

# Research Reports

ZOOLOGY

## Smithsonian experts consult on book encompassing entire animal kingdom

By Mary Combs  
Smithsonian Office of Public Affairs

**D**on Wilson, senior scientist at the Smithsonian's National Museum of Natural History and co-editor-in-chief of *Animal: The Definitive Visual Guide to the World's Wildlife*, remembers how, as a child, he spent hours poring over the pictures of John James Audubon. "I envisioned myself trundling after him," Wilson recalls, "although I had no idea that I could make a career of it."

Lavishly illustrated and filled with vivid images and intriguing details, *Animal*—a new release from Dorling Kindersley Publishing and the Smithsonian—is likely to inspire the same kind of attention from another generation of budding naturalists.

*Animal* aims "to illustrate, describe and explain the incredible range of creatures that make up the animal kingdom," Wilson says. Ambitious? Yes. Stuffy? No. There is plenty here for the avid scholar, but this book also will delight children—or the curious child inside every reader.

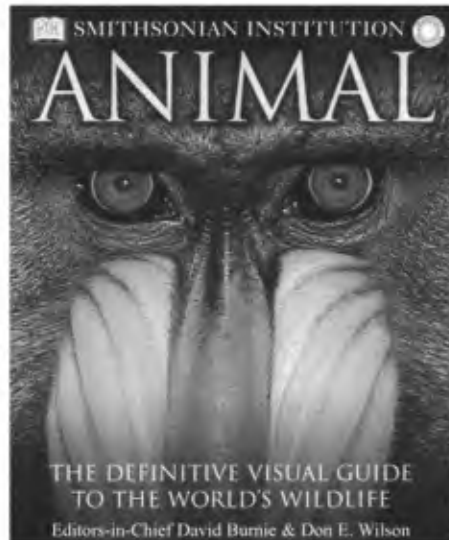
### An inside view

After answering the fundamental question, "What are animals?" the book takes the reader through anatomy and behavior to issues of conservation. Then comes an exploration of animal life in 11 different habitats, including the critters that share our urban space. The main body of the book provides fascinating profiles of more than 2,000 species—mammals, birds, reptiles, amphibians, fishes and invertebrates—full of vivid images and intriguing details.

The preface, written by Wilson and co-editor David Burnie, describes the work as "a celebration," but goes on with a sobering message: "Statistics suggest that, during the production of this book, as many as 5,000 animal species may have disappeared.... At the end of each section of this book, lists summarize species that are the most likely victims.... Wildlife can no longer be taken for granted, and the wish to conserve rather than exploit it is something that unites people across the globe

and has given rise to a number of high-profile conservation organizations. Knowledge and awareness are essential first steps: This book aims to provide both in a way that conveys the variety, beauty and richness of animal life as a whole."

As informative as a cover-to-cover read might be—from the staring mandrill on the front to the winking feline on the back—*Animal* really invites random page turning, with an occasional dive into fascinating detail. There are skeletons galore among the illustrations, as well as graphics revealing how a water buffalo digests grass and why moths spiral inward toward a light bulb. Frame-by-frame views of a flying beetle readying itself for take-off or cranes doing a courtship dance are the next best thing to video.



An international team of more than 70 scientists, including 15 from the Smithsonian, collaborated on *Animal*.

It has been just a year since Dorling Kindersley asked the Smithsonian for help in vetting this masterwork. "They had a list of British experts reviewing the book, and they wanted a U.S. imprimatur," recalls Ellen Nanney, brand manager of Smithsonian Business Ventures' Product Development and Licensing division. The

division is charged with creating collaborative relationships between the Institution and companies with similar goals.

Nanney worked on *Animal* solo from summer 2000 until January 2001, when Assistant Brand Manager Robyn Bissette joined the staff. "It was a massive undertaking for my very first assignment at the Smithsonian, jumping into the middle of a 700-page book!" Bissette says. "But it was a great introduction to the Institution, with so many curators involved."

When *Animal* finally arrived from the printer at the end of August, Nanney hefted the 8-pound, 5-ounce book and said, "I feel as if I've just given birth!"

### A collaborative project

*Animal's* production involved an international team of more than 70 biologists, zoologists and naturalists—15 of whom were from the Smithsonian. The curators reviewed both text and images to make sure that everything was as exact as possible. Adding to the logistical challenge was the need to fit in with research schedules.

After some adjustments involving the differences between American and British/

*'Animal,' continued on Page 6*



Showing off copies of the new book *Animal* with specimens from the Smithsonian's National Museum of Natural History collections are, from left, Research Zoologist Duane Hope, Museum Specialist Timothy Coffey, Senior Scientist Robert Hoffmann, Research Zoologist Clyde Roper, Research Zoologist Stephen Cairns, Don Wilson, Public Information Officer Gary Hevel, Curator Stanley Weitzman, Research Zoologist Brian Kensley, Museum Specialist Carla Dove and Curator Kristian Fauchald. (Photo by James DiLoreto)

**Love of jazz** ■ John Hasse doesn't like jazz. He loves it. He studies it, writes about it, plays and records it, produces albums of it and generally thinks it is the greatest cultural contribution America has made to the world.

He is, in fact, one of the best-known jazz cognoscenti in the country and recently edited and co-wrote *Jazz: The First Century*, an illustrated history of jazz, written by 27 leading experts. He also is curator of American music at the Smithsonian's National Museum of American History, Behring Center.

"Jazz expresses the pains, sorrows, joys, humor and contradictions of 20th-century American life," he explains. "I have always been drawn to jazz." Hasse's lifelong affair with jazz started in the fifth grade, when he attended a jazz concert at the University of South Dakota, where his father taught mathematics and his mother taught English. "It was live. It immediately seized my attention and imagination," he recalls.

By the time he was in high school, Hasse, who started picking out tunes on the piano at age 5, had formed his own jazz trio and was playing at proms and college fraternity dances. When it came time to decide whether or not to become a musician, however, Hasse paused. "I had gone to New York to study jazz piano with two of the greats, Sir

Roland Hanna and Jaki Byard. I was at a crossroads, trying to decide. Hanna told me that, in order to get to where he was, he had to practice eight hours a day. I got discouraged."

Now Hasse sees himself as a musician by avocation who is invited to perform around the country and abroad. "But I'm glad I don't have to depend on that to make a living," he adds. "And I am having a ball in this job [at the museum]."



John Hasse

For the last 17 years, Hasse has focused primarily on American music of the 20th century. This includes research, writing, building the Museum of American History collections and curating exhibitions in the areas of ragtime, blues, popular song, gospel, rhythm and blues, rock 'n' roll, music publishing and recording, and, of course, jazz.

In 1990, this passion led Hasse to found the Smithsonian Jazz Masterworks Orchestra. Established with a congressional appropriation in recognition of the importance of jazz in American culture, the orchestra serves as the jazz orchestra-in-residence at the museum. It also performs, broadcasts and records across the country and internationally. "It's one of the accomplishments in my career I am most proud of," Hasse says. After nine years as its executive director, however, he relinquished the post. "I am very happy to be curating full-time again."

For Hasse, there is no end of projects. As part of the public service aspect of his job, he has been working with the National Park Service in establishing the New Orleans Jazz National Historical Park. "The park will focus on the early history of New Orleans jazz, in particular, and will have a few buildings and a visitor center for exhibitions. There may be a role for the Smithsonian to help develop those exhibitions."

In the many roles Hasse simultaneously plays, he is happiest when he is being creative. In 1995, he decided to write a book for his then 4-year-old daughter, Leanne. "For years, I have been reading her a story I had developed on my own," Hasse explains. "She liked it a lot, so I thought it might be nice for other parents to share with their kids." *I Love You When*, published this year by Random House, appeared on the USA Today list of best-selling books, at position 150. "It was totally unexpected!" he says.



These inlaid decorative scrolls are from three Stradivari violins, dating from 1679 to 1700, in the Smithsonian's National Museum of American History. (Photo by Eric Long)

### HISTORY OF MUSIC

## High-tech research techniques help reveal Stradivari's violin secrets

By Michael Lipske  
Special to Research Reports

One day last winter, Gary Sturm stopped by the Smithsonian's National Museum of Natural History to watch an old violin share some of its secrets with a CT scanner, a super-sophisticated X-ray machine worth around half-a-million dollars.

Someone asked what the violin was worth, Sturm recalls, and "I told them it was worth more than the machine that was doing the scanning." Which wasn't even a stretch, considering that the violin had been made by Antonio Stradivari and belonged to a matched set of musical instruments that have been appraised at \$50 million.

"Everybody knows the name 'Stradivarius,'" says Sturm, assistant chair for special projects in the Division of Cultural History at the Smithsonian's National Museum of American History, Behring Center. Stringed instruments Stradivari crafted three centuries ago in Cremona, Italy, are the world's most prized musical artifacts, coveted by museums and collectors.

Musicians yearn to play the instruments, which are considered unsurpassed in richness of tone. Modern makers of violins long to copy the master's methods of craftsmanship. "They have this incredible thirst for wanting to do things the way Stradivari did them," Sturm says.

### Analyzing a Stradivarius

A former violinmaker himself, Sturm means to slake that thirst. In a project linking experts from three branches of the Smithsonian, as well as from the National Gallery of Art, several Stradivarius instruments are being analyzed from scroll to tailpiece.

The goal is to reveal precisely what materials and techniques Stradivari used to fashion his instruments, right down to the kind of varnish he put on the outside. "We want to peel away the process, layer by layer," Sturm says.

At the center of this investigation is the Axelrod Quartet of instruments—two violins, a viola and a cello made by Stradivari and given to the Smithsonian in 1997 by Herbert Axelrod, a New Jersey publisher, ichthyologist, violin lover and major music-world benefactor. To Sturm, the Axelrod Quartet is the stringed instrument equivalent of the Hope Diamond. The violins and viola are among a handful of Stradivarius instruments embellished with delicate carving and ornamentation.

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# 'The King and Queen' once again hold court in a museum's sculpture garden

By Angela Cervetti  
Smithsonian Office of Public Affairs

There is something about the couple sitting on a bench in the garden that immediately garners attention. They are thin—their limbs more rails than arms and legs—with well-formed, sinuous torsos. She looks away from him, her hands folded on her lap. He gazes ahead, as if surveying the surroundings. There is a bond between them and an air of contented aplomb.

"Beautiful, aren't they? They haven't been in the garden for almost 20 years," Valerie Fletcher, the museum's curator of sculpture, says smiling. "We are happy to have them back."

The couple is "The King and Queen," a bronze sculpture by English artist Henry Moore (1898-1986). Part of the Smithsonian's Hirshhorn Museum and Sculpture Garden since it opened in 1974, the sculpture became a signature piece and highly popular with visitors. It seemed like "The King and Queen" would hold court forever.

But by the late 1970s, suffering serious structural problems, the piece was moved

indoors for display. The deterioration continued, and for a time, "The King and Queen" was covered up and stored away.

How "The King and Queen" came once more to sit resplendent in its rightful place is a story of dedication and hard work by the museum's curators, conservators and exhibits specialists.

## Royal couple deteriorates

In 1966, "The King and Queen" were among 6,600 works of art donated by financier Joseph H. Hirshhorn to establish a modern art museum at the Smithsonian. Like many of his sculptures, it had been exposed to the weather for years on his Connecticut estate, Fletcher says. "Even metal and stone are not as sturdy as people imagine."

In bronze casting, the metal is poured into the space between an outer shell and an inner core. When the metal cools, foundry workers break away the outer shell and remove the core. Artists save the original plaster to make different casts of a work.

For some reason, "the bronze cast we had of 'The King and Queen' had a lot of core material in it," Lee Aks, conservator of sculpture, says. "Saturated with water, the material froze in winter, expanding and cracking the walls. In warm weather, it dried, letting moisture out through the porous metal and cracks."

As the moisture inside evaporated, it re-crystallized in powdery, white blooms on the outer surface. Steel bolts and rods rusted inside and stained the outer walls.

"It could no longer be displayed," Aks explains. "We wrapped it in a plastic tent with silica-gel packs to absorb moisture and put it away."

After about three months, the sculpture became stable enough to be displayed again, but it would not withstand the weather outdoors, where Fletcher and Aks felt it belonged. "As a young museum, we did not have the wherewithal for major restoration work," Aks says. "It would have to wait."

Cracked, filled with decaying matter and darkened to a dull brown by exposure, "The King and Queen" was displayed in various galleries in the Hirshhorn for more than 20 years.

## Restoration of the royals

By 1989, Fletcher realized that, over the years, the patina of the garden's sculptures had become monochromatic, unlike that of indoor casts. She started thinking about restoring sculptures to correspond with the artist's original intention.

"The challenge was to determine as closely as possible what that [intention] was," Fletcher says.

Fletcher headed to the Henry Moore Foundation outside of London, spending days interviewing artists who had worked with Moore. Then, going through the foundation's archives, she struck gold.

"I found a color photograph of Moore's 'Seated Woman' taken right after patination, along with a letter from Moore saying he had just redone the patina to look exactly as he wanted it," Fletcher says. "It was a researcher's dream come true. It would go a long way to clarify what his intention was for his sculptures."

Back in the United States, Fletcher amassed volumes of information on the pieces in the Hirshhorn collection. Eventually, she felt she had seen enough casts and done enough research to begin conservation work on "Seated Woman."

After successfully restoring four sculptures in less than two years, the conservation team turned its attention to "The King and Queen."

Patina expert Andrew Baxter brought Fletcher and Aks several pieces of bronze with different patinas he had created. "We chose a blue-green tone," Fletcher recalls. "Based on everything we all knew collectively, it seemed to us to be the closest [color] to what Moore had intended."

## The work begins

Early on a hot August morning, Aks stood in the garden's tunnel looking over "The King and Queen" and waiting for Steve Roy, a welding expert from the Argos Fine Arts Foundry in New York.

"We had to disassemble the sculpture and cut four panels in the underside of the bench to clean the interior and get to the



Lee Aks carefully applies hot patina to the royal sculpture. (Photo by Andrew Baxter)

bolts that held the figures in place," Aks recalls.

What he found in the interior wasn't pretty. "Besides the rotted core, we found dozens of rusted rods and bolts," Aks adds. "We filled two five-gallon buckets with them."

With the sculpture in pieces, the team removed all the core material and air blasted the interior clean. Then, Roy repaired the cracks and followed up by "chasing," or filing down, the welded areas and putting the original texture back on the surface.

After making small weep holes on the figures' feet to drain moisture, Roy and Aks reassembled the piece and prepared the sculpture for patination.

Using a low-pressure, glass-bead blaster, Aks removed the dirt, oil, rust, wax and stains from the surface. "It looked smooth and honey-colored," he recalls, "the color of clean bronze."

## The finishing touches

Baxter's formula called for a layer of black-toned patina to act as a base for the lighter colors. "We used hot patinas," Aks explains. "We warmed up the metal with propane blow torches and delicately brushed the solution on the warmed area."

After days of careful application of the green-toned patinas, "the sculpture looked wonderfully rich and nuanced," Aks says. "But we weren't quite finished yet."

Moore had wanted certain areas of this sculpture to look darker, as if shaded naturally, Aks says. "So we applied more patina to darken those areas. Then we stopped and waited for experts from the Henry Moore Foundation to come and tell us what they thought."

Two weeks later, the experts walked slowly around "The King and Queen." They had only one suggestion.

"Moore was spontaneous with the patina application," Aks explains. "They suggested we add an additional yellow-green tone, but in a more random manner, as if the piece had weathered naturally. We did, and it enhanced the piece quite wonderfully. It was the finishing touch it needed."

## Safely home

On a sunny October morning, Fletcher watched Aks and a museum crew carefully hoist "The King and Queen" to its new place in the east section of the garden.

"Exiled" for nearly 25 years, "The King and Queen" were finally home. As they sat peacefully and radiantly in the fall sunlight, it seemed as if they had never left.



After nearly 25 years indoors, "The King and Queen" has returned home to the Hirshhorn Museum's Sculpture Garden. (Photo by Angela Cervetti)

# Underwater 'traffic jams' result in collisions between whales and ships

By Michael Lipske  
Special to Research Reports

If traffic jangles your nerves and simply crossing the street feels like the newest extreme sport, then you may sympathize with the modern whale. A recent report on collisions between whales and ships makes today's seaways sound as dicey as any two-lane blacktop.

During the 1990s, being run over by a ship was the cause for nearly half of all North Atlantic right whale deaths. Right whales are critically endangered cetaceans found off the coasts of the eastern United States and Canada. Between 1985 and 1992, 30 percent of humpback whales that washed up dead along the U.S. Atlantic coast had injuries from ships.

In the stretch of ocean off the Chesapeake Bay, the conflict between whales and ships is "like a migration of deer crossing the interstate," says James Mead, marine mammal curator at the Smithsonian's National Museum of Natural History.

In summer, many whales swim along that part of the coast as they migrate to northern feeding grounds. Along the way,

Concern for North Atlantic right whales sparked the study, according to David Laist of the U.S. Marine Mammal Commission. Lead author of the collisions report, Laist says that, of 30 North Atlantic right whales born last year, two have already been found dead from ship accidents. With about 300 right whales in the North Atlantic, any loss is a setback to saving the animals from extinction.

## Seeking expert advice

Laist came to Mead for help in assessing the extent and causes of whale deaths from ships. "I'm in the habit of maintaining a big database on stranded animals," Mead says. In fact, the marine mammalogist has collected data on every whale and dolphin known to have washed up on the U.S. coast since 1975.

For scientists, strandings provide opportunities to study many species of marine mammals. Mead's necropsies on beached animals have helped fill in the blanks in life histories of whales and dolphins.



James Mead holds the skull of a dolphin in the marine mammal collections area of the Smithsonian's National Museum of Natural History. (Photo by James DiLoreto)

late 1800s, when motorized vessels reached speeds of 13 to 15 knots. However, whale deaths from collisions remained infrequent until around 1950. The rate of fatal ship strikes of whales climbed after that, a result of an increase in both the number and speed of motorized ships.

For example, between 1950 and 1980, the number of ships measuring greater than 100 gross tons more than doubled, reaching a total of 73,832 ships. During the same decades, according to the report,

account of a 1953 collision in the Northern Yellow Sea. Other accidents were marked by a "mysterious jolt," or the sound of a "crunch" at the stern, or a decline in vessel speed, which was ultimately explained by the discovery of a dead whale draped across a ship's bulbous bow.

## Hazardous bows

A recent development in naval architecture, so-called bulbous bows—designed to improve hydrodynamic efficiency—are now found on most cargo and container ships. Torpedo-shaped or even spherical, the bows jut from the juncture between a ship's prow and keel.

Unfortunately, the bulbous bows are hazardous to whales. According to Mead, a whale struck by a bulbous-bowed freighter can be trapped in the notch between the descending part of the bow and the protruding structure. "The pressure of the water jams the whale back in there, kills the whale and then keeps the whale," he says.

On the screen of his office computer, Mead shows a photo of a dead whale hanging limply at the waterline at the front of a ship. "We have had several whales come into Baltimore this way in the last 10 to 15 years," he adds.

Although ocean ships are unlikely to be stripped of their bulbous bows anytime soon, the new report on collisions should help managers of marine mammal populations find ways to prevent some whale deaths. Information in the study is being used to develop safer speed limits for whale-watching boats off the New England coast, Laist says.

## Rerouting ships

Also, route restrictions are being proposed for ships in the right-whale calving area that extends along part of the Georgia and Florida coasts. Pregnant right whales and females with newborn calves spend late winter and early spring at the calving ground, which reaches roughly 20 miles out to sea from the shore.

Laist says that to reduce the number of ship-whale encounters, vessels may be



Researchers discover the skeletal beak of a whale washed ashore. Strandings such as these allow scientists to study the elusive mammals.

they cross busy sea-lanes plied by ships leaving and entering New York, Philadelphia and other East Coast ports. Some of the whales end up as accident statistics.

## Studying whale strikes

Mead is one of the co-authors of "Collisions Between Ships and Whales," published in the journal *Marine Mammal Science*. Drawn from historical records, whale-stranding surveys and other sources, the paper is the first effort to pull together information on the circumstances that cause ships to strike whales—findings that could help reduce the number of such accidents.

For "Collisions Between Ships and Whales," Mead mined his stranding records, as well as similar data for the British Isles collected by British Museum scientists since 1913. The report also draws on records of whale deaths in France, Italy and South Africa.

In addition to Laist and Mead, the collision study's other authors are Amy R. Knowlton, Right Whale Research, New England Aquarium; Anne S. Collet, Center for Research on Marine Mammals, La Rochelle, France; and Michela Podesta, Milan Museum of Natural History, Italy.

Historical records show that ship strikes deadly to whales began occurring in the

"the maximum speed of most large ocean-going ships began to exceed 14 to 15 knots per hour, and most new passenger vessels were exceeding 20 knots per hour."

## Research findings

The report presents detailed descriptions of 58 collisions between whales and destroyers, aircraft carriers, submarines, passenger liners, cargo vessels and whale-watching boats packed with eco-tourists. They take place in seas ranging from the Bay of Bengal to the Mediterranean.

"After midnight under a full moon and in calm seas, a sudden shudder was felt throughout the ship," begins a firsthand

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# When mysteries remain, aircraft restorers choose an alternate route

By Jo Hinkel  
Special to Research Reports

The “detectives” had already come and gone by the time visitors arrived at the Smithsonian National Air and Space Museum’s Paul E. Garber Preservation, Restoration and Storage Facility in Suitland, Md. The detectives were aviation experts searching for clues that would enable them to accurately and completely restore the Nieuport 28C.1, a vintage World War I aircraft.

The Nieuport 28C.1, along with other aircraft from World War I, will be on public display when the Air and Space Museum’s Steven F. Udvar-Hazy Center opens at Washington Dulles International Airport in December 2003.

“The Nieuport 28 was the first fighter plane to carry American colors into combat in organized American units, under American command and in support of American troops,” says Peter Jakab, the curator responsible for World War I-era airplanes in the Air and Space Museum collection.

## Looking for clues

“Each historic aircraft calls for a different level of preservation or restoration,” Jakab explains. To determine whether an aircraft requires conservation only, minor repairs or major restoration, he and Chief Conservator Edward McManus, along with restoration specialists, become historical detectives. They pieced together clues from the aircraft’s present condition, manufacturers’ blueprints and maintenance manuals, paint samples, personal recollections of those connected with its past performance and official documents.

An artifact’s provenance, or origin, provides other vital information. For example, is the aircraft made up of components from several aircraft, or has it remained relatively untouched since it rolled off the assembly line? Does it mark a breakthrough in aviation history? Who was the owner before it became part of the national collection? Only after such questions have been answered and the history of the aircraft has been established can the museum specialists’ work begin.

## About the Nieuport

Developed in 1917 by a French manufacturer, Société Anonyme des Etablissements Nieuport, the 28C.1 was adopted by the U.S. Air Service of the American Expeditionary Force. Following World War I, 88 Nieuports were returned to the United States. Of these, 12 were used by the U.S. Navy for shipboard launching trials and the remaining 76 were operated by the U.S. Army at bases and airfields throughout the country.

Many of these Nieuports later found their way into private hands and were used for air racing or commercial enterprises. Some even found their way into Hollywood films, most notably the popular “Dawn Patrol” films of the 1930s. But was the museum’s Nieuport one of these? Its provenance was a mystery that Jakab and Ted Hamady, longtime volunteer research assistant, had to solve before restoration could begin.

The Air and Space Museum acquired the aircraft in 1986 from Cole Palen, the

founder and operator of the Old Rhinebeck Aerodrome Museum in Rhinebeck, N.Y. Palen restored the airplane in 1958 and flew it in his air shows until 1972, after which he loaned it to the Intrepid Sea-Air-Space Museum in New York City for display.

Sifting through clues to its earlier history proved difficult for a number of reasons. The aircraft purportedly had been flown with

from World War I. The Nieuport, with its full-span wings, makes it highly probable that Palen assembled a single airplane from the best components shown in the Orange County Airport photographs. Since no detailed records of the trade between Mantz and Palen exist, Jakab says, it was impossible for him to confirm his deduction. In 1986, Palen traded his airplane to the Air and Space Museum for a Nieuport 10 two-seater trainer.



This fully restored Nieuport 28C.1 will go on view in the Steven F. Udvar-Hazy Center when it opens at Washington Dulles International Airport in December 2003. (Photo by Mark Avino)

the U.S. Air Service in World War I, was one of 12 U.S. Navy Nieuports, had been used in “Dawn Patrol” and belonged to millionaire Howard Hughes. But Jakab’s thorough sleuthing found all these claims to be erroneous.

## Different serial numbers

How, then, was the mystery of the Nieuport’s provenance solved? The numbers and markings on its airframe gave Jakab valuable clues. Five different serial numbers appear on the Nieuport—6497 on the firewall, 7103 and 7226 on the upper wings, 6465 on the lower left wing and 6432 on the lower right wing. The upper wings have a manufacturing date of February 1919; one lower wing is dated November 1918, the other October 1918.

World War I ended on Nov. 11, 1918, so it is evident that the museum’s Nieuport saw no wartime service. Jakab discovered that none of the five serial numbers matched those of the Navy aircraft, nor does the airframe show evidence of any Navy modifications.

Did the museum’s Nieuport “go Hollywood”? Jakab says: “At best, this only can be said of the fuselage.” From movie stills, it is clear that the “Dawn Patrol” Nieuports had their wings shortened by several feet, whereas the Air and Space Museum aircraft has full-span wings.

In 1941, Paramount Pictures sold the four “Dawn Patrol” Nieuport 28s to famed movie stunt pilot Paul Mantz. Photographs of the Mantz airplanes taken in the mid-1950s at the Orange County Airport in California show the airplanes disassembled and in derelict condition. In addition to the four clipped-wing Nieuports, the pictures reveal another set of full-span wings that Mantz had apparently acquired from another service.

In 1957, Mantz traded Palen a Nieuport for a Standard J-1, a two-seater trainer

Concluding that the Nieuport housed at the Garber Facility is an assemblage of various aircraft, all manufactured at the end of or immediately after World War I, Jakab believes that the components are from the 88 Nieuports sent to the United States after the war. None of the Air and Space Museum serial numbers match any of the 12 Nieuports used by the U.S. Navy.

He, therefore, surmises that aircraft components came from the remaining 76 that were operated by the U.S. Air Service at a number of bases around the country. But proving definitively from which base components of the Air and Space Museum aircraft came will be a challenge, Jakab says. No documentation has yet been found matching specific serial numbers to particular bases.

Unraveling the history of the Nieuport 28 led Jakab to recommend that the aircraft be fully restored as one of the wartime U.S. Air Service Nieuport 28C.1s, piloted by 1st Lt. James Meissner. He flew with the famous “hat-in-the-ring” 94th Aero Squadron, which was the first fighter squadron formed by the United States during World War I. It was known as the “hat-in-the ring” squadron because of its distinctive insignia, which reflected the United States’ entry into war in 1917.

Because the history of the museum’s Nieuport could not be documented with any specificity, and certain configurations could be ruled out, the most reasonable approach was to represent the aircraft in accordance with the rationale for bringing it into the collection—its place in U.S. air operations during World War I, Jakab says.

## Fabricating new parts

Careful inspection of the aircraft revealed that many of the replacement parts incorporated by Palen in his 1958 restoration

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Max Gainer, left, restoration volunteer at the Paul E. Garber Facility, and Rich Horgan, restoration specialist, work on the wings of the Nieuport 28C.1. (Photo by Carolyn Russo)

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European English, and differences in common names—there are six very different birds known as robins—all went well.

"It's the first time I've worked with so many of my colleagues on a book," Wilson says. "We've just been consolidated into one department, Systematic Biology, and I think it's great that *Animal* coincides with that [change]."

The team scrutinized images for color and anatomical accuracy. "Zebras were pretty easy," Wilson says with a smile. For less-straightforward creatures, they turned to the Smithsonian's huge collections of specimens. "Of course, we don't have whole whales. So our goal was to look at as many different high-quality photos as we

could be sure the artist's depiction was as close as could be."

Wilson sees the Smithsonian-Dorling Kindersley relationship as the perfect marriage of two exceptional organizations, one that excels at production and marketing, and another that is a superb source of quality information. "Often, at the end of a long project, one is inclined to say, 'Never again,'" he adds. "But that's not the case with this." In fact, Product Development and Licensing and Wilson are working on a spin-off book, a *Handbook of Mammals*, based on the "Mammals" section in *Animal*.

*Animal* lists for \$50 and is available from most bookstores and online book sellers, at the Museum of Natural History Museum Store and at SmithsonianStore.com.

'Whales,' continued from Page 4

instructed to sail directly east or west across the zone. Once past the 20-mile limit, they can resume cruising north or south toward their next port.

"Collisions Between Ships and Whales" focuses on mishaps involving motorized vessels because those faster ships are considered more dangerous to marine mammals. But old-time sailing ships have sometimes rammed whales, too. "Those ships were quiet," Mead says. "The whales would be lying around not even aware that the ships were bearing down on them." However, a wind-driven ship, slower and with a traditional bow design, was less likely to deliver a deadly blow to the whale that got in its way.

"We just had an interesting event," Mead says, referring to a June collision off Bermuda between a 32-foot sloop named Kestrel and an unknown species of whale.

"The impact staggered us," wrote Washington Post reporter Kathy Sawyer, who was on the Kestrel when it struck the whale. "We heard the raspy crunch of fiberglass flexing under stress."

Although the whale was probably not seriously injured, a plug of its flesh jammed the sloop's toilet-intake valve. Sawyer presented a sample to Mead, and DNA analysis should reveal the species and sex of the unlucky whale.

Meanwhile, the report serves as a useful reminder that, on land or at sea, it pays to look both ways before you cross.

'Violins,' continued from Page 2

Along the sides of the violin known as the "Greffuhle" (named for a French nobleman who once owned it), Stradivari executed an arabesque pattern of foliage, eagles and spotted leopards. The master carved the design into the maple and then filled it in with a black substance.

Violinmakers and scholars have wondered about the composition of that black material for years. "The legend has always been that it's some kind of an ebony dust mixed with animal-hide glue," Sturm says. "Lampblack was another guess. In truth, nobody has ever really taken it apart and looked at it." Until now.

#### A close-up look

Sturm went to Melvin Wachowiak of the Smithsonian Center for Materials Research and Education for analysis of the material. Trained as an artist and conservator, Wachowiak has often come to Sturm's rescue on questions about coatings on the Museum of American History's musical instruments.



According to the research team, the inlaid design in the ribs of the Greffuhle Stradivari violin, circa 1700, depicts eagles and spotted leopards. (Photo by Gary Sturm)

Using a microscope, Wachowiak employed an extremely fine hypodermic needle to cut six tiny samples from different locations along the Greffuhle's sides. "I used the needle like a little chisel or a scalpel," he says, explaining that he wanted to avoid any visible removals that would require restoration on the violin. "I took a sample from an edge where there was a crack and where I could already get in underneath the varnish."

Infrared analysis of those samples indicated that the dark substance used by Stradivari is shellac, a wood-finishing material derived from resinous secretions of the Indian lac insect. But that isn't the end of the investigation.

#### CT scanning

Violinmakers would like to know how Stradivari went about carving his eagles and leopards, which are a mere millimeter thick, into the sides of the Greffuhle. The answer requires knowing the depth of his incisions. Sturm says, "Bruno's going to solve that problem, I'm sure."

He means Bruno Frohlich, an anthropologist at the Museum of Natural History and maestro of the museum's two CT scanners. Donated by Siemens Medical Systems and Siemens Corp., they are the same machines that hospitals use to make 3-D images of the insides of patients' bodies. Frohlich says he has used the CT scanners to peer inside "spacesuits, fossils, mummies—and now, violins."

"The CT scan is giving us an interior view of the Greffuhle," Sturm says of scans made by Frohlich. "I can see repair work on the interior that wasn't obvious before.

That gives us a sense of history of use and originality, of how much of the violin is still with us as it left the maker's hand."

CT scanning is providing the information about the thickness of pieces of wood in the Greffuhle. With refinements by Frohlich to the computerized scanner's software, the depth of Stradivari's decorative carving should also become known.

Stradivari left no record indicating why the violin was embellished with eagles and leopards. "Are they icons of the time?" Sturm wonders. "Did they mean good hunting or wealth?"

To find out, he has roped in more collaborators. Last February, historians of art and music, along with violinmakers, musicians and conservators, attended a one-day seminar on Stradivari's decorated instruments. There are 11 such instruments out of the more than 1,000 he made.

Sponsored by the Museum of American History and the National Gallery of Art's Center for Advanced Study in the Visual Arts, the seminar was the first formal attempt to understand the significance of Stradivari's ornamentation. It also was to determine who the master craftsman's customers might have been and whether the violins were made to order or produced on speculation.

CT scans and chemical sampling are in the works for the other three instruments in the Axelrod Quartet. The findings of Sturm, Wachowiak and Frohlich, including downloadable, full-scale drawings of the construction of the Greffuhle, eventually will be posted on Smithsonian Web pages.



The inlaid ribs and tops of three Stradivari violins are the subject of research by a team of Smithsonian scientists and scholars. (Photo by Eric Long)

'Nieuport,' continued from Page 5

were not made to the original specifications. All nonstandard repairs that had been made by him and previous owners were identified and removed.

Following original specifications, museum specialists fabricated new parts. Molded plywood "skins" for the tail sections were fabricated following the procedures used by the French manufacturer.

While looking for replacement parts, Jakab located a set of original Nieuport wheels and numerous other parts at the Champlin Fighter Museum in Mesa, Ariz., in addition to other places. Restoration specialists closely matched an original sample of fabric, totally replacing the modern aircraft fabric that Palen had applied. By analyzing paint on fabric samples from surviving Nieuport 28s that were flown by members of the 94th Aero Squadron, museum specialists replicated the French factory-applied, five-color camouflage.

Only vintage black-and-white photographs existed of the "hat-in-the-ring" insignia, so Jakab was unsure of the paint color of the ring. To find the answer, he turned to modern computer technology. Using digital imaging processing, Geographer Andrew Johnston of the museum's Center for Earth and Planetary Studies helped to narrow the color possibilities uncovered by Jakab's research, which indicated that the insignia was either yellow or green.

Brightness values from the original photographs were compared with brightness values of the color possibilities. Although Johnston was unable to pinpoint the exact shade of paint, he could see that the brightness of the ring in the photo is closer to the brightness of yellow than to green.

In addition to the insignia, Meissner's Nieuport carried a "Fight or Buy Bonds" poster on the top right wing panel. The poster was designed by artist Howard Chandler Christy in 1917 for a Liberty Bond campaign. An original poster acquired from the Smithsonian's National Museum of American History was reproduced and attached to the wing, completing the restoration process.

The fully restored aircraft is currently in storage at the Garber Facility awaiting completion of the Udvar-Hazy Center.

## Research Highlights

**New museum director.** Ned Rifkin, director of the Menil Collection and Foundation in Houston, has been selected to be the third director of the Smithsonian's Hirshhorn Museum and Sculpture Garden. He will begin work on Feb. 1. Rifkin succeeds James Demetrian, who retired in early October after nearly 17 years at the post. Rifkin's extensive experience includes serving as director of the High Museum of Art in Atlanta (1991 to 1999) and as chief curator of the Hirshhorn (1986 to 1991).

**Poisonous birds.** Several years ago, John Dumbacher, a research associate at the Smithsonian National Zoological Park's Conservation and Research Center in Front Royal, Va., and his colleagues described potent neurotoxic alkaloids found in two New Guinean bird genera, *Pitohui* and *Ifrita*. The toxins are among the most poisonous natural substances known, and it appears that the birds may use the toxins for defense against their natural enemies. Dumbacher is now collaborating with scientists at the Smithsonian's National Museum of Natural History and the Conservation and Research Center to study how the birds get the toxins, how they use them and how they remain insensitive to such high levels of toxins in their own tissues.

**Science Commission.** The second meeting of the Science Commission, which was set up last summer to advise Secretary Lawrence M. Small and the Smithsonian Regents on the subject of science at the Institution, was held Nov. 13. Members discussed information gathered in meetings that had been held by the commission's Executive Committee with staff in the U.S. Office of Management and Budget and the Committee on House Administration. Also discussed were Executive Committee meetings with the directors of all the Smithsonian's science organizations,



**Ned Rifkin will take over as the third director of the Hirshhorn Museum and Sculpture Garden on Feb. 1.**

along with recommendations contained in two reports prepared in 2000 about research at the Smithsonian's National Museum of Natural History. The commission also is reviewing strategic planning and budgeting process models at other agencies. On Dec. 13 and 14, the Science Commission held its third meeting. At press time, details of the meeting were not available.

**American postal system.** Jeffrey Brodie, a museum specialist in the Smithsonian's National Postal Museum, is exploring the history of the American post office during the American Revolution and its role in the new society. He is looking at the form and functions of the British postal system in Colonial America compared with the U.S. Post Office created during the American Revolution.

**Baby elephant.** On Nov. 25, a male Asian elephant was born at the Smithsonian's National Zoological Park. The calf, which weighed in at 325 pounds, was born to the youngest of the National Zoo's Asian elephants, 25-year-old Shanthi. The birth was



**The Smithsonian National Zoological Park's new Asian elephant, weighing in at 325 pounds at birth, huddles close to his mother, Shanthi. (Photo by Jessie Cohen)**

a result of artificial insemination. It is the fourth successful artificial insemination of an elephant in the United States and the fifth in the world.

**Young scientists.** The Smithsonian hosted 40 middle-school students ages 11 through 14 from across the country who competed in the Discovery Young Scientist Challenge. During the three-day event, held Oct. 22 to 25, students competed under the direction of Smithsonian scientists, historians and educators from the National Museum of Natural History, the National Museum of American History and the National Zoological Park in a quest to be named "America's Top Young Scientist of the Year." Branson Sparks, 14, of Alexandria, La., won the title and a \$15,000 scholarship.

## Series Publications

The following publications on research in various fields were issued during the period July 1 through Nov. 30, 2001, by Smithsonian Institution Press in the regular Smithsonian series. Diane Tyler is managing editor. Requests for series publications should be addressed to Smithsonian Institution Press, Series Division, 750 Ninth St. N.W., Suite 4300, Washington, D.C. 20560-0950.

### Smithsonian Contributions to Paleobiology

- 92 *Triassic Gastropods of the Southern Qinling Mountains, China*, by Jinnan Tong and Douglas H. Erwin. 47 pages, 11 figures, 6 plates, 5 tables.

### Smithsonian Contributions to Zoology

- 613 *Phylogenetic Study of the Neotropical Fish Genera Creagrutus Günther and Piabina Reinhardt (Teleostei: Ostariophysi: Characiformes), with a Revision of the Cis-Andean Species*, by Richard P. Vari and Antony S. Harold. 237 pages, 97 figures, 60 tables.

## Books & Recordings

**Conducting Post-World War II National Security Research in Executive Branch Records: A Comprehensive Guide**, by James E. David (Greenwood Press, 2001, \$79). This book provides considerable detail on the quantity, nature and public accessibility of records pertaining to national security. Copies of the book may be ordered by calling 1 (800) 225-5800 or ordering online at [www.greenwood.com](http://www.greenwood.com).

**Societies in Eclipse: Archaeology of the Eastern Woodlands Indians, A.D. 1400-1700**, edited by David S. Brose, C. Wesley Cowan and Robert C. Mainfort Jr. (Smithsonian Institution Press, 2001, \$65 cloth; \$29.95 paper). Archaeologists combine their current discoveries with insights from anthropology, history and Native oral traditions to examine the cultural transfor-

mations among the Eastern Woodlands tribes immediately preceding and following the arrival of Europeans.

**Bogolan: Shaping Culture Through Cloth in Contemporary Mali**, by Victoria L. Rovine (Smithsonian Institution Press, 2001, \$45). The author explores the revival of a traditional African textile, featuring black- or brown-and-white geometric patterns, known as "bogolanfina," "bogolan" or "mudcloth."

**At the Controls: The National Air and Space Museum Book of Cockpits**, edited by Tom Alison and Dana Bell (Stoddart/Boston Mills Press, \$39.95). This book documents 45 of the world's premier historic aircraft and spacecraft, with an extremely wide-angle lens mounted on a short-bodied large-format architectural camera, to duplicate the sensation of being at the controls, in the cockpit. Copies of the book may be ordered by calling 1 (800) 805-1083.

**African Predators**, by Gus Mills (Smithsonian Institution Press, 2001, \$39.95). Award-winning photographer Martin Harvey's dramatic images complement the



**Although much smaller, the aardwolf resembles the striped hyaena. It is one of the animals featured in African Predators.**

author's extensive field research to bring 14 species of African carnivores to life.

**A New Century of Biology**, edited by W. John Kress and Gary W. Barrett (Smithsonian Institution Press, 2001, \$35 cloth; \$17.95 paper). Eleven contributors, who are leaders in their scientific fields, address how their discipline must evolve to address the future of biology in the 21st century.

**Mason Patrick and the Fight for Air Service Independence**, by Robert P. White (Smithsonian Institution Press, 2001, \$24.95). Although Patrick did not earn his "wings" until 1923, he transformed the Air Service and set it on the path to independence from the U.S. Army.

**See America First: Tourism and National Identity, 1880-1940**, by Marguerite S. Shaffer (Smithsonian Institution Press, 2001, \$55 cloth; \$18.95 paper). The first comprehensive assessment of tourism and the formation of a 20th-century American identity, the book chronicles the birth of modern American tourism between 1880 and 1940.

**Ecology of the Marine Fishes of Cuba**, edited by Rodolfo Claro, Kenyon Lindeman and Lynne R. Parenti (Smithsonian

*'Books,' continued on Page 8*

## Looking at Life Magazine

Edited by Erika Doss (Published by Smithsonian Institution Press, 2001, \$29.95)

The appearance of the first issue of Life magazine, on Nov. 23, 1936, marked an unprecedented event in the history of American magazine publishing. Life—with its distinctive visual style, dramatic use of the photo-essay and mandate to show readers the world—was a new kind of magazine. It reported on everything from sports and entertainment to science, politics and war. The magazine was an instant success, with Americans buying more than 5 million copies each week.

*Looking at Life Magazine* focuses on how the magazine, in its editorial and pictorial styles, played a leading role in shaping American national identity—from the Great Depression through the Vietnam War. For more than 35 years, the magazine's popularity hinged on its innovative combination of photographs, easy-to-read captions and fresh editorial content.

How and why did Life become so popular? What political and social views did it reflect and project? How did the editors try to create an image of a unified and classless nation? And why did the magazine ultimately fail? Thirteen contributors attempt to answer these questions and more.

In essays ranging from the magazine's coverage of civil rights, sexuality and the atomic bomb to its treatment of

religion, masculinity and the counterculture, the contributors explore Life's style and public response. "From its first issue," contributor Kelly Ann Long writes, "Life aimed to serve as an eyewitness to world events."

Erika Doss, professor of art history and director of the American Studies Program at the University of Colorado, Boulder, and editor of the book, recalls growing up reading the magazine and being astounded by the high quality of the photos. "I remember cutting out pictures and putting them on the walls of my bedroom," she says. "Visually, for me, it was like going to museums and buying posters."

How then did this magazine shape and direct America? Doss asks. "It was a magazine like no other," she says, "and it offered something for everyone. Even today, my own kids—10 and 12—spend hours looking at old copies that I have."

But Doss didn't want *Looking at Life Magazine* to be about topics that Time-Life Inc. covers in its *Best of Life* books. "Instead of focusing on photographs of World War II, the Space Race or celebrity movie stars," she says, "this book aims at a critical and historical understanding of how Life magazine shaped American attitudes about race, class, gender, sex and consumerism, especially in the post-World War II era." In the end, what emerges is a book about why Life picked certain topics and how it presented them.



This image accompanied an article, "Life Goes to a Party at the Savoy With the Boys and Girls of Harlem," which appeared in the Dec. 14, 1936, issue of Life magazine. (Photo courtesy of George Varger/TimePix)



This image (detail) on the cover of *Looking at Life Magazine* also appeared on the cover of Life's 10th anniversary issue in November 1946. (Photo by Herbert Gehr/TimePix)

The book is the result of a 1995 conference on Life magazine hosted by the University of Colorado's American Studies Program. At the conference, approximately 30 presenters gave papers on various aspects of the magazine—including its audience; its founder, Henry Luce; and important photographers such as Gordon Parks and W. Eugene Smith.

—Jo Ann Webb

'Books,' continued from Page 7

Institution Press, 2001, \$55). Originally published in Spanish in 1994, the book has been completely updated and revised for this English edition, which collects and expands on the findings of more than 20 years of work by an international team of ichthyologists and marine biologists studying the coastal fishes and habitats of Cuba.

**There is No Eye: Music for Photographs** (Smithsonian Folkways Recordings, 2001, \$15 CD). Compiled and produced by photographer, filmmaker, folklorist and musician John Cohen in conjunction with a book of his photographs, this compact disc is a historical document of his folk scene—from the mid-century American zeitgeist to his international travels.

**Traditional Music of Peru 6: The Ayacucho Region** (Smithsonian Folkways Recordings, 2001, \$15 CD). This compact disc is a collection of 27 recordings that are the first from Ayacucho to be made available since that region's period of heavy conflict in the early 1980s and 1990s.

**Traditional Music of Peru 7: The Lima Highlands** (Smithsonian Folkways Recordings, 2001, \$15 CD). This compact disc of 25 field recordings offers an intensely honest glimpse into the lives of the people of this region.

Books published by Smithsonian Institution Press can be ordered from P.O. Box 960, Herndon, Va. 20172-0960. To order by phone or for more information, call 1 (800) 782-4612. There is a \$3.50 postage and handling fee for the first book ordered and \$1 for each additional book.

Smithsonian Folkways Recordings can be ordered from Smithsonian Folkways Mail Order, 750 Ninth St. N.W., Suite 4100, Washington, D.C. 20560-0953. To order by phone or for more information, call (202) 275-1143 or 1 (800) 410-9815. There is a \$5.50 fee for shipping and handling of the first 15 recordings ordered; call for other shipping prices.

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