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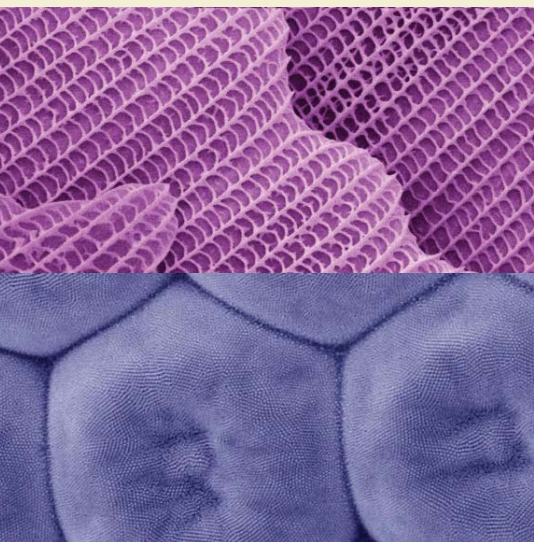
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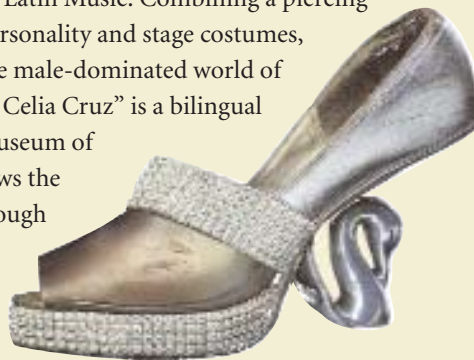
Nature up-close. When scientists at the Smithsonian's National Museum of Natural History need a close-up view of the tiny scales on a butterfly's wing, the venom pores on a spider's fangs or the minute teeth of a snail, they take their specimens to the museum's Scanning Electron Microscopy Laboratory. By processing data from an electron beam



scanned across a specimen's surface, the instrument allows scientists to see specimens at magnifications vastly greater than the capacity of optical microscopes. In the museum, the scanning electron microscope is used mainly to capture the morphological details of animals and plants for taxonomic study. The results are first-rate science, as well as stunning views of nature on a nanometer scale. A new Web site featuring images from the laboratory includes close-ups of spiders, golden threads from a Sikh ceremonial costume and dinoflagellates, the single-celled organisms that make up plankton.—www.nmnh.si.edu/highlight/sem/highlight/SEM_main.htm

Wing scales of a red-banded hairstreak butterfly (top) and lens facets in the eye of the same species (bottom), as seen by the scanning electron microscope

Celia Cruz. Starting from a humble childhood in Havana, Celia Cruz (1925-2003) went on to achieve world-renown as the Queen of Latin Music. Combining a piercing and powerful voice with a larger-than-life personality and stage costumes, Cruz was one of few women to succeed in the male-dominated world of salsa music. "¡Azúcar! The Life and Music of Celia Cruz" is a bilingual Web site from the Smithsonian's National Museum of American History, Behring Center that follows the high points of the singer's life and career through photos, personal documents, costumes and music. The site complements a new exhibition on Cruz at the museum in Washington, D.C. On the Web site, dozens of photos document her life in Cuba and Mexico, the many musicians with whom Cruz collaborated, and her life in New York City in the 1960s and beyond. A discography features the covers of many of her LPs and audio samples of favorite songs.—americanhistory.si.edu/celiacruz



Silver shoe worn by Ceila Cruz

Editor's Note: An article in the Summer 2005 issue on the coastal plain swamp sparrow should have more clearly explained isotope-ratio mass spectrometry. In samples of the sparrow feather tissue, scientists measured the ratio of occurrence of the hydrogen isotope, deuterium, to the more abundant hydrogen atoms found in the tissue. It is this ratio that varies geographically and helped pinpoint where the sparrow winters.

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On the cover: This image of the tail of the Smithsonian National Air and Space Museum's 1931 midget racing plane, Buster, was taken by Air and Space Museum photographer Carolyn Russo and will appear in the 2007 exhibition "In Plane View: Abstractions of Flight" (see article Page 8). Buster, a home-built midwing monoplane, was owned by racing pilot Steve Wittman. From 1931 until its retirement in 1954, the Buster set records and took numerous trophies in class races and free-for-alls, including two wins in the Goodyear Trophy Races.



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Scientists solve puzzle of Prussian blue pigment in Japanese paintings

By Donald Smith

Special to Inside Smithsonian Research

In a sparsely furnished back room at the Smithsonian's Freer Gallery of Art, a trim, gray-haired chemist is hunched over a Japanese painting from the 19th century. After making minute adjustments to a fiber-optic probe suspended just millimeters above the painting, he flicks on the power.

A tiny dot of light beams from the probe's tip, reflecting off of a blue pigment that was delicately laid down by the brush of Katsushika Hokusai (1760-1849) more than 200 years ago. The reflected light flows into a spectroscope that measures both visible and invisible ultraviolet light.

Titled "Miscellaneous Subjects," the painted handscroll being examined is a stunning work in the Japanese ukiyo-e style. Yet Conservation Scientist John Winter of the Smithsonian's Arthur M. Sackler Gallery and Freer Gallery of Art is looking for a European invader hidden in plain sight on the painting's surface: a pigment called Prussian blue.

This synthetic paint made from iron



salts and cyanide obtained from cattle blood was invented in Germany in 1704. Some 80 years later, it reached Japan through trade with the Dutch and Chinese. By the 1820s, after Prussian blue became readily available and less costly, its vividness and intensity sparked a fashion for blue among the producers of Japanese ukiyo-e woodblock prints, but not among painters, as Winter's research reveals.

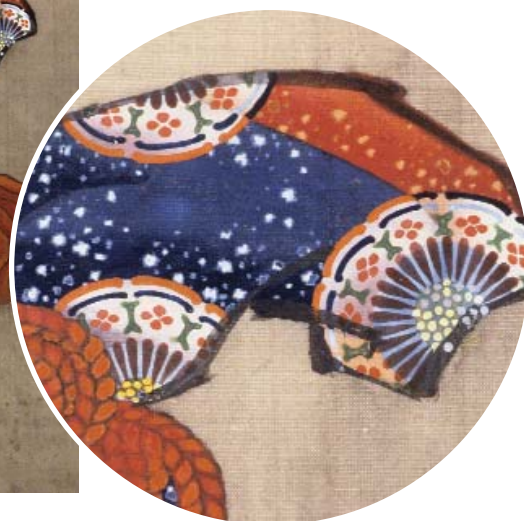
Woodblock prints were reproduced in large numbers by a guild of artists, block-carvers and printers. Perfectly suited for printmaking because of its intensity and fine grains, "Prussian blue quickly replaced indigo and other traditional blue pigments in Japanese prints," says Marco

Leona, the David H. Koch scientist-in-charge in the Department of Scientific Research at the Metropolitan Museum of Art in New York, who collaborated with Winter in the investigation.

But as Winter and Leona discovered in their work, Japanese painters were not as enamored with this new color as were

(continued)

Above: A fiber-optic probe attached to a movable arm above the painting "Miscellaneous Subjects," by Katsushika Hokusai, allows John Winter to collect both ultraviolet and visible light reflected from tiny spots on the painting's surface. (Photo by Owen MacDonald)



Japanese printmakers. By compiling data from spectroscopic analysis of Japanese paintings in the Freer Gallery's collection, Winter and Leona have documented the more conservative response to this novel European pigment by Japanese ukiyo-e painters.

Indigo vs. Prussian blue

For centuries, many different materials—such as clay, crushed oyster shell, gamboge (tree resin), mica, ground copper minerals and mercuric sulfide—have been used to create pigments for the palettes of Japanese artists. Many pigments and the knowledge of making them came to Japan through China and other areas of Asia. Pigments such as cinnabar, malachite and azurite, for example, came into Japan, along with the introduction of Buddhism, from mainland China.

Using microscopy and microchemical analysis, Freer Gallery of Art Research Associate Elisabeth West Fitzhugh recently published a comprehensive database identifying every pigment employed in the creation of some 500 Japanese ukiyo-e paintings, dating from the 16th to the 19th centuries and owned by the Freer. The database represents “a titanic work,” Leona says. It took Fitzhugh and others decades to complete.

Yet in specific areas on some paintings

where the paint was exceedingly thin, Fitzhugh was unable to determine whether an artist had used Prussian blue or indigo, a traditional blue pigment made from plants.

Looking at a painting's surface with the naked eye, it is impossible to tell Prussian blue and indigo apart, Winter says. Often, they appear in “very similar shades of dark blue. I don't think anybody would claim to tell the difference just by looking at them through an optical microscope.”

One simple method to tell these two pigments apart is through chemical analysis. Both pigments react differently when exposed to specific chemicals, such as nitric acid, an oxidizing agent. Because each pigment is made up of particles that are quite tiny, the pigments are intense. “Painters did not need to apply much of either” to achieve the desired shade of blue, Winter explains. Layers of these pigments on Japanese paintings are often thin. Lifting even tiny samples for analysis may be impossible without damaging the paintings.

Ultraviolet analysis

“Using a spectroscope, however, is noninvasive,” Winter explains. “No sample is removed, and there is no contact between the probe and the work of art being examined.” Winter and Leona used a fiber-

Both indigo and Prussian blue pigments were used by artist Katsushika Hokusai to color the decorated lute bag in this painting “The Lute and White Snake of Benten (Sarasvati).” Reflectance spectroscopy revealed the darker blue in the painting to contain the pigment Prussian blue. The lighter blue is indigo.

optic probe with the spectroscope that allowed them to collect reflected light—both visible and ultraviolet—from spots as small as .025 of an inch.

Armed with this equipment, Winter and Leona returned to inspect blue areas of some 200 paintings, areas that Fitzhugh had been unable to determine were painted with indigo or Prussian blue. “We built upon her work,” Leona says.

In the infrared range, invisible to the human eye, the differences between Prussian blue and indigo became immediately apparent. In visible light, both pigments absorb the color red and reflect blue. In the infrared, Winter explains, “Prussian blue continues absorbing red, while indigo does not. Indigo is faint, nearly invisible in the infrared. The difference is striking.”

Paintings and prints

Winter and Leona discerned the earliest use of Prussian blue in a painting dated with certainty to 1817. Of the 500 ukiyo-e paintings in the Freer collection, 139 contained either indigo or Prussian blue, alone or in mixtures.

One point of interest, Winter says, “is that a painter sometimes used indigo and Prussian blue for different design features in the same painting. This, I thought, was interesting in that it shows a remarkably subtle appreciation of color differences.”

Despite the availability of Prussian blue, indigo still remained popular with Japanese painters. Half of the 34 paintings made after 1830 that were selected for this study contained Prussian blue, while 31 of the 34 paintings contained indigo.

This was at a time that Prussian blue had replaced indigo in Japanese prints and was being used by printmakers in

sizeable quantities for prints with large production runs, Leona points out. It stands to reason Japanese painters could easily have afforded Prussian blue during this time.

Overall, Prussian blue never achieved the popularity among Japanese painters in the 1820s and 1830s that it did among printmakers. “Probably most painters did not feel the need to add a new pigment to their repertoire,” Leona says, “particularly in the early years of its introduction, when the price was still quite high. They even had blue pigments other than indigo that could be used instead, such as azurite and smalt.” The coarse grains of azurite, a crushed mineral pigment, and smalt, a pigment made from deep-blue glass that has been pulverized, made them unsuited for woodblock prints.

“Printmakers had more incentive to change,” Leona continues. “The new

‘Technicolor’ hues of Prussian blue were in demand among the lower middle class who couldn’t afford paintings.”

On a number of paintings, Winter and Leona encountered Prussian blue and indigo mixed together as a single pigment. Did an artist combine the pigments to try to create a new color? Or was it an attempt to stretch the more costly Prussian blue by mixing it with indigo? Or as Winter questions, did a merchant cut his stock of Prussian blue with indigo before selling it to increase profits? These are a few questions awaiting answers.

“What we have done in this study is provide raw data on pigments contained in the Freer’s amazing collection of Japanese ukiyo-e paintings,” Leona says. “Now, it is the job of an art historian, economist or other scholar to try to apply this data to specific socio-economic questions.” ❖



In visible light, indigo and Prussian blue pigments are difficult to tell apart. In the infrared range, however, indigo becomes nearly invisible, Prussian blue does not. The fiber-optic probe shown here is used to bounce beams of visible and infrared light off of the surface of a painting and into a spectroscope. By analyzing the reflected light, the spectrometer can easily tell the two pigments apart. Spectroscopic analysis is a noninvasive method of studying thin layers of pigments on the surface of a painting. (Photo by Owen MacDonald)

Catfish inventory has Smithsonian scientist exploring rivers and streams the world over

By John Barrat
Smithsonian Office of Public Affairs

Native to sub-Saharan Africa, the electric catfish can temporarily paralyze enemies with a shock of 350 volts. In South America, the candiru, a small voracious blood-sucking catfish, attacks other fish and occasionally humans. In Suriname, talking catfish grunt loud protests when pulled out of the water.

Few vertebrates rival the diversity and

global distribution of catfish. They are found on every continent except Antarctica, and fossils show that they once even thrived there.

Scientists have identified 2,743 different species—ranging in size from the giant Mekong catfish of Vietnam to the tiny transparent glass catfish popular among aquarists—and are still counting. It is estimated that there are as many as 1,750

species of catfish in the world yet to be discovered.

For the last 18 years, Richard Vari of the Smithsonian's National Museum of Natural History has been studying and describing new species of catfish collected from South America, Africa and Asia. He and other taxonomists hope to piece together the complex family tree of the catfish and establish the evolutionary ties



Richard Vari with some of the catfish specimens from a working ichthyology collection maintained by the Vertebrate Zoology Department of the National Museum of Natural History (James Di Loreto photo)

Opposite: *Cetopsis parma*, the heavy bodied fish, is a member of the catfish family Cetopsidae. *C. parma* is native to the northern and western portions of the Amazon basin in Brazil, Ecuador and Peru. The specimen shown here is about 6 inches long. Richard Vari and two colleagues named this species in 2001.



that link them to all other species of fish.

In addition, Vari collects life history data on these new species, such as what they eat, where they live, whether there are morphological differences between sexes, what they look like as juveniles and if they are exploited for food by humans. This information may someday prove critical to wildlife experts trying to manage or re-establish populations of these fish in the event of human encroachment or natural or man-made disasters.

Catfish inventory

Recently, Vari joined a new initiative of the National Science Foundation known as the All Catfish Species Inventory. With this project, 200 scientists around the world will spend the next five years trying to collect and describe every catfish species on Earth.

With mass extinctions occurring in many parts of the world, the National Science Foundation has made it a priority to try to inventory at least some of the Earth's existing biodiversity before it disappears.

Catfish are a logical choice for such an ambitious project, Vari explains. "They are a major food source for people in many parts of the world. Virtually all catfish species are edible."

Their global distribution also makes them an ecologically significant species. Scientists in the United States, for example, have long used the presence and health of the bullhead catfish, a bottom feeder, as a gauge of pollution in streams and rivers nationwide.

'Whale catfish'

With grants from the Catfish Inventory, Vari plans to document the evolutionary relationships among the Cetopsidae, a group of small South American catfish that resemble whales and are called "whale catfish."

"Members of the Cetopsidae range from having small eyes to having very small eyes to, in one case, lacking any indication of eyes at all," Vari says. "They also are often called 'bagre ciego,' meaning 'blind catfish.'" Recent research by Vari and his colleagues has established 20 new species of this catfish family.

For the inventory, Vari also intends to collect and study "various groups of Asian catfish—from eastern Pakistan to Thailand, down the Malay Peninsula and onto Borneo—all of which are exploited for food through their range," he says.

Why have catfish been so successful in adapting to such diverse environments around the world? "Catfish have elaborations of their sensory systems, including the whiskerlike barbels on either side of their mouth that earned them the name 'catfish.' These allow them to sense potential food items in the environment," Vari explains.

Also, along with other groups of largely freshwater fish, catfish have modifications on the backs of their heads, on the tops of their vertebral columns and on their swim bladders that increase their ability to sense vibrations, including sound, Vari says. This gives them an advantage in eluding predators and finding prey.

Phylogenetic studies

Naming a new catfish species or family can take place years after a specimen is collected. Traditionally, new species and relationships between species are determined through visual similarities in morphology, although DNA analysis is being used more frequently. Only after careful examination of a specimen's skeleton, cartilage, fins, muscles and other body structures do their distinguishing characteristics emerge. For his research, Vari uses the National Museum of Natural History's fish collection, the largest in the world, with approximately 3.5 million specimens.

One common technique Vari uses to study fish bone and cartilage is to dissolve a specimen's muscle and soft tissue with an enzyme solution. He then treats the specimen with stains that turn its bones red and its cartilage blue. "We often focus on bones and cartilage in our phylogenetic studies. Preparing the fish in this way makes it easy to compare specimens side by side," he says.

In a recently published phylogenetic study of all known members of one catfish group, for example, Vari and colleagues consulted hundreds of specimens representing the genera of all known catfish families.

It is a slow, labor-intensive process, but Vari's work is providing essential information about a prolific group of fish that is an important environmental indicator and part of the human diet in many areas of the world. ❖

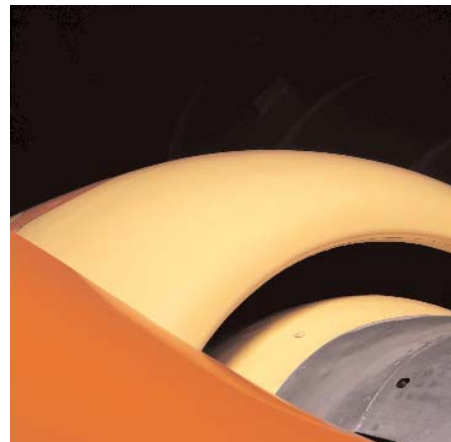
Smithsonian photographer transforms aircraft into abstract art

By Caroline Taylor
Special to Inside Smithsonian Research

Hung in a modern art museum, the copper-hued photograph might well attract the serious attention of art aficionados. It's a study in texture, organic form and line. The surface is multi-dimensional and swarms with movement.

The photograph is a close-up of the heat shield of the Apollo 11 Command

Module Columbia taken by Smithsonian National Air and Space Museum Photographer Carolyn Russo. As the capsule plunged through the Earth's atmosphere with Neil Armstrong, Buzz Aldrin and Michael Collins aboard on July 20, 1969, searing heat left its mark on the honeycomb surface of the shield. This is what is captured in the picture.



The Apollo 11 Command Module is on exhibit in the Milestones of Flight Gallery at the National Air and Space Museum. The image is one in a series of 65 color photographs by Russo that offer an abstract look at the iconic air- and spacecraft in the Smithsonian's collection. Her exhibition, "In Plane View: Abstractions of Flight," will open in March 2007 at the museum.

"This is a new way to show aircraft," Russo explains. "I want people to be exposed to the beauty in what are otherwise thought of as utilitarian objects. I hope to show that these marvels of technological advancement also are marvels of color, line and shape."

One of her photographs is a stunning vertical view of the deep red, heart-shaped tail of the Smithsonian's 1931 Wittman Buster, a post-World War II-era midjet racing plane (see cover). A similar shot of the 1929 Kreider-Reisner C-4C Challenger biplane, in white on black, calls to mind a dragonfly skimming a shaded pond.

"This show is fundamentally about the nexus between art and science," explains Anne Collins Goodyear, who is curating the exhibition. "Creativity is at the heart of science, technology and art. In the same way that scientists' creations spark new ways of thinking and perceiving our world, Russo's photographs open up worlds of possibility—things beyond our capacity to imagine here and now."

Goodyear, assistant curator of prints and drawings at the Smithsonian's National Portrait Gallery, is particularly interested in the relationship of art to science and technology in the United States and the effect of flight on 20th-century art.

Russo takes her abstract photographs with a medium-format Hasslebad film camera and strobe lights. But she first sets up her shots using a digital camera. "I use a digital camera the way an artist might use a sketch pad," she explains. "I take a number of preliminary shots in digital, because it gives me a good overall idea how the final image will appear."

Once she's satisfied with the image on the digital camera's display, "I put the Hasslebad on the tripod and shoot with film. I might take between one and four rolls, bracketing the exposure lengths to vary the light, changing the camera's angle, zooming in and out." A minor change in the camera's angle can make a big difference in an abstract photograph, she says.

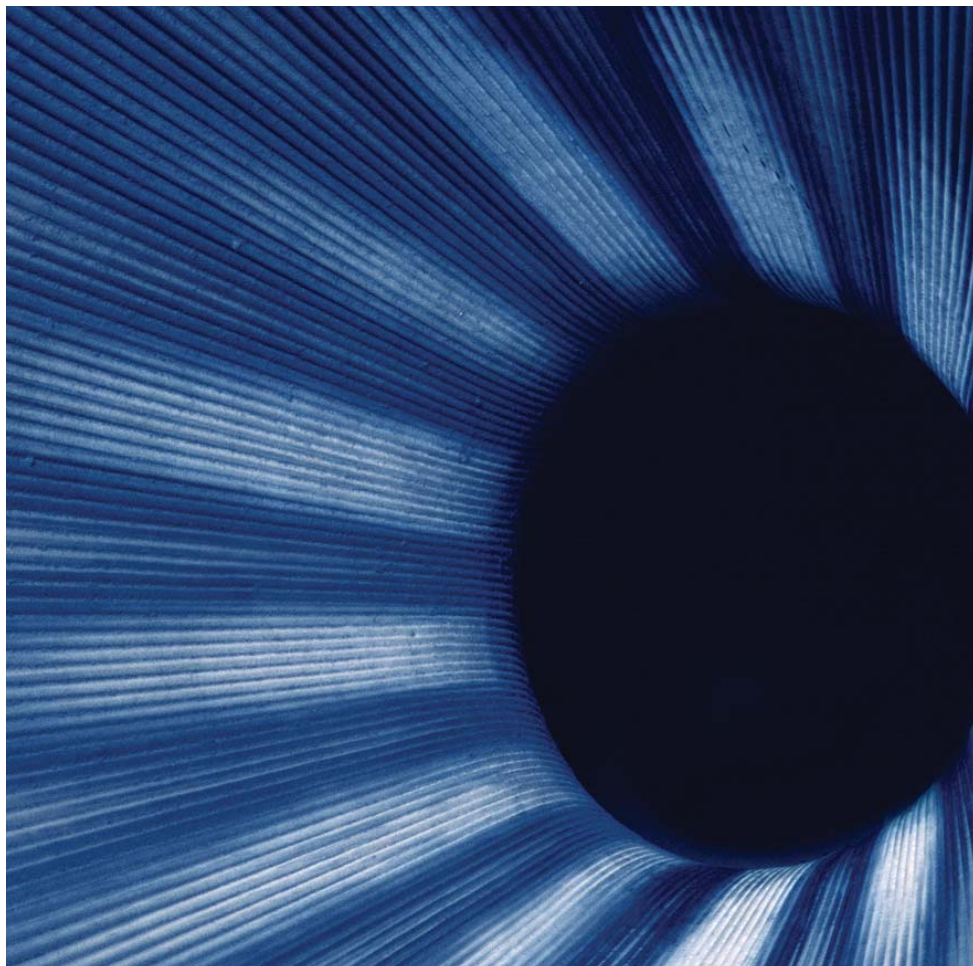
Working late into the night in the solitude of an empty museum, Russo is free of the distractions of museum visitors and daytime museum lighting. "At night, I can concentrate and focus on only the camera and the airplane. I might walk by a plane 100 times before something will pop out at me that I didn't see before. And then I have to shoot it."

After having her film developed, Russo picks the shot that she considers to be the best and scans it using a high-resolution film scanner. This turns her photographs from film into digital images that can

Opposite bottom: The heat shield of the Apollo 11 Command Module Columbia

Opposite top: The yellow engine cowling and orange propeller of the Grumman F8F-2 Bearcat Conquest I

Above: The exhaust pipe of the North American X-15 (Photos by Carolyn Russo)



then be manipulated using Photoshop, a computer software program. "It's just like going into the darkroom with a negative and being able to manipulate the film to get the results I want," she says.

Russo and Goodyear are now working together to select photographs for the exhibition from dozens of Russo's images. "Our criteria are that the photographs be of high aesthetic quality and that the images tell a story about the aircraft they represent," Goodyear says.

"Russo brings out qualities in the aircraft that escape most of us," she continues. "She fits right into a long tradition of artists, such as Robert Rauschenberg and Georgia O'Keeffe, who responded to the innovation of human flight by offering unique vantage points on daily life."

The age of flight has long captured the imagination of artists, as well as scientists, Goodyear explains. "Twentieth-century

artists have been moved not only by the appearance of the airplane but also by the principles it represents: a mastery of mass and weight, a victory over the force of gravity through motion."

In addition to the air- and spacecraft in the Smithsonian's collection, "In Plane View" will pay homage to the aviators, designers, engineers and others associated with the machines. Quotes and comments by aviation greats Allan Lockheed, Gen. Hap Arnold, Igor Sikorsky, William Boeing, Eddie Rickenbacker, Jack Northrop, Donald Douglas, Jimmy Doolittle and others will appear in the exhibition with the photographs.

After its debut at the National Air and Space Museum, "In Plane View: Abstractions of Flight" will travel the United States under the auspices of the Smithsonian Institution Traveling Exhibition Service. ❖

Crowned-nun portraits reveal importance of the convent in colonial Latin America

By Vicki Moeser
Smithsonian Office of Public Affairs

Of the many striking paintings that make up the new Smithsonian exhibition “Retratos: 2,000 Years of Latin American Portraits,” the “*monjas coronadas*,” or crowned nuns, stand out for their elaborate detail, beauty and depiction of piety.

Crowned nun portraiture was unique to Mexico during the 18th and 19th centuries and was meant to mark a nun’s spiritual marriage to Christ. “Families would commission artists to paint portraits of daughters who were soon to enter convents,” explains exhibition co-curator Miguel Bretos, a senior scholar at the Smithsonian’s National Portrait Gallery. “Convents were an important part of the religious and social life of colonial Latin America.”

“Retratos” is an exhibition of 115 paintings and sculptures drawn from the holdings of museums in Latin America, Spain and the United States, as well as from private collections. It has 76 lenders from 15 countries and took four curators from three museums two years to organize. Its stunning portraits of Latin American rulers, priests, military figures and everyday people will be on view at the Smithsonian’s International Gallery in Washington, D.C., from Oct. 21 to Jan. 8, 2006.

On the “Retratos” curatorial team are Bretos; Carolyn Kinder Carr, deputy director and chief curator at the National Portrait Gallery; Marion Oettinger Jr., director of the San Antonio Museum of Art; and Fatima Bercht, chief curator, El Museo del Barrio, in New York City. The Smithsonian is the fourth stop on the ex-



hibition’s five-city tour, which includes venues in New York, San Diego, Miami and San Antonio.

“We all came to this project with slightly different perspectives,” Carr says of the team. “Marion is an anthropologist; Miguel, a historian; and Fatima’s focus is on contemporary Latin American artists.” Carr is a respected art historian who has organized numerous exhibitions, mainly of modern and contemporary art and photography.

Because there is little published on Latin American portraiture, the team undertook three research trips, visiting churches, museums and private collections in Brazil, Argentina, Chile, Peru, Ecuador and Mexico. Team members also traveled individually to other countries, including Colombia, Paraguay, Uruguay and Puerto Rico, to view portraits and follow up on different aspects of the project.

During what Carr describes as three “marathon sessions,” the curators reviewed more than 1,000 images and, “with much difficulty,” whittled down their selections to a manageable size. Among their favorites were a small number of crowned-nun portraits.

Palm branches and crowns

Crowned-nun portraiture embodies “the celebration surrounding a young woman’s religious profession in a devoutly Catholic culture,” writes Kirsten Hammer, director of Latin American art at Sotheby’s. Hammer is author of an essay in the catalog that accompanies “Retratos.”

Crowned-nun portraits depict a female figure accompanied by objects used in the Catholic profession ceremony, including candles, palm branches and crowns, all of which may appear interwoven with flowers and fruit, Hammer explains.

“Other objects commonly shown in crowned-nun portraits, though not specific to the profession rites, are small statues or dolls [symbolizing the baby Jesus],

Above: This 18th-century oil-on-canvas painting (detail) of a crowned nun by an unknown Mexican artist is in the exhibition “Retratos: 2,000 Years of Latin American Portraits.”

Opposite: “Sor María Francisca de San Calletano,” an oil-on-canvas painting by Mexican artist Félix Zárate, who was active from 1788 to 1847 (Image courtesy of the San Antonio Museum of Art)

crucifixes, crests and rosaries. Each object carries special symbolic significance, sometimes pertaining only to the nun displaying it, sometimes employed as a standard icon expressing larger social or religious ideas,” Hammer writes.

The “Retratos” portrait of Sor María Francisca de San Calletano, for example, is filled with religious objects. Painted in 1840 by Félix Zárate, a respected painter from Jalisco, Mexico, in the first half of the 19th century, his subject is shown wearing the Dominican habit and a rosary. A disk with the Dominican emblem and a depiction of Saint Dominic of Guzman hangs from her habit. A crown with the Dominican emblem and a depiction of Saint Dominic of Guzman hangs from her habit.

“She carries a lighted candle, a symbol of fidelity, and an image of the Christ child,” Hammer writes. “Her crown represents victory over sin and contains images of the Immaculate Conception; her patron saint, Saint Cajetan; and an unidentified figure.”

This oil-on-canvas crowned-nun portrait measures nearly 6½ feet tall and 4 feet wide and belongs to the San Antonio Museum of Art in Texas.

Identity of the sitter

The writing along the bottom of a portrait is called the “leyenda,” or legend, and provides clues to the identity of the sitter. “The legends are as varied as the liturgical objects chosen for the painting, but commonly list the nun’s religious name, her family name and the titles of her parents,” Hammer writes.

“Often they describe distinguished godparents or patrons. The city in which the nun was born, the convent that she entered and the date of her profession also are among the most common facts mentioned. Occasionally, if she was a distinguished student, her educational background is noted,” Hammer continues.

In the portrait of Sor María Francisca de San Calletano, for example, the legend reveals she is the “legitimate daughter of Don Leonicio Leal and Arquilina Bidrio” and “was born Jan. 1, 1820.... She was a novice of the convent of Saint Maria de Grasia...



and professed the black veil in the same convent April 2, 1840, at 20 years of age.”

“Retratos: 2,000 Years of Latin American Portraits” forms the centerpiece of a major international project that includes educational materials, innovative out-

reach programs, a catalog, committees of Latino leaders working to support the project and a team of scholarly advisers. Additional information is available at the Web site www.retratos.org. ❖

Panda birth. Mei Xiang, the Smithsonian National Zoological Park's female giant panda, gave birth to a male cub on Saturday, July 9, at 3:41 a.m. Under Mei Xiang's care, the cub is thriving and growing daily. The cub's birth was the result of artificial insemination conducted by National Zoo staff in March. On Sept. 19, Zoo staff gave the cub his sixth veterinary exam, determining he is healthy. At the time, he was 22.51 inches long and weighed 9.57 pounds. Zoo staff also observed that his tooth buds—swollen areas where his teeth eventually will erupt—are pronounced, and his first teeth should start to break through in about a month.



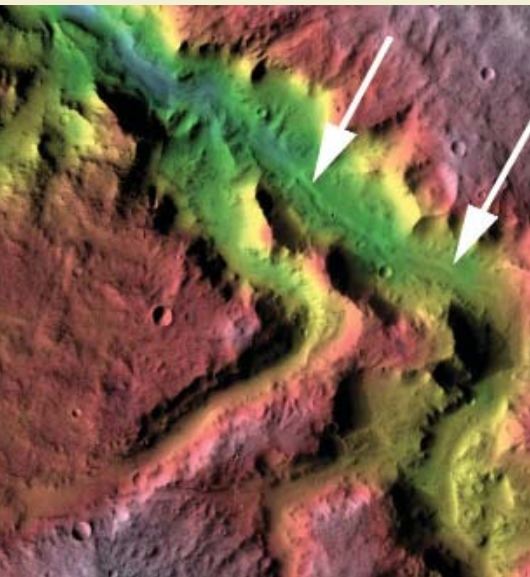
This photograph of the National Zoological Park's new panda cub was taken during a recent veterinary exam. The male cub is healthy, thriving and growing daily. (Photo by Jessie Cohen)

IRIS donation. A 1989 IRIS 3047 printer made by IRIS Graphics in Bedford, Mass., was recently donated to the Smithsonian's National Museum of American History, Behring Center by Nash Editions, a California company recognized as the world's

first fine-art digital printmaking studio dedicated to photography. Nash Edition's IRIS printer was one of the first to be used to make fine-art digital photographs and to jump-start a new business model and method for the production of fine art photographs. Included with the donation were prints produced with the IRIS printer by Nash Editions.

Hirshhorn director. Olga Viso, deputy director of the Smithsonian's Hirshhorn Museum and Sculpture Garden, has been named the Hirshhorn's new director. Viso joined the museum's Curatorial Department in 1995 as assistant curator, was named associate curator in 1998 and served as curator of contemporary art from 2000 to 2003. She became deputy director in 2003. Viso, well-known for her expertise in contemporary Latin American art, succeeds Ned Rifkin, now the Smithsonian's Under Secretary for Art.

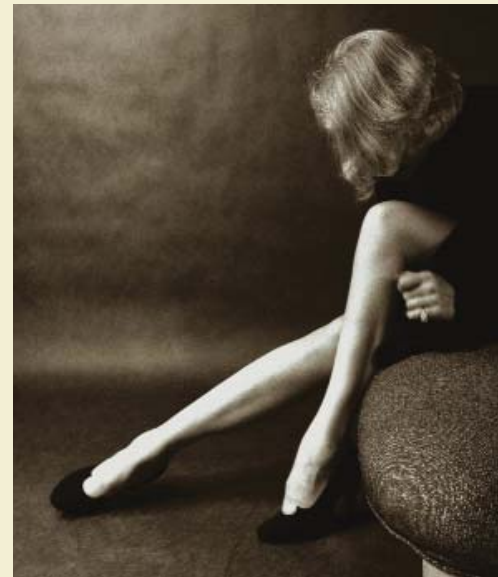
White arrows on this false-color image of the Licus Vallis network on Mars indicate the location of one of the newly discovered dry river channels.



Mars rivers. Robotic satellites and rovers have returned new evidence that Mars had a much warmer and wetter climate some 3.5 billion years ago, when conditions may have been more favorable

for life. Geologists at the Smithsonian National Air and Space Museum's Center for Earth and Planetary Studies, working with colleagues at the University of Virginia, have recently discovered 21 river channels in the dry Martian valleys. Researchers determined that Martian rivers were about the same size as their counterparts on Earth, suggesting similar amounts of runoff from thunderstorms or rapid snowmelt.

Zoo director. John Berry, executive director of the National Fish and Wildlife Foundation from 2001 to 2005, has been named director of the Smithsonian's National Zoological Park. Berry served as assistant secretary for policy, management and budget at the U.S. Department of the Interior from 1997 to 2001. From 1995 to 1997, Berry was director of government relations and a senior policy adviser at the Smithsonian. Berry succeeds Lucy Spelman as Zoo director.



This 1952 photo of Marlene Dietrich by Milton Green was printed with the IRIS 3047 printer by Nash Editions and recently donated to the Smithsonian.

Unpublished photos from Scopes 'Monkey Trial' of 1927 discovered in Smithsonian Archives

An independent historian doing research in the Smithsonian Institution Archives in Washington, D.C., has uncovered a set of previously unpublished photographs taken in 1925 during the Tennessee vs. John Scopes "Monkey Trial," in Dayton, Tenn. The photo collection includes portraits of trial participants, images from the trial itself and significant places in Dayton, such as the Rhea County Courthouse. The nitrate negatives were discovered inside boxes of archival material donated to the Smithsonian by Science Service in 1971.

Science Service is a Washington, D.C.-based organization founded in 1921 for the promotion of science writing and information about science in the media. The photos were taken by Watson Davis (1896-1967), the Science Service managing editor who covered the Scopes trial as a reporter and assisted in the selection of prominent scientists to testify for the defense.

"We've always known that records and correspondence from the Scopes trial were in this collection," says Smithsonian Archivist Tammy Peters. "We didn't know that negatives of photographs Davis had taken during the trial also were here."

Consisting of about 60 different photographs, highlights of the collection include a rare photograph of attorney William Jennings Bryan being interrogated by defense attorney Clarence Darrow on July 20, 1925, a day the trial had been moved outside due to extreme heat.

A second photo shows Rhea County High School teacher John Thomas Scopes and George Washington Rappleyea, manager of the Cumberland Coal and Iron

Co. Rappleyea is credited with suggesting that Dayton challenge Tennessee's statute against the teaching of evolution in schools. "These stunning photographs are the discovery of a lifetime and a spectacular find for the Smithsonian Institution Archives," says Marcel LaFollette, the independent scholar, historian and Smithsonian volunteer who found the images.

A few of these photos can be viewed at the Web site siarchives.si.edu.

—John Barrat



John Thomas Scopes, Dayton, Tenn., June 1925 (Photo by Watson Davis)

Astronomers detect little water in Comet Tempel 1

Rarely do astronomers get a chance to reach out and touch what they study. One of those rare opportunities came on July 4, when the National Aeronautics and Space Administration's

Deep Impact probe smacked into a comet with the force of nearly 5 tons of TNT. The impact blew a crater in the comet 200 yards across and 30 yards deep.

NASA organized this cosmic assault to study the structure and composition of a comet nucleus—a Manhattan-sized chunk of ice and dirt that gradually vaporizes. As it turns to gas it creates the glowing head and tail we see from Earth. Comets hold material left over from the formation of the solar system, providing clues to how the planets formed.

When Deep Impact hit, astronomers at the Smithsonian Astrophysical Observatory were watching with the Submillimeter Array telescope in Hawaii and the Submillimeter Wave Astronomy Satellite. Both instruments seek cosmic radio sig-

nals from gases, such as water vapor and carbon monoxide.

The debris cloud created from the blast contained fine dust similar to talcum powder. Surprisingly, little water was detected, considering that comet nuclei are often described as "dirty snowballs."

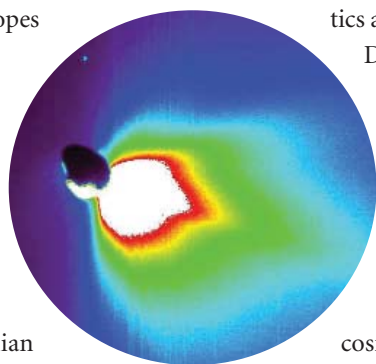
"It's pretty clear that this event did not produce a gusher," SAO Astronomer Gary Melnick says.

The target, Comet Tempel 1, travels through the inner solar system every 5½ years, making it a "short-period" comet. Scientists expected that solar heating during its previous passages had vaporized ice close to the comet's surface. However, the drought extended deeper inside the comet than predicted.

"Theories about the volatile layers below the surface of short-period comets are going to have to be revised," SAO Astronomer Charlie Qi says.

Melnick, Qi and colleagues will continue to analyze the comet debris in coming months. "The big picture will emerge once astronomers meld data from different observatories at different wavelengths," Melnick says.

—Christine Pulliam



A false-color image of Tempel 1 after it was struck by Deep Impact (NASA/JPL-Caltech/UMD image)



Smithsonian Baseball: Inside the World's Finest Private Collections, by Stephen Wong (Collins, 2005, \$29.95). Revealing stories, lavish photography and essays highlight 21 of the best private collections of baseball memorabilia in existence. From a 1848 copy of the first written rules of the game to Mark McGwire's 1998 record-shattering home-run ball, this book spans baseball's history.

The Art of Botanical Painting, by Margaret Stevens (Collins, 2005, \$29.95). A practical teaching guide to the art of botanical illustration, from exotic and garden flowers and plants to fruits and vegetables. Published in association with the Society of Botanical Artists.

Collins Atlas of the Night Sky, by Storm Dunlop (Collins, 2005, \$29.95). A large-format atlas containing specially commissioned charts of the 88 constellations, maps of the moon and planetary information covering the next five years.

War in the Air, 1914-1945, by Williamson Murray (Collins, 2005, \$29.95). This book is an illustrated account of the

conditions under which World War I and World War II pilots fought, following the rise of air warfare from its beginnings to the Enola Gay's dropping of the atomic bomb on Hiroshima.

Explorers: A Photographic History of Exploration, by Richard Sale (Collins, 2005, \$24.95). A complete chronological and geographical overview of exploration since the late 19th century. This illustrated book celebrates the men and women who have pushed forward the boundaries of knowledge of the world's least-known places.

New Orleans Street Singer (Smithsonian Folkways Recordings, 2005, \$15). This 1959 acoustic blues album by Snooks Eaglin showcases his idiosyncratic and passionate singing and guitar playing. On CD for the first time, with seven previously unreleased tracks.

Dark Holler: Old Love Songs and Ballads (Smithsonian Folkways Recordings, 2005, \$15). A remarkable collection of traditional North Carolina singing featuring Dillard Chandler and his peers.

Rolas de Aztlán: Songs of the Chicano Movement (Smithsonian Folkways Recordings, 2005, \$15). A compilation of powerful songs recorded between 1965 and 1999 that range from farm-worker strike songs to civil rights anthems.

Hobart Smith, In Sacred Trust: The 1963 Fleming Brown Tapes (Smithsonian Folkways Recordings, 2005, \$15). Mountain music virtuoso Hobart Smith (1897-1965) sings and plays banjo, fiddle, guitar and piano in this album of deeply personal recordings. An 80-page booklet with historical photos and lyrics is included.

Books listed on Pages 14 and 15 can be ordered through online book vendors. They also can be purchased in many 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.

Saving Stuff: How to Care for and Preserve Your Collectibles, Heirlooms and Other Prized Possessions

By Don Williams and Louisa Jaggar (Fireside Books, 2005, \$16)

Nostalgia and a desire to document our personal past for posterity makes us hoard boxes of toys in the basement, store old uniforms in the closet and stack photographs, letters and comic books in plastic bins in the attic.

Yet the extreme environmental conditions often found in these common storage spaces can warp granddad's vintage Johnny Cash vinyl LPs, allow silverfish to feast on Sally's kindergarten artworks, and cause mold and mildew to attack mother's World War II-era wedding dress.

But there is good news.

Simple rules anyone can follow to ensure that their treasures stand the test of time have been folded into a new book, *Saving Stuff: How to Care for and Preserve Your Collectibles, Heirlooms and Other Prized Possessions*, by Don Williams and Louisa Jaggar.

As senior conservator in the Smithsonian Center for Materials Research and Education, Williams has consulted on the preservation of such artifacts as President Franklin Roosevelt's desk and Archie Bunker's chair from the television show "All in the Family."

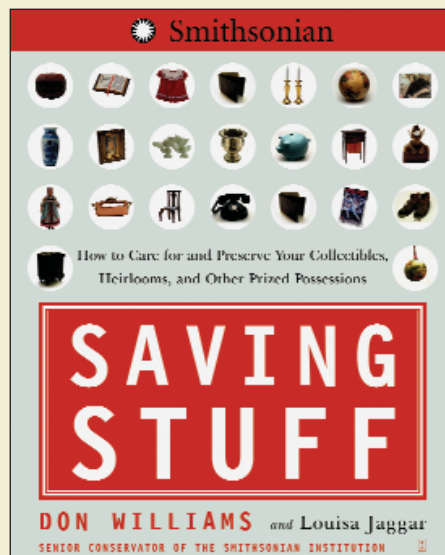
Jaggar is a columnist for Washington Parent magazine and has contributed articles to Diversion and the Family Travel Network Web site.

Saving Stuff is written in an enjoyable,

engaging style and is packed with many straight-on facts about how to preserve everything from old photographs to football jerseys and even animal specimens.

For example, Williams recommends making copies of your most prized photographs for hanging on the wall and everyday viewing. Keep originals in a cool, dry place where they won't be exposed to extremes of light, temperature and humidity.

A cherished high-school football jersey may look more authentic with its sweat



and grass stains, but it should be professionally washed to remove them. Evidence of past gridiron battles makes a good dinner for all manner of fabric-munching creatures. Once the jersey has been cleaned, give it form by stuffing polyester or acid-free paper inside. Then mount it on a backing board using velcro before placing it in on display in a glass-front shadow box. (Instructions for making a shadow box are outlined in Chapter 5.)

The opening section of *Saving Stuff*, titled "The Museum of You," is essential reading. It explains how to minimize the harsh effects of extreme light, temperature and humidity on collectibles.

Williams and Jaggar also walk readers through the critical task of deciding what to save. "Prioritize what's worth preserving and do it right instead of indiscriminately hoarding every memento," they advise. Worksheets are provided to help decide a top-10 list of what to keep, based on who owned it, its financial and emotional value, when it was made, where it came from and the action needed to preserve it.

Other chapters serve as a reference for all the best practices in saving photos, films, books, paper dolls, silverware, bronze, electrical devices, sculptures, wedding dresses and even insect collections.

In the margins, both writers offer anecdotes, real-world wisdom and time-tested rules for preserving precious personal goods. Throughout the book, Williams offers helpful tips by relating fascinating "Smithsonian Stories" of famous American artifacts and gives details of how they were professionally preserved. In addition, the authors debunk some old-wives' tales, such as one that antique furniture needs to be "fed" with special oils and other nutrients to keep it in good shape.

"Let me break it to you gently in hushed tones," Williams writes. "Furniture is dead. Dead, I tell you. Dead! What furniture does need is to be protected from the elements and, to be perfectly frank, you. Traditional furniture polish mixtures of linseed oil, turpentine, beeswax and vinegar are especially bad, because they darken with age."

The proper care is simple, Williams writes—clean and wax, no matter what your grandmother said.

Saving Stuff offers rare access and advice from a master Smithsonian conservator. Just as important, readers learn what not to do from a number of unfortunate, yet entertaining, collectors' mistakes.

—Daniel Friend

Stunning collection of ikat textiles donated to the Arthur M. Sackler Gallery

With its bold design, dazzling colors and intricate workmanship, it must have belonged to someone special. Such an exquisite robe would have taken as long as a year to make.

The garment is a superb example of ikat, a centuries-old tradition that has been virtually abandoned with the advent of machine-made cloths and artificial dyes. The robe is among more than 100 ikat textiles from Central Asia that make up one of the newest acquisitions of the Smithsonian's Arthur M. Sackler Gallery.

"What's really important about the collection is its quality," says Massumeh Farhad, chief curator and curator of Islamic art at the Sackler. "It's really remarkable. There are no 'Bs' in the collection. They are all 'As.'"

Found around the world, ikat has been compared with tie-dyeing, the method of producing colored patterns in a fabric by tightly tying many small portions of material with string and then immersing the cloth in dye baths. The word itself is of Malaysian origin and means "to tie." But ikat involves a process far more complicated: Individual threads are tied together and dipped in dye before being woven into a fabric.



"It is mind-boggling in terms of its complexity," Farhad says. "These textiles would be worn for special ceremonial occasions, such as weddings, or used as wall-hangings."

The collection was assembled by Harvard University's Guido Goldman, whose early interest in modern painting and sculpture led to his appreciation of the much older art of ikat. "I saw them as wonderfully bold, colorful, individual works of art that moved me in the same way as did paintings by Kandinsky, Morris Louis and Helen Frankenthaler," Goldman says.

"Dr. Goldman's generous gift of more than 100 ikat textiles will make us one of the foremost centers for the study of Central Asian ikats in the world," says Julian

Raby, director of the Freer Gallery of Art and the Sackler Gallery.

The Sackler intends to exhibit pieces from the collection on a rotating basis. It also will lend them to U.S. and foreign museums for major exhibitions of ikat textiles.

—Donald Smith

Woman's Munisak robe, made from silk velvet, circa 1850-1875

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