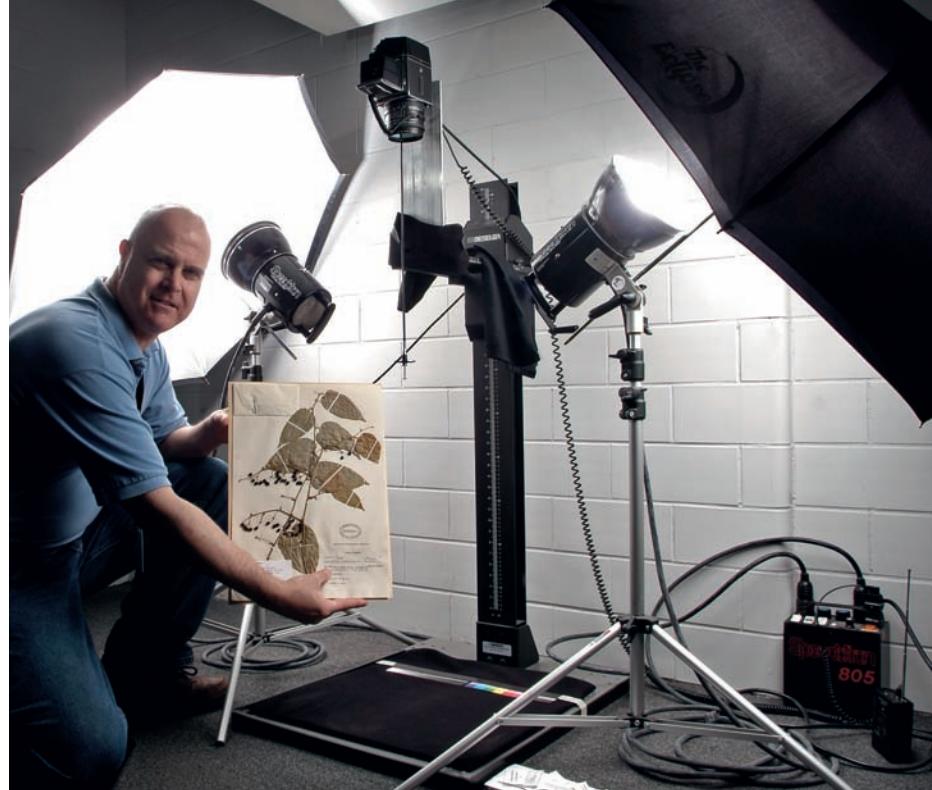
To help in that process of speedier discovery, the IIS project has recently been augmented by the completion of an online digital archive of the Smithsonian's botanical type specimens. Building on work initiated by Botany Collections Manager Rusty Russell, the project, which got underway in 2002, has created high-resolution digital images of some 88,000 plant specimens which botanists also can use in the field as a visual reference.

At the same time, Smithsonian botanists working on the project have collected thousands of leaves from 300 species of plants native to Plummers Island, a small, wooded tract in the Potomac River. Images of leaves from Plummers Island make up the database for the first working prototype of the electronic field guide. In Kress' lab at the Natural History Museum, botanist Ida Lopez gives a demonstration of how the system works.

Arranging a fresh green "unknown" leaf on a sheet of white paper, she snaps its photo with the small, digital camera built into a Sony Vaio laptop computer. In a matter of seconds, 20 thumbnail photos of potentially matching leaves appear on the computer screen.

"You can then enlarge what you think is a possible match," says Lopez, doing just that by clicking on a thumbnail photo. She compares the base of the potential matching leaf with the base of the leaf she photographed and declares them the same species, common hackberry (*Celtis occidentalis*). Just to be certain of her identification, Lopez next uses the field-guide computer to search for and study other examples of hackberry leaves from the digital archive photos of dried specimens in the Botany Department collections.

Eventually, a full set of color images of each species will be available for comparison. When Lopez finally clicks the match button on screen, the electronic field guide records the Global Positioning System coordinates of her location—useful information to help botanists using the system in the field.



**Rusty Russell, collections manager for the Department of Botany at the Smithsonian National Museum of Natural History, prepares to photograph one of the tens of thousands of type specimens in the museum's collection. Russell and colleagues have created high-resolution digital images of approximately 88,000 type specimens and posted them online at the Web address: [persoon.si.edu/types](http://persoon.si.edu/types). (Photo by James Di Loreto)**

## iPhone

The field guide isn't perfect. When Lopez and other museum botanists took it for a test drive in September in Washington, D.C.'s nearby Rock Creek Park, the autumn leaves threw it for a loop. "We had drying leaves," Lopez explains. "As the leaves dry, they tend to get distorted in shape. That was problematic." Many of the late-season leaves also had been chewed by insects, another challenge for the system's shape-matching computer algorithm.

Since creating the electronic guide to the trees on Plummers Island, the project has assembled comparable datasets for woody plants of the entire Washington, D.C.-Baltimore area and, in a nod to Columbia University's role in the project, a dataset for the 125 tree and shrub species in New York City's Central Park. Soon, Kress hopes, a fourth dataset will exist for the flora of Barro Colorado Island in the Panama Canal, part of the Smithsonian

Tropical Research Institute.

The project also is focusing on a version of the guide that might be used by anyone curious about trees in their own backyard.

"We hope to have a system for identifying the woody plants of the entire continental United States working over the iPhone in the next few years," Peter Belhumeur says.

And while it may be a while before botanists and other scientists can get their hands on a commercial version of the electronic field guide, Kress thinks demand will be strong. At a recent meeting in Mexico of some 600 tropical biologists from around the world, Lopez and post-doctoral fellow Ling Zhang put the prototype field guide through its paces.

"Everybody was approaching us and saying things like, 'Can you help us develop this for our field site in Panama?' or 'We need one of these for the dry forest of Brazil,'" Kress recalls happily. "Everybody wants this." ♦

# Archival letters reveal love and passion of some of America's best-known artists

By Topper Sherwood  
Special to Inside Smithsonian Research

**T**he legendary Hope Diamond may sparkle in its vault at another museum down the street, but at the Smithsonian's Donald W. Reynolds Center for American Art and Portraiture in Washington, D.C., something much more precious is on display. Protected under glass in a small exhibition on the first floor is evidence of a most cherished treasure sought by all—love and passion.

"A Thousand Kisses: Love Letters from the Archives of American Art" is a new exhibition featuring love letters written by such artistic luminaries as Frida Kahlo, Lee Krasner, Gio Ponti, Abbott Handerson Thayer and Xavier Gonzalez.

"If only you knew how I want you, my darling, my darling! You will know when we are together and I can prove it," reads an 1889 letter by American painter Walter



Gay (1856-1937) to his fiancée Matilda Travers (circa 1866-1943).

"My soul hangs upon your love—my lips burn to touch your neck—your eyes—your fingertips," sculptor John Storrs (1885-1956) wrote his wife, Marguerite De Ville Chabrol (1881-1959), in 1926.

Accompanied by photographs of artists with their wives, husbands and lovers, these written vows of love and affection—many featuring intimate and humorous illustrations—offer a vivid look at the passion of some of America's best-known artists.

## Passion

"We wanted to find letters that told us something about the artists themselves; or those defining a historically important moment," says Liza Kirwin, curator of the exhibition and a 28-year employee of the Smithsonian's Archives of American Art. "And, of course, we were looking for passion."

In some cases, they hit all the marks. Take, for example, a 1953 letter by Finnish-born architect Eero Saarinen (1910-1961) to Aline Bernstein (1914-1972). Bernstein, an art editor and critic for The New York Times, had met with Saarinen for an article on the General Motors Technical Center in Warren, Mich. In his letter to Bernstein, Saarinen describes his sudden attraction to her and embellishes the paper with architectural sketches and notes on projects he had on his mind: the Milwaukee Cultural Center, a site for the University of Michigan and the Kresge Auditorium and Chapel at the



**Left:** Aline and Eero Saarinen appear together in this 1955 boating photograph from the Aline and Eero Saarinen papers of the Archives of American Art.

**Above:** This handwritten note "I am in a hurry, back in 10 m." was done by painter Xavier Gonzalez (1898-1993) for his wife Ethel Edwards (1914-1999). It is in the Xavier Gonzalez papers of the Archives of American Art.

**Opposite:** Artist Frida Kahlo (1907-1954) planted a lipstick kiss on this letter, written in Paris on Feb. 27, 1939, to artist Nickolas Muray (1892-1965). It is in the Nickolas Muray papers of the Archives of American Art.

Massachusetts Institute of Technology.

"[T]he thing I liked most about the monument," he wrote, perhaps referring to the Milwaukee County War Memorial, "was that it was a beautiful result of you and I being close together—the funny thing about it is that it proves your point...that I translate everything into architecture."

Saarinen—who is also known as the designer of air terminals at Dulles and Kennedy airports and the Gateway Arch in St. Louis—expressed a desire for a long courtship. But, throwing caution to the wind, the architect was soon divorced from his wife of more than 10 years and remarried to Bernstein, in whom he found "a soul mate, a partner and a passionate advocate of his work," Kirwin writes in the exhibition.

"Their love affair was very much entwined with his architecture career," Kirwin says. "They connected on so many different levels."

### Inside jokes

Kirwin's familiarity with the archives led her immediately to some of the letters she was seeking. Lesser-known love letters, however, were more difficult to find, forcing the archivist to search the database, catalogs and the collection itself "in funny ways," she says.

"I did a [database] search on 'love,' but we don't catalog along those lines," she explains. "So I searched for 'fiancée,' 'wife' and 'husband.'"

But locating the letters was just the beginning. There are the demands of transcription. Aside from differentiating a slip of the pen from the cross of a 't', the editors had to identify names of friends, inside jokes, outdated phrases and even intimate nicknames. They came across one puzzler in a letter by painter Elliot Orr (1904-1997), who addressed his wife, Elizabeth (1908-2002), as his "Dearest Piepet." What could this mean? Could the letter have been intended for someone else? A family member offered the probable answer: Elizabeth Orr worked in a

medical lab. "Pipette," referring to a piece of lab equipment, may well have served Orr as a term of endearment.

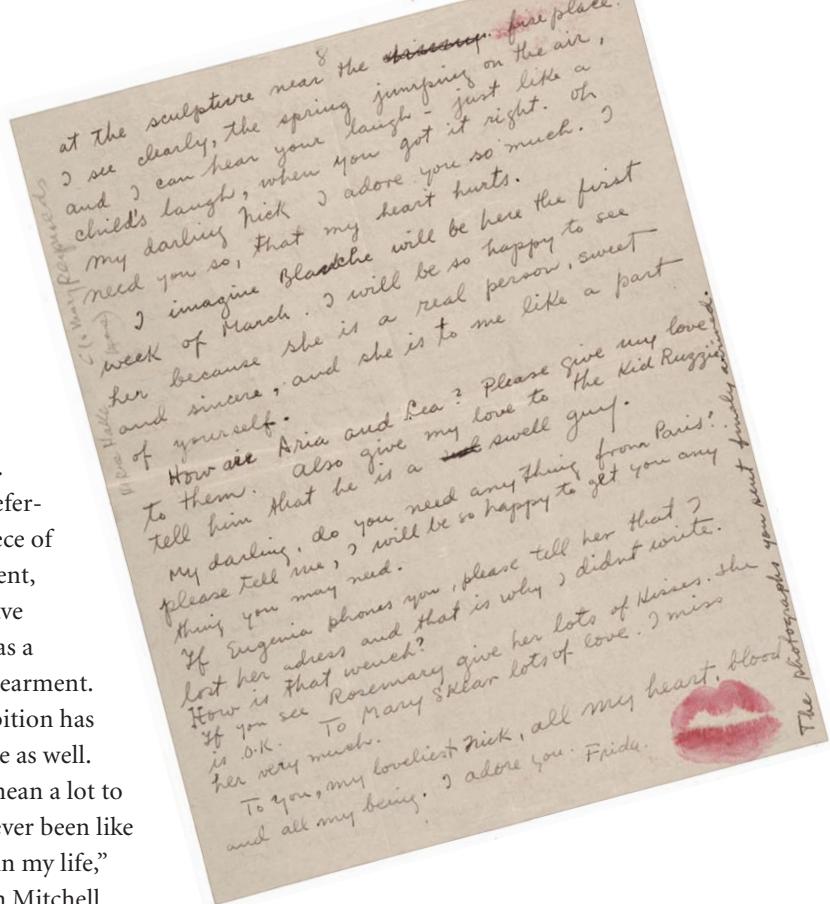
The exhibition has a darker side as well. "God you mean a lot to me—it's never been like this before in my life," painter Joan Mitchell (1925-1992) writes to

Michael Goldberg (born 1924), a fellow abstract painter for whom Mitchell left her husband. "I'm using the paint off your palette—I feel so close to you," she continues. At the time Goldberg was at the Rockland State Hospital in Orangeburg, N.Y., where he was spending six months in lieu of doing prison time for writing fraudulent checks from the account of Mitchell's husband.

"I miss you and wish you were sharing this with me...It would be wonderful to get a note from you," abstract painter Lee Krasner (1908-1984) wrote to her husband, artist Jackson Pollock (1912-1956), from Paris in 1956. At the time their marriage was in trouble. Three weeks later, while still vacationing in Paris, Krasner learned of Pollock's death in a car crash.

### Hard copy

The tone of the letters ranges from the overtly sexual to parental doting, and even to fan-mail. While the exhibition plays to the "voyeur within," it is voyeurism, quite literally, of the highest art; an exercise that brings life and spark



to our understanding of history. Kirwin wonders how blog-it-all generations of the future will understand something as exotic as a piece of intimate, eagerly awaited "hard copy" like the letters in "A Thousand Kisses."

"A lot of these letters were about the endurance of desire," Kirwin explains. "A letter would take forever to get to its destination, and then the writer had to wait forever for the response. They couldn't just pick up the telephone. Relationships and courting developed over long periods. This is something that may be lost to people today, because of the instant access that we have."

The exhibition is accompanied by a book, *With Love: Artists' Letters and Illustrated Notes* (Collins, 2008) by Kirwin and Archives Specialist Joan Lord. ♦

"A Thousand Kisses: Love Letters from the Archives of American Art" will be on view at the Donald W. Reynolds Center for American Art and Portraiture through June 2, 2008.

# Rising acidity of estuary waters may spell trouble for oysters and other shellfish

By Kimbra Cutlip  
Smithsonian Environmental Research Center

**S**ince the onset of the Industrial Revolution 200 years ago, carbon dioxide levels in the atmosphere have increased by 35 percent. During this time, the world's oceans and waterways also have been soaking up excess carbon and growing more acidic in the process. For oysters, clams, scallops and other shellfish with calcium carbonate shells, this increased acidity may have dire consequences, causing their shells to grow more slowly, grow not at all, or, in some cases, begin to dissolve.

Already under siege from overfishing, disease and poor water quality, the oyster population in the Chesapeake Bay today stands at 2 percent of what it was in colonial times.

How oysters will respond to the growing acidification of the oceans in coming decades and what impact their demise could have on the environment remains a critical question for biologists. Oysters serve as filters for the Bay, and their reefs provide habitat for juvenile crabs and fish.

"We're going to see acidified oceans and coastal ecosystems no matter what we do," says Ecologist Whitman Miller of the Smithsonian Environmental Research Center on the Chesapeake Bay. "The \$64,000 question is: What will the biological and ecological response be to these changing conditions?"

## Larvae response

In a laboratory filled with small three-liter aquaria, each of which has been inoculated with 15,000 microscopic oyster larvae, Miller has begun tackling this question. He is feeding and caring for the oysters as he studies their response to varying levels of CO<sub>2</sub> in their water.

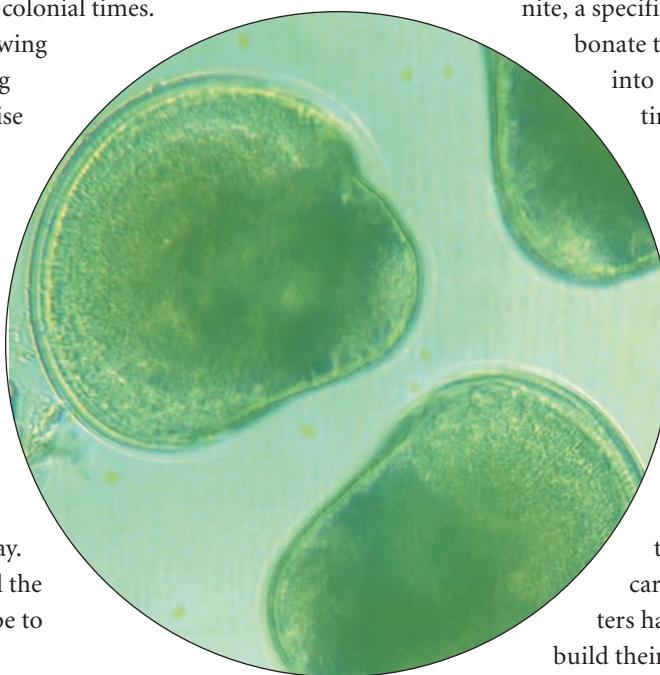
Some of Miller's aquaria contain water at levels of CO<sub>2</sub> that re-

flect current atmospheric concentrations. The other aquaria contain more CO<sub>2</sub>, some at concentrations anticipated 50 years from now and others at concentrations anticipated 100 years from now. Miller is carefully monitoring the oysters' growth, the amount of calcium in their shells and their rates of survival.

A few hours after emerging from their eggs, oyster larvae look a lot like tiny adult oysters with a thin shell and beating cilia that propel them through the water. They spend three to four weeks as free-swimming larvae, feeding on tiny algae, before settling down to begin the rest of their lives attached firmly to some hard surface.

During this larval phase, oysters incorporate aragonite, a specific crystalline form of calcium carbonate that they extract from the water, into their shells. As adults, they continue to build shell, but by using calcite, a slightly different form of calcium carbonate.

For shellfish, the problem begins when CO<sub>2</sub> dissolves in seawater and creates carbonic acid that is rapidly transformed into carbonate and bicarbonate ions in the water. Increased acidity caused by higher CO<sub>2</sub> levels tips the balance toward bicarbonate formation and away from carbonate. Less carbonate in the water means the oysters have less material with which to build their shells. If the water is acidic enough, oyster shells will even begin dissolving.



## Already vulnerable

Miller is interested in the early life stages of oysters because he wants to know more about the vulnerability of these bivalves during this very crucial point in their life cycle. He intends also to investigate acidification's effect on adult oysters and other calcifying species, eventually taking his experiments into the field.

**Opposite:** Oyster larvae, shown here under a microscope only days after hatching, take on the shape of an adult oyster. Their shells are thin and translucent and they propel themselves through the water with cilia that protrude from the rims of their shells. (Photo by Amanda Reynolds)

**Right:** Whitman Miller collects oyster larvae from one of the experimental treatment cultures that he maintains in his laboratory at the Smithsonian Environmental Research Center in Edgewater, Md. (Photo by Kimbra Cutlip)

"Perhaps in the future, bivalves and other calcifiers will begin to lose out to competition with noncalcifiers," he says, "or interactions of low pH [higher acidity] with known stressors like disease will conspire to attack an already vulnerable organism."

This may already be happening in the Chesapeake Bay, he says. "Oysters are holding on, but we know disease and overfishing have troubled them." Miller suggests that higher levels of CO<sub>2</sub> in the water may already be having an impact on oyster populations, but it is a subtle impact that scientists have yet to identify clearly.

Teasing apart how the gradually rising levels of CO<sub>2</sub> absorbed into the water from the atmosphere is impacting coastal ecosystems presents quite a challenge. These environments are extremely complex, and many factors affect them. In addition to the CO<sub>2</sub> that bays and estuaries absorb from the atmosphere, nutrient runoff from land and carbon input from marshes and many other sources contribute to the problem.

"Most researchers [working on impacts of atmospheric carbon dioxide] are looking at pelagic systems—open ocean systems—where carbon dioxide input and outputs are somewhat simpler and conditions are much more constant—as in, no complicating inputs from land, etc.," Miller explains.

In other areas of the oceans, "experts are already seeing a grim picture of what acidification can do to corals, mollusks, foraminifera and some plankton. In some cases, they're seeing the dissolving of coral structures," Miller says. "We know we will see a loss of biodiversity along with loss of critical habitats created by coral reefs, but what about estuaries? Nobody's looking.

"The Smithsonian Environmental Research Center is an ideal place to begin looking at acidification of estuaries because of our already rich history in long-term studies on the impacts of carbon dioxide on plant and marsh communities," Miller adds.

When combined with the decades of environmental research that the Environmental Research Center has focused on atmospheric CO<sub>2</sub> and its effect on the Chesapeake Bay watershed, "extending our CO<sub>2</sub>-global change studies into the water is a natural step, and one that is urgently needed." ♦



*Miller suggests that higher levels of carbon dioxide in the water may already be having an impact on oyster populations.*

# Hypervelocity stars: Fast-moving exiles of the Milky Way

By Christine Pulliam  
Smithsonian Astrophysical Observatory

**B**eyond the edge of the Milky Way galaxy, a star flies through space a thousand times faster than a speeding bullet. The voyager is screaming along at 1.5 million miles per hour, or 430 miles per second. At that speed, it is destined to escape the gravitational pull of our galaxy and to travel—exiled for all time—through the blackness of intergalactic space.

How could any star be flung outward at such a speed? Discoverer Warren Brown, an astronomer at the Smithsonian Astrophysical Observatory in Cambridge,

Mass., points to the giant black hole at the center of the Milky Way.

“It’s paradoxical, but a black hole doesn’t always suck in whatever gets close,” he explains. “In rare circumstances, a star that’s part of a pair can be ripped from its partner and launched through space at an amazing speed.”

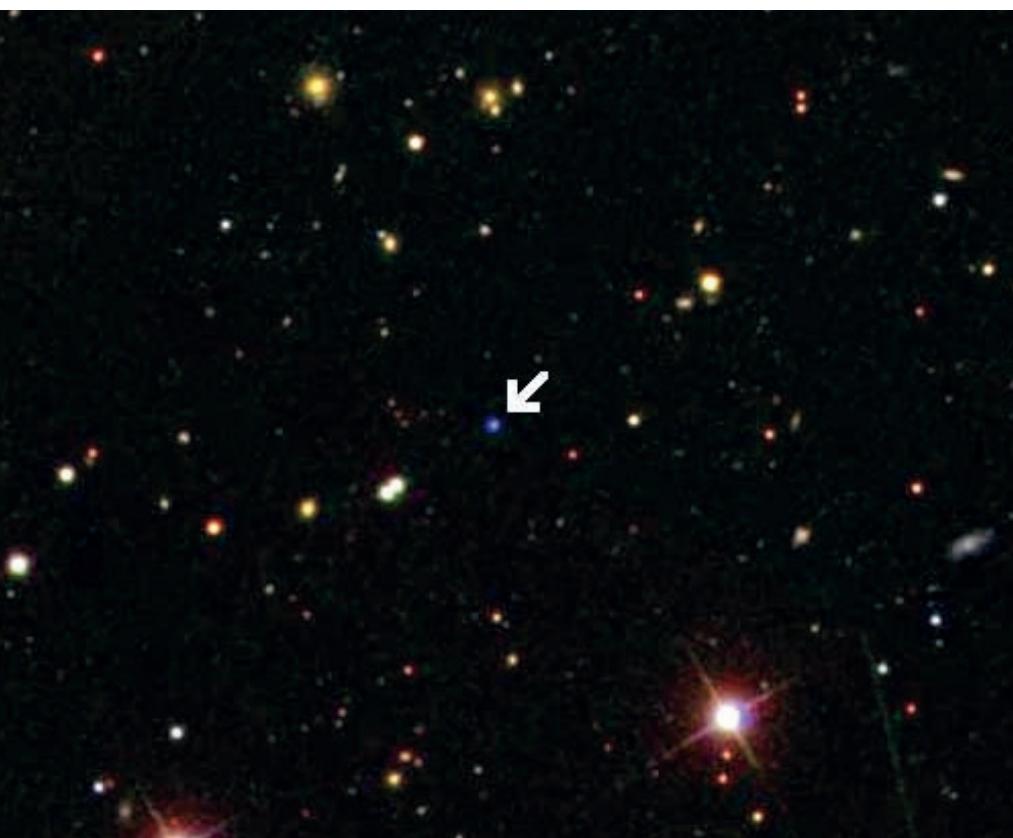
To make a hypervelocity star, as astronomers call them, a pair of stars orbiting each other must brush close to the giant black hole at the Milky Way’s center. One star is captured into orbit around the black hole, while its partner is released

and flung into space by the immense gravity of the black hole like a stone from a slingshot.

## Astonishing oddball

Although predicted to exist in 1988, the discovery of the first hypervelocity star came as a complete surprise. Brown intended to look for “streams” of stars—groups of stars all moving in the same direction. Star streams form when the Milky Way cannibalizes a smaller galaxy, tearing it apart and absorbing its stars.

While measuring the motions of his tar-



**Left:** An arrow points to the second of two newly discovered hypervelocity stars in this photograph from the Sloan Digital Sky Survey. Astronomers estimate this star to be moving at 1.43 million miles per hour, a speed that will eventually carry it far beyond the Milky Way Galaxy. It is currently located about 180,000 light-years from Earth.

**Opposite:** Most hypervelocity stars are destined to drift far beyond their galaxies and into the depths of intergalactic space. This artist’s conception shows a hypervelocity star moving into deep space after leaving the Milky Way Galaxy. (Image by Ruth Bazinet)



get stars, Brown spotted an oddball. Its speed was astonishingly fast.

At first, it was hard to believe the surprising result, Brown says. "When I showed the data to [senior Smithsonian astronomer] Margaret Geller, she exclaimed, 'You have a what?'"

After finding the first hypervelocity star, Brown began a systematic hunt for more using the Multiple Mirror Telescope Observatory in southern Arizona. He examined an area of sky 8,000 times larger than the full moon and discovered nine additional hypervelocity stars. Other astronomers joined the hunt, and now about a dozen such stars are known. On average, one star escapes the galactic center of the Milky Way every 100,000 years, so many more hypervelocity stars likely await discovery.

"There's a whole half of the sky we haven't searched yet—the southern sky," Brown adds.

Astronomers estimate that about 1,000 hypervelocity stars are speeding through our galaxy. By comparison, the Milky Way

contains about 100 billion stars in total, making the search for hypervelocity stars much more difficult than finding the proverbial "needle in a haystack."

### Exchange program

An even greater challenge would be finding stars that have traveled to the Milky Way from neighboring galaxies. For example, the Andromeda spiral galaxy also has a central black hole that could occasionally toss stars across space and into our Milky Way galaxy. However, only long-lived stars can survive the journey.

Closer galaxies offer a better possibility. Earlier this year, astronomers announced the discovery of a hypervelocity star that came from a small, nearby galaxy known as the Large Magellanic Cloud.

"You could say we have an exchange program going," Brown suggests. "Some Milky Way stars travel to other galaxies, while an occasional star from those galaxies finds its way here."

Asked if we should worry about a rogue star blundering through our neighbor-

hood, Brown laughs and shakes his head. "Not at all. There's a lot of empty space between the Milky Way's stars, and very few hypervelocity stars are being thrown outward. The chances of any getting close to us are astronomical."

Although our solar system is safe, any planets orbiting a hypervelocity star would have a rough time. It takes a close pair of stars to create a gravitational sling-shot. In such a star system, planets could only form in the outskirts, circling both stars in a wide orbit. As the star system passed by the black hole, those planets would be ripped away and lost to cold, interstellar space.

### Back in time

Beyond the amazement factor, hypervelocity stars offer opportunities to learn about our galaxy. The Milky Way's center is obscured by dust and gas, making it difficult for astronomers to study the black hole and surrounding stars. Yet the types of hypervelocity stars that Brown finds tell astronomers about the types of stars orbiting near the central black hole.

By looking for patterns in the locations and ejection times of hypervelocity stars, astronomers also can infer what happened in the galactic center millions of years ago.

As they travel across great distances, hypervelocity stars are influenced by the gravitational pull of the Milky Way's stars, hydrogen gas and unseen "dark matter." By running the motions of these travelers backward in time, astronomers can learn about the galaxy's structure.

"It's another way of studying the shape of the Milky Way and how its constituents are distributed," Brown says.

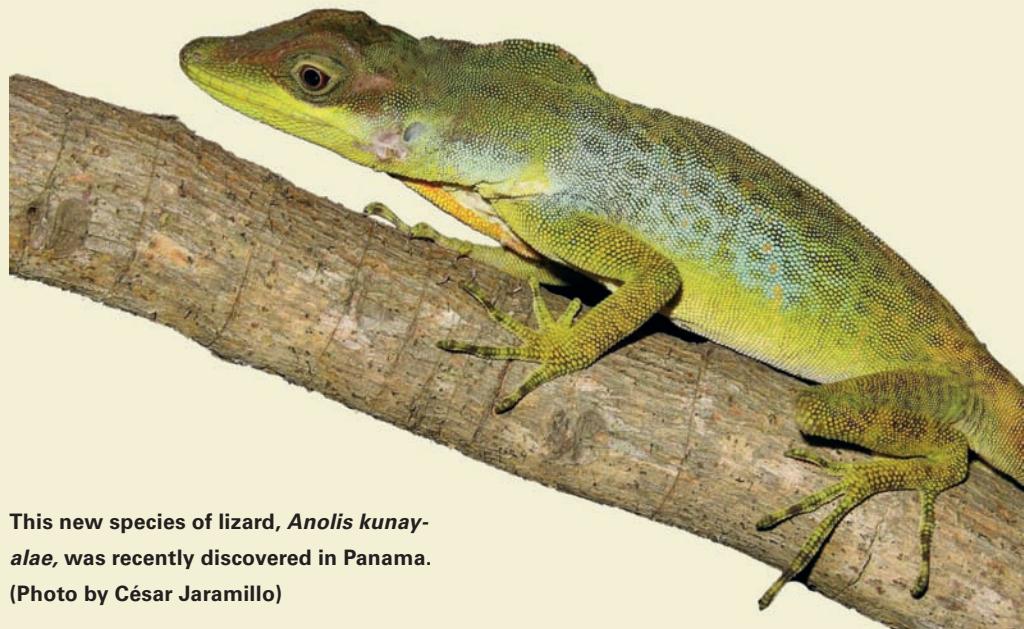
Each newfound hypervelocity star is as prized as a rare gem. The beauty of these stars lies not in their outward appearance, but in what their sensitive measurements reveal about their dramatic history, and in what they can tell us about our galactic home. For that reason, astronomers will continue to prospect for more hypervelocity stars. ♦

**Desert meteorites.** A collection of 921 meteorites recovered from the Sahara Desert in Algeria and Libya and from the Oman desert were recently acquired by the Department of Mineral Sciences in the Smithsonian's National Museum of Natural History. The collection includes a rare lunar breccia and a remarkable carbonaceous chondrite that may be the best known record to date of the materials and processes that operated in the Solar Nebula before the formation of planets. The acquisition of these rare meteorites from a private collector ensures that they are now permanently available to researchers.

**Leading ladies.** At a January ceremony in the historic El Portal Theater in North Hollywood, Calif., nine legendary leading ladies of American motion pictures, televi-



Carol Channing with her dress from "Lorelei." (Photo by Bill Dow)



This new species of lizard, *Anolis kunayalae*, was recently discovered in Panama.  
(Photo by César Jaramillo)

sion and Broadway gathered to donate objects from their award-winning careers to the Smithsonian's National Museum of American History, Kenneth E. Behring Center. The items included Carol Channing's diamond dress from the Broadway production "Lorelei"; Tippi Hedren's script from the movie "The Birds"; Florence Henderson's People's Choice Award; Angela Lansbury's costume from the Broadway hit "Mame"; June Lockhart's 1947 Tony Award; Julie Newmar's original Catwoman suit from the TV show "Batman"; and a bequest of Esther Williams' scrapbooks from her days as an MGM star.

**Museum study.** Freelon Bond, an architectural and design association, has been hired by the Smithsonian's National Museum of African American History and Culture to conduct an 18-month study to examine the various needs of the new museum—technology, acoustics, fire protection and security—which is expected to open in 2015 in Washington, D.C. The study team is holding a series of meetings and focus groups across the country to gather ideas about what type of visitor-oriented features should be included in the museum.

**Portrait Gallery.** Martin Sullivan, chief executive officer of the Historic St. Mary's City Commission in Maryland, was named director of the Smithsonian's National Portrait Gallery, effective April 28. Sullivan also has served as director of the Heard Museum, an internationally renowned museum of American Indian cultures and art in Phoenix; director of the New York State Museum in Albany; and as assistant commissioner for museums in the New York State Education Department. Sullivan succeeds Marc Pachter, who retired as director of the Portrait Gallery on Jan. 25.

**New lizard.** A distinctive new species of *Anolis* lizard was recently discovered in Panama by a team of scientists that included Roberto Ibáñez, a researcher at the Smithsonian Tropical Research Institute. Named *Anolis kunayalae*, the male lizard of this species has an aqua color on its neck and a distinctive orange border on its dewlap—the fold of loose skin under its throat. A unique fourth toe found on *A. kunayalae* lizards, which average just under 12 inches in length, indicate they may be closely related to two other Panamanian lizards, *A. mirus* and *A. parilis*.

## *G. Wayne Clough named 12th Secretary of the Smithsonian Institution*

On March 15, the Smithsonian's Board of Regents announced that G. Wayne Clough, president of the Georgia Institute of Technology, had been unanimously elected the 12th Secretary of the Smithsonian. Clough, 66, became president of Georgia Tech in 1994 and transformed it into one of the top public universities in the country. During his tenure, Georgia Tech's academic reach expanded across the world, with campuses in France, Ireland, Singapore and Shanghai. Annual research expenditures increased from \$212 million to \$425 million; enrollment increased from 13,000 to more than 18,000; and the university consistently ranked among the nation's top 10 public research universities.

While improving Georgia Tech's reputation for science, Clough also emphasized the importance of humanities education. He established two endowed chairs in poetry and strengthened the university's commitment to public policy and service.



**G. Wayne Clough**

Clough currently serves on the President's Council of Advisors on Science and Technology and on the National Science Board, the governing body of the National Science Foundation. Both appointments required Senate confirmation. He is vice chair of the U.S. Council on Competitiveness, a nonprofit focused on eliminating barriers that make the United States less competitive in the sciences, wireless communication and innovation.

Clough has spoken and written extensively about innovation, higher education policy, diversity, economic development and technology. He received nine national awards from the American Society of Civil Engineers, most recently, the OPAL Lifetime Achievement Award for contributions to education.

Clough also has served as provost and vice president of academic affairs at the University of Washington and dean of the College of Engineering at Virginia Polytechnic Institute and State University.

Born in Douglas, Ga., Clough married his wife, Anne, during his junior year at Georgia Tech. They have two children: Mathew, a 1994 graduate of Virginia Tech, and Eliza, who attends college in Virginia.

Clough succeeds Lawrence M. Small, who resigned as Smithsonian Secretary March 26, 2007.

## *Smithsonian and University of Alberta join to conserve Folkways' cover material*

When the Smithsonian Institution acquired Folkways Records from the estate of its founder, Moses Asch, in 1987, it received all of the company's business papers and files in addition to a complete catalog of its recordings. Among these materials were more than 2,000 envelope files, called "job bags," containing photographs, artwork, cover text and other production materials for each of Folkways' distinctive album covers.

Now, researchers from Smithsonian Folkways Recordings and the University of Alberta in Canada are collaborating to document and preserve the contents of these job bags. Recently, Margaret Asch, daughter-in-law of Moses Asch, and Lorna Arndt, project manager of the University of Alberta's FolkwaysAlive! program, visited the Smithsonian's Ralph Rinzler Folklife Archives and Collections

in Washington, D.C., where the Folkways Records collection is housed, to launch a careful examination of this material.

Asch and Arndt examined cover material for some 200 Folkways albums, documenting items, making note of the importance of the items in each file and noting the presence of anything in need of conservation. At the start, Nora Lockshin,



**Margaret Asch, right, and Lorna Arndt examine cover art from a Folkways recording. (Photo by Owen Macdonald)**

paper conservator at the Smithsonian Institution Archives, briefed Asch and Arndt on the proper handling of archival materials. Further work will be continued by interns under the supervision of Stephanie Smith, assistant archivist at the Rinzler Folklife Archives and Collections.

"It is evident that Moses Asch put a great deal of effort into the materials that went along with the recordings," Asch says. "He felt his recordings were documents, and that every one needed its own documentation and visual art to create a complete understanding."

In 1985, Moses Asch donated a collection of Folkways record albums to the University of Alberta, where his son, Michael, worked as an anthropologist. His donation was the genesis of the university's FolkwaysAlive! program.

—Donald Smith



**Superdove: How the Pigeons Took Manhattan...and the World**, by Courtney Humphries (Collins, 2007, \$29.95). The fascinating story, including evolutionary and cultural history, of that often reviled yet vastly misunderstood creature—the pigeon.

**America's Hidden History**, by Kenneth C. Davis (Collins, 2008, \$31.95). In this dazzling new book, one of the country's most popular historians illuminates some of the "hidden history" that schoolbooks leave out, such as the identity of the real first Pilgrims to America and the little-known story of George Washington as a headstrong young soldier.

**How the States Got Their Shapes**, by Mark Stein (Collins, 2008, \$23.50). In a light, accessible style, the author deciphers the mysteries of the American map, state by state and border by border. Packed with fun oddities and trivia.

**Smithsonian Field Guide to the Birds of North America**, by Ted Floyd (Collins, 2008, \$28.95). An authoritative text from the world's foremost birding expert, this astonishing paperback resets the bar for birding guides, with more than

2,500 color photographs, 730 new color maps and information on 730 North American species.

**Glorious Mud! Ancient and Contemporary Earthen Design and Construction in North Africa, Western Europe, the Near East, and Southwest Asia**, by Gus Van Beek with Ora Van Beek (Smithsonian Institution Scholarly Press, 2007, \$99.95). Van Beek, a curator in the Anthropology Department of the Smithsonian's National Museum of Natural History, explores the history, characteristics, advantages and disadvantages of earthen construction.

**A Tribute to Gonzalo Asencio, "Tío Tom"** (Smithsonian Folkways Recordings, 2008, \$15). This singing and all-percussion tribute to the late "street hero" Tío Tom boasts the all-star line-up of Conjunto Todo Rumbero, led by renowned drummer Orlando "Puntilla" Ríos.

**Tony Trischka Territory** (Smithsonian Folkways Recordings, 2008, \$15). One of the most innovative and respected musicians in his field, Tony Trischka showcases the banjo and its rich history using spec-

tacular technique and demonstrating a wide array of influences.

#### **La India Canela: Merengue Típico from the Dominican Republic**

(Smithsonian Folkways Recordings, 2008, \$15). An unparalleled collection celebrating the traditional style of merengue music integral to Dominican culture, featuring performances by premier accordionist La India Canela.

**Classic African American Gospel from Smithsonian Folkways** (Smithsonian Folkways Recordings, 2008, \$15). Spirituals, guitar evangelists, "shout" bands, quartets and choirs sing out the sacred sounds of African American gospel music in select recordings spanning more than a half-century.

*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.*

## Von Braun: Dreamer of Space, Engineer of War

By Michael Neufeld (Alfred A. Knopf, 2007, \$35)

In the new book *Von Braun: Dreamer of Space, Engineer of War*, Smithsonian National Air and Space Museum Researcher Michael Neufeld describes German rocket engineer Wernher von Braun as having made a “Faustian bargain” with the leaders of the Nazi Reich that first employed him. This image of the classic “deal with the devil” works well, and on a number of levels.

A researcher and curator at the Air and Space Museum since 1988, Neufeld has combed through countless yards of documentation to bring readers a fascinating volume. In *Von Braun*, we have a vivid portrait of a man who steadfastly nurtured his childhood dream of designing rockets for space travel—a vision that clearly obscured any moral reservations he might have had about his government’s demand for the V-2 rocket as a “wonder weapon” against the Allies in World War II.

After Germany’s surrender, von Braun became a “founding father” of the space program in the United States, appearing as its most high-profile advocate in popular print and broadcast media of the 1950s and 1960s.

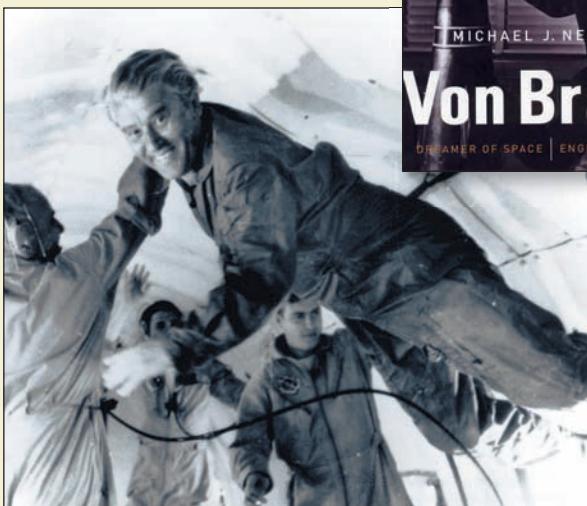
“The challenge of studying von Braun,” Neufeld says, “is that there is little that is personal from the first half of his life. Then you have the material describing the second half—and it is huge.”

Neufeld pored through 160 linear feet of mostly postwar documents in the Library of Congress and the U.S. Space and Rocket Center in Huntsville, Ala. He spent years

on fact-finding missions, notably to the von Braun’s ancestral home, now in Poland, and to the German Federal Archive in Koblenz, where von Braun’s father’s correspondence is stored.

“I actually like digging through all those papers,” Neufeld says. “I enjoy the detective work, finding new documents...shedding light on things that I never knew happened, or existed.”

The detective work was substantial. Von Braun’s friends and family were re-



**Wernher von Braun in the Air Force zero-G training plane, August 1968**

luctant to explore the engineer’s German career. Some of this material became volatile media fodder after von Braun’s death in 1977, including his membership in Heinrich Himmler’s SS and his proximity, at least, to the horrific abuse of enslaved laborers.

Neufeld sheds a vivid light on these events. The reader bears witness to the elation of von Braun and his collaborators as their early rocket experiments win astoundingly generous funding from the rising National Socialist government.

Later, Neufeld shares the record of SS commander Heinrich Himmler’s desire to bring von Braun’s rocket program under his authority, pressuring the scientist in 1940 to join the notorious Nazi party auxiliary. In 1944, von Braun rebuffed Himmler’s last offer—unmindful of the

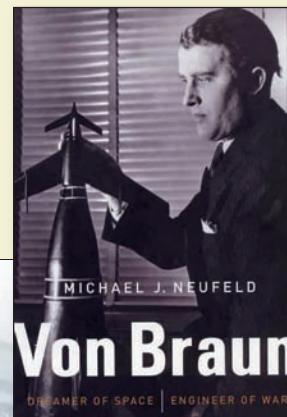
Reichsführer’s personal warning that the rocket “has ceased to be an engineer’s toy”—and the SS had him jailed for several days.

Neufeld brings a range of documentation and detail to the work, all of it well-applied to drive the story. Through every turn of events, technological or political, we are always aware of Von Braun’s emotional investment in manned space flight and the earthbound forces he had to marshal to achieve it. The author guides the reader through von Braun’s witness of Neil Armstrong’s first steps on the moon, and the engineer’s ensuing struggles within NASA.

For the contemporary reader, it is interesting to hear von Braun bemoan the fact that a Vietnam-weary public had suddenly turned “anti-science,” thus feeding Washington’s new political and financial emphasis on “cost-effectiveness” above projects that literally reached for the stars.

Neufeld has taken an extremely challenging subject and produced a well-researched book that is also a good read. He neither indulges in hero worship nor rushes to judgment—dual temptations for other writers—making *Von Braun* a victory over myriad “Faustian bargains” the biographer could have struck for himself.

—Topper Sherwood



## Jenny Holzer's "truisms" enliven the American Art Museum's Lincoln Gallery

Reflecting a bright, white light upon the arched galleries and marble floors of the Smithsonian American Art Museum's historic Lincoln Gallery, Jenny Holzer's new text-based installation, "For SAAM," grabs the attention like a Times Square marquee. Wrapped around a 28-foot column packed with light-emitting diodes, foot-tall characters in varying fonts scroll an endless litany of short statements, or "truisms," that have long been Holzer's artistic calling card. The sculpture features texts taken from four of Holzer's series "Truisms," "Living," "Survival" and "Arno."

Unlike a public marquee however, viewers must struggle to read the sentences on the sculpture. Focusing on just one line of text is like listening to a single conversation in room filled with loud voices—concentration is required. Those who persevere are rewarded with such statements as: "Having two or three people in love with you is like money in the bank," "Reptiles don't show much but are valued as exotica," or "Rechanneling destructive impulses is a sign of maturity." The sculpture offers no time to ponder the meaning of



**Jenny Holzer's "For SAAM," a site-specific work at the Smithsonian's American Art Museum, pulsates with lively aphorisms. (Photo by Gene Young)**

the statements before one vanishes and another takes its place.

Since the late 1970s, Holzer has exhibited her text-based art in public places in such cities as Paris, Rome, Venice, Buenos Aires, Berlin and New York. Her truisms have appeared on everything from T-shirts and granite benches to projections on large buildings and even the undulating surface of the ocean. "For SAAM," is the first major light-emitting diode piece by Holzer in a Washington, D.C., museum collection and is the only work by Holzer on public view in the city. The sculpture is a site-specific installation that was commissioned by the American Art Museum.

One of the truisms that flashes across the face of "For SAAM" reads "Drama often obscures the real issues" and it would be easy to let the flashy, high-tech drama of this sculpture obscure its overall meaning. Taken as a whole, "For SAAM" seems to embody a few insights not found on its vibrant surface: Truth has hundreds of guises. Truth's perception is fleeting. It is up to you to sort out what it all means.

—John Barrat

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