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Research Reports

CONSERVATION

Chinese ancestor portraits are restored to their stunning, original beauty

By Brenda Kean Tabor
Special to Research Reports

In 1989, Jan Stuart and Shen Fu stumbled, almost by chance, upon an unusual treasure trove of Chinese art. It was a discovery that led to a painstakingly executed two-year conservation project and the first exhibition in the West in more than half a century to focus on Chinese ancestor portraits. "Worshiping the Ancestors: Chinese Commemorative Portraits" opened at the Smithsonian's Arthur M. Sackler Gallery June 17.

It all began with an unexpected phone call from a colorful 87-year-old horse breeder named Richard Pritzlaff, who lived in New Mexico. He owned more than 80 large Chinese ancestor portraits and was interested in donating them to the Smithsonian. Stuart and Fu, curators at the Smithsonian's Freer Gallery of Art/ Arthur M. Sackler Gallery, arranged a trip to his ranch and were astonished to find that "hanging in his house and hidden in a bank vault, was a large collection of intricately detailed, brightly colored, nearly life-sized Chinese ancestor portraits of members of the Qing dynasty (1644-1911) Imperial family," Stuart says. "There also were other elite, as well as stellar, portraits from the Ming dynasty (1368-1644)."

A fine collection

Pritzlaff, who had bought some Chinese portraits for his enjoyment, received the majority of the paintings unsolicited in the 1940s from his friend, Wu Lai-hsi, a preeminent, internationally respected art dealer. Wu had fallen on hard times during the chaos following the Japanese invasion of China and also was concerned about the safety of the collection he had assembled.

Pritzlaff compensated Wu for the portraits and, over the succeeding decades, had tried to interest a number of museums in acquiring them.

At one point, in the mid-1980s, the portraits were owned briefly by former presidential contender Ross Perot, who had initially visited Pritzlaff's ranch to look at his Arabian horses and, in the process, had purchased the portraits. But when Perot failed to commission a building to display the portraits, Pritzlaff bought them back.

Pritzlaff had trouble finding purchasers because, until the late 1980s, the value of ancestor portraits was not generally recognized in the West. Before the fall of the Qing dynasty, ancestor portraits were rarely available on the market. Historically, they were never sold and seldom exhibited publicly. Possessing portraits of someone else's ancestors was considered an anathema, if not downright dangerous.

After the fall of the Qing dynasty in 1911, however, more portraits began to reach the marketplace due to the reduced circumstances of the Qing nobility. Wu became one of the first collectors/dealers to recognize their value as art and, by 1940, had acquired a large collection.

On viewing the collection, Stuart and Fu immediately recognized their value, not only as art objects but also because of the sociological and anthropological information that could be gathered from them. Ancestor portraits were traditionally the focal point of a ceremony honoring a family's forebears, because after death, it was believed that these ancestors had the power to influence their progeny's health and well-being.

Painted by anonymous studio artists either before the death of the subject or posthumously, the portraits provide a wealth of visual information about the material culture of the time.

The portraits find a home

The curators arranged for the Sackler Gallery to acquire the paintings from Pritzlaff and shipped them to the gallery, where they were examined by conservators.

"Most of the larger portraits displayed typical problems of staining on the silk and painted surfaces, and there was also horizontal creasing and cracking," says Paul Jett, head of conservation and scientific research at the Freer and Sackler galleries.

"We applied for and received two grants for conservation and exhibition support," he adds. They hired two additional conservators, including Yuan-Li Hou, who had worked at the National Palace Museum in Beijing for 10 years, to help the staff conservator, Xiangmei Gu, with the work. Gu's 15-year experience restoring hanging scrolls, hand scrolls and albums at the Shanghai Museum before joining the Freer Gallery staff in 1990 would come in handy.

"Because most of the portraits are 11 feet tall by 4 feet wide, size was a challenge," Jett says. Consequently, they had to convert one room of the Sackler and Freer galleries' Conservation Department into a lab, as well as purchase two large Formica-topped tables to work on the portraits.

Assessing the damage

"The first thing we did was estimate how many of the portraits needed treatment and how many had to be completely remounted," says Gu, who directed the restoration. "Of the 34 that were chosen for the exhibition, 18 needed treatment, but the silk borders and backing paper could be kept. Fourteen had to be completely remounted because the silk borders and paper backings were torn or missing or were very dirty and brittle." The other two did not need remounting.

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In this portrait, Prince Hongming (1705-1767) of the Qing dynasty Imperial family is dressed in a semiformal court dress that was considered appropriate for winter.

Profiles in Research

Aviation history ■ Peter Jakab talks about Wilbur Wright and Orville Wright with an old familiarity—almost as if they were acquaintances, if not good friends. While the 43-year-old curator at the Smithsonian's National Air and Space Museum isn't old enough to have grown up with the Wright brothers, he does "know" them quite well. After all, he has been researching them and their invention for the last 18 years.

"These guys were more than just bicycle mechanics from Dayton, Ohio, who, technically, didn't finish high school," says Jakab, whose specialty is the history of technology and invention. "They were fine engineers, who not only invented the first airplane but also pioneered the basic approach to aeronautical engineering."

Jakab turned his attention to the Wright brothers in the mid-1980s after coming to the Air and Space Museum on a Smithsonian fellowship. He worked on several special projects, one of which included helping to write a book to accompany the restoration of the Wright Flyer.

Peter Jakab beside a portrait of Wilbur Wright in the National Air and Space Museum (Photo by Jo Ann Webb)

As fate would have it, the curator in charge of the restoration and book project took a position at another Smithsonian museum, and Jakab was asked to complete the book. He spent countless hours going through the Wright papers, the bulk of which had been deposited at the Library of Congress. In addition, he met with and talked to surviving members of the Wright family. He also spent a great deal of time studying and examining the Wright Flyer—a machine he has come to know intimately. His research ultimately led to the book *Visions of a Flying Machine*, published by Smithsonian Institution Press.

Jakab eventually landed a full-time job in the museum and has been there ever since. His curatorial responsibilities include aviation prior to World War I. He also is in charge of the World War I aircraft collection, as well as the military aircraft collection between World War I and World War II.

"Orville and Wilbur, neither of whom ever married and had children, were fascinating people," he says. When they wrote to the Smithsonian in 1899 asking for literature on flight, Wilbur was 32 and Orville was 27, Jakab adds. They performed their aeronautical research during the bicycle shop's off seasons. In 1900, they built their first full-size glider, which was tested at Kitty Hawk, N.C. Nine years later, the brothers incorporated their company and, a short while later, sold their first airplane. "Not bad for two bicycle mechanics from Dayton, Ohio," he says.

In addition to writings Jakab has done on the Wright brothers, he also has published an article in a book on Theodore von Kármán, a Hungarian aerodynamicist, who, in 1944, founded the Jet Propulsion Lab in Pasadena, Calif. Jakab took a particular interest in von Kármán because of his own Hungarian roots.

Jakab's father, a successful Hungarian pharmacist, and his mother, a fashion designer, fled Hungary in 1956 during the Hungarian Revolution. It wasn't until 1996 that Jakab himself visited Hungary. When his parents escaped with his older brother, Peter had not yet been born. Yet, instinctively, he felt "at home" in Hungary, he says. "Based on everything that my parents had told me as kid growing up in New Brunswick, N.J., I just knew where everything was. It was as if I had been there before."

This 2½-story Georgian-style house was brought to the National Museum of American History from Ipswich, Mass., in 1963. It is now the centerpiece of a new exhibition.

AMERICAN HISTORY

A Massachusetts house full of history finds a home at the Smithsonian

By Michael Lipske
Special to Research Reports

You may have heard the old adage, "if walls could talk, they'd have a story to tell." Well, in this case, the entire house "talks"—thanks to the help of researchers at the Smithsonian's National Museum of American History.

The real glory of the Ipswich house, says curator William Yeingst, museum specialist in the Museum of American History's Division of Social History, is the collection of human stories historians have teased from it during the last two years. The stories resulting from research on the house are of "people much like ourselves, leading everyday lives, who became part of extraordinary events that we think of as American history," Yeingst says.

An 18th-century, timber-frame dwelling, the house was snatched from a bulldozer's path in Ipswich, Mass., and brought to the Smithsonian 37 years ago. Although architecturally interesting, the reason the house went on long-term display in May in the exhibition "Within These Walls..." has less to do with its design or construction than with the succession of "ordinary families" it sheltered for some 250 years.

The house, which stood at 16 Elm St. in Ipswich, is actually two houses. Facing Elm Street was a "stylish example of the new Georgian architecture that was becoming popular in America in the 1760s," Lonn Taylor, the exhibition's co-curator, says. Bringing up the rear is part of another house, built around 1710, that was moved to the site and attached to the Elm Street house as an economical expansion.

The Ipswich house is framed in massive beams held together with mortise-and-tenon joinery instead of nails. The 2,300-square-foot home had six heated rooms to hold back the cold of Massachusetts winters. What could not be held at bay was progress, in the form of plans for a new parking lot at 16 Elm St.

Saving a landmark

The house was about to become history—in the worst sense of that word—when the phone rang one summer day in 1963 at the Smithsonian's new Museum of History and Technology, now the Museum of American History.

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Studying rats, wolves and more—it's all in a life's work for this researcher

By Michael Lipske
Special to Research Reports

Ask Louise Emmons about the time she was "stalked by wildcats," as one newspaper reported, and she chuckles and says, "Oh, that old story." She concedes that a jaguar "followed" her in the jungle. But "stalked" implies predatory intent on the part of the cat, and for that, Emmons says, there really is no proof.

A passion for research

Precise, modest, unflappable—Emmons has been described as all of these and, more importantly, as one of modern science's foremost authorities on mammals of tropical forests. A research associate for more than 20 years in the Division of Mammals at the Smithsonian's National Museum of Natural History, she has studied wildlife in Africa, Asia and, most often, South America.

She has written more than 60 scientific publications on an ark-load of beasts, including bats, squirrels, porcupines and, yes, jaguars. Emmons also is the author of the first full-scale guide to mammals of neotropical rain forests. Last year, the University of California Press published her book *Tupai*, which highlights her two-year study of the ecology of Bornean tree shrews.

Emmons is a veteran of 14 field surveys of flora and fauna in remote corners of Bolivia, Guyana, New Guinea and other countries—trips she undertook for the environmental group Conservation International. The arduous expeditions were made for the group's Rapid Assessment Program, described by one writer as a squad of "biological guerrillas" doing "quick-and-dirty" inventories of a region's species. The research team's reports have been the first accounts of the biological richness of poorly known areas—information that can prove critical in efforts to preserve ecosystems.

"I love to work in the field," Emmons says. But doing science deep in the forest for weeks at a time is anything but glamorous. She has described the work as "day after day in the mud and rain and the mosquitoes."

A giant of a find

Four years ago, on a Rapid Assessment Program expedition into an isolated part of the Peruvian Andes, Emmons discovered a new species and genus of giant rat. She found the rodent, freshly slain by a weasel, along a trail in the cloud forest. Back at the soggy, cold camp, she skinned and preserved the specimen. Upon her return to the museum, she studied the anatomy of *Cuscomys ashaninka*, as she named the rat species.

She visited Yale University's Peabody Museum to compare her find with a rat species that anthropologists excavated from Inca tombs in Peru in the early 20th century. Emmons concluded that the newly discovered rat she found in 1997 and the rats that the Incas ceremonially buried with human dead 500 years ago belong to the same genus. She believes that both species are probably alive and well in the area she describes as "an island in the sky."

The discovery of *Cuscomys ashaninka* underscores Emmons' belief that planet Earth still harbors lots of secrets. "The world is full of things we haven't yet discovered," says the scientist, sitting in her cramped and cluttered cubicle in the Museum of Natural History. New shrew species and even a new rabbit turned up recently in the United States, and Emmons herself has described other new mammals in addition to her giant rat.

Science, she says, knows of roughly 4,600 species of mammals, "but my guess is that, to the actual mammal fauna of the world, you can probably add 10 percent more, at least. Over the last decade, there have been 12 to 20 new species described every year."

Conducting research in French Guiana, located in northeast South America, Louise Emmons uses a microphone to record mammal calls. (Photo by Marc Dubois)

Naming new species

Making sense of those new species is painstaking intellectual labor. "It's a museum science involved with studying the collections and understanding variation of species, deciding what is a species, which things should have a new name and which things already have names," Emmons says. "You have to compare something that you find with the original specimen that was given a name, which may be in the British Museum, in order to find out whether it's the same or not. To do it properly can be a long process."

A very long process. Emmons is just now wrapping up her own museum-based, taxonomic study of tree-dwelling members of *Echimyidae*, the spiny-rat family of the New World tropics. Determining who is related to whom among 10 genera and dozens of species, including such handsome rodents as the red-crested tree rat and the yellow-crowned brush-tailed rat, turned out to be a much larger job than Emmons anticipated. "It must be 18 years now," she says, sighing.

Emmons considers herself privileged to be part of the place she characterizes as "the Library of Congress of biodiversity," referring to the National Museum of Natural History. "It's a very good place to be if you want to write and work on specimens. We have the biggest mammal collection in the world, somewhere on the order of 600,000 species. We have things that [John James] Audubon collected, along with animals from forests that no longer exist and from regions that, for political reasons, are now closed to researchers. It's priceless. It's irreplaceable."

In addition to her taxonomic work, Emmons is nearing the end of a five-year field study of mammals living in an area where rain forest meets savanna in Bolivia's Noel Kempff Mercado National Park. Although throughout her career she has worked mainly with small mammals—"rodents, marsupials, the little tiny critters"—one of the Bolivian species Emmons finds fascinating is the maned wolf. Actually a kind of giant fox, it is "the tallest wild dog in the world," she says, pointing to a snapshot of the animal on her wall. *Walker's Mammals of the World* describes the maned wolf as looking like "a red fox on stilts."

"We've been trying to catch them and put radio collars on them," Emmons says, but the long-legged, fruit-eating foxes have been unwilling to enter traps. In the Bolivian study, Emmons is investigating how climate change, especially global warming, might affect mammal species found at the rain forest-savanna edge.

Meanwhile, she is beginning new work in Peru with the Amazon Conservation Association, an organization recently established by two other Museum of Natural History research associates, Entomologist Adrian Forsyth and Ecologist Enrique Ortiz. In May, Emmons visited the association's biological station on the Rio Madre de Dios to set up a long-term study of seasonal changes in rain-forest leaf cover. She also will coordinate the new association's research on mammals.

"It's very exciting," she says. "It's a beautiful place, lots of species." No matter the mud, the mosquitoes or the tailgating jaguars, Emmons' enthusiasm for the rain forest and its mammals remains unquenchable. As she says, "There's so much we still don't know about the world."

Several years ago, Louise Emmons described *Cuscomys ashaninka*, a new genus and species of giant rat found in the Vilcambamba range of the Peruvian Andes. (Louise Emmons photo)

Years of research and planning bring cultures together for annual Festival

By Vicki Moeser
Smithsonian Office of Public Affairs

Of the many skills possessed by organizers of the annual Smithsonian Folklife Festival, one is especially prized: the ability to anticipate the unexpected. Like the time a sheep escaped a shearing demonstration and ended up in the elevator of the Washington Monument.

Or the time when a calf jumped the corral fence and headed down Independence Avenue during rush-hour traffic. His break for freedom was brief and ended when a cowboy on horseback—a Festival participant—lassoed him in the underground parking lot of the John F. Kennedy Center for the Performing Arts.

"When you bring together 300 to 400 of the world's most talented and interesting people," says Festival Director Diana Parker, "amazing things happen."

A performer from the 1990 Festival program entertains the crowd. (Richard Strauss photo)

"Since its inception in 1967," says Richard Kurin, director of the Center for Folklife and Cultural Heritage, which organizes the annual event, "the Festival has featured more than 20,000 musicians, artists, performers, craftspeople, workers, cooks, storytellers and other exemplars from numerous ethnic, tribal, regional and occupational cultures."

Held on the National Mall every summer for 10 days around the Fourth of July, the Festival usually includes international, regional and state, occupational and thematic programs. Typically, a Festival has three to five programs. Past Festivals featured Maryland, Southwest Indians and Labor (1972); Old Ways in the New World, Energy and Community, and American Talkers (1980); U.S. Virgin Islands, Senegal and Musics of Struggle (1990); and the Mississippi Delta, African Immigrant Folklife and Sacred Sounds (1997).

Brainstorming ideas

"Ideas for Festival programs come to us in a multitude of ways," Parker says. "Anyone can propose a program. It may be an individual scholar, or perhaps a state will come to us because they're celebrating a special event such as a bicentennial. Sometimes, it's an embassy or a nation's tourism department. Once a program is proposed, we investigate to see whether it's feasible for consideration."

Parker and her staff consider several things: Can they turn this idea into a Festival program? Is there enough substance to make the program interesting? Will it be visual and engaging?

"We have on staff some 20 scholars with backgrounds in many fields, but we don't have specialists on every culture," she says. "We need to determine whether there are individuals or institutions in place that can work with us to get the information we need."

In addition, Parker must consider a program's cost. Since most of the Festival is funded from outside the Smithsonian, she has to determine whether money can be raised for a program in the necessary timeframe, or whether it will be funded by a state or other government agency.

"These kinds of discussions usually take place at least three or four years out," Parker says. "And lately, it's been more and more the case that we're talking to people five to six years out; not so much working on the program and content, but investigating the possibilities."

At any one time, Parker could be working on up to 20 different Festival programs, all in various stages of production—in addition to managing the programs of the current Festival.

Organizing the Festival

Once Parker and her staff determine a program is a "go," she must select a curator, develop a budget, find the research money, and develop other materials needed for fieldwork and fund raising.

Diana Parker serves as a narrator at a Folklife Festival on the National Mall.

Parker explains what happens next, using the 2001 "Bermuda Connections" program as an example. "We began talking about this program several years ago. In 1999, Diana N'Diaye, the curator of the Bermuda program, Richard Kurin and I went to Bermuda. There, we pulled together several brainstorming sessions, meeting with Bermudian scholars, academics and representatives from local cultural organizations, along with educators, politicians, tradition bearers and tourism people. We talked about the Festival and explained the dynamics of this medium, and everyone discussed their ideas."

Afterwards, Parker continues, the curator crafted a research plan that covered how many people she would need to do fieldwork and how long she expected that work to take. "[N'Diaye] mapped out traditions that the Festival would look at, in addition to those that may have been missed. She determined what areas still needed to be researched."

Fieldworkers' training

Next on the agenda was a training program for local fieldworkers. There were some two dozen people doing fieldwork in Bermuda under N'Diaye's guidance. Fieldworkers ordinarily document four to five times as many people than the number that will eventually come to the Festival as participants.

Just what are the fieldworkers looking for? "We want to show living traditions at the Festival," Rich Kennedy, deputy director of the center, explains, "traditions that have been passed down in families and communities, not traditions that have been passed down in special schools or traditions that have died out and have been revived."

Fieldworkers research traditions in a number of areas, including material culture such as crafts, ceramics and textiles; music; dance; cooking; occupations; religious practices; and other traditional forms of knowledge, such as medicine and sports.

"What we hope to leave in place after this research phase," Parker says, "is a cultural snapshot, a picture of the vital grassroots culture of a particular area at that moment."

Pulling it together

Once the research is finished, the curators begin to put the program together. "This is the most complicated part of the process," Parker says. "It's like trying to put together a jigsaw puzzle."

During meetings that take place over several days, curators consider many things in order to assemble a balanced program. There can't be too much music and not enough crafts, for instance. Also to be considered are the geographic, ethnic, gender and age distribution of participants. "So while everyone needs to meet a certain level of excellence," Parker explains, "all other elements are in play as well."

"The fieldwork component of each program is crucial," Kennedy says. The commitment to collegiality and equity starts with the fieldwork phase and carries through with production and presentation. "This collaborative mode of operation respects all parties and avoids the kind of insensitive, exploitative displays done in the past," he adds.

The Festival honors the people who have kept the traditions alive, as well as the traditions themselves, Kennedy says. "There is usually a huge array of traditions from which to choose. The curatorial job is to limit and select from these traditions and to choose areas relevant to the themes you want to emphasize at the Festival."

Once the fieldworkers are trained, they may continue to use their skills after the Festival. "Most of the state programs since 1987 have done a restaging of their Festival program, usually the following summer, back home," Kennedy points out.

Indeed, the development and inclusion of a Michigan program at the 1987 Smithsonian Folklife Festival had far-reaching effects in the Wolverine state. In August 1987, the Smithsonian Festival program was restaged as the Festival of Michigan Folklife on the campus of Michigan State University, East Lansing, as the centerpiece of the first annual Michigan Festival. This festival has continued each year since 1987, building on the research done for the original Smithsonian Folklife Festival program.

Stone carver Patrick Plunkett demonstrates his skills at this year's Smithsonian Folklife Festival. (Photo by James DiLoreto)

Freezing fish embryos provides hope for saving an important food source

By Margie Gibson
Smithsonian's National Zoological Park

Following dieticians' advice to eat at least one fish dinner weekly may become more difficult in the near future. Cod, haddock, flounder and halibut—all staples at fish counters across the United States—are already overfished, and the limited wild populations that remain may not be able to recoup their losses.

Aquaculture, or fish farming, has been heralded as a tool to rebuild depleted wild populations. It already provides more than one-fourth of all fish used for human consumption, but aquaculture has both environmental and practical limitations. However, a scientific breakthrough at the Smithsonian's National Zoological Park could resolve some of the practical problems.

The breakthrough would permit the long-term preservation of fish embryos through a process known as cryopreservation, or the maintenance of fertilized eggs at extremely low temperatures for future use. This would boost aquaculture's success and improve prospects for restoring endangered fish populations.

Scientists at the National Zoo and their British and Russian counterparts are near to resolving the problem. They are developing new ways of getting the cryoprotectant into the fish embryo, which would allow it to survive freezing to minus 321 degrees Fahrenheit.

"Fish embryo cryopreservation—a puzzle that has perplexed scientists for more than 50 years—is coming closer to reality," says Mary Hagedorn, fish physiologist at the National Zoo.

In an attempt to pool the latest results on cryopreservation research, the National Zoo convened an international meeting in March 2001 of the world's leading experts on the cryobiology of fish embryos. Scientists from the United States, Britain and Russia gathered at the weeklong meeting to discuss their research. They also talked about discoveries that may eventually not only help save one of the world's most important food resources but also help conserve a number of endangered fish species. These discoveries also could lead to a better understanding of the role of genes in the human disease process.

The challenges

The technical challenges of achieving this milestone have been substantial. Although the protocols for cryopreserving mammalian embryos were developed about 30 years ago, fish embryos, as well as bird, reptile and amphibian embryos, present a greater challenge, Hagedorn says. Why the complexity, especially given that cow and even human embryos routinely survive freezing?

"The problem," Hagedorn explains, "is related to the fish embryo's much larger size and more complicated structure, which includes a yolk that supplies nutrients to the embryo." During development, mammalian embryos take up substances that provide energy. For example, glucose passes through a channel into an embryo. It is possible that these channels may also allow the entry of cryoprotectant substances, many of which are chemically related to sugars. Fish embryos, on the other hand, lack these channels found in mammalian embryos, and this complicates cryopreservation efforts.

Consistent laboratory failures that had worked with mammalian embryos, Hagedorn adds, led scientists to turn to high-tech solutions, including molecular biology and even magnetic resonance imaging, which is used in hospitals on humans.

Real-world benefits

Developing nations, where fish already provide an essential protein source for 1 billion people, may reap especially great benefits if cryopreservation can make aquaculture more effective and assure the supply of fish available for food use, Hagedorn says. "Already, providing adequate supplies of seafood to feed growing populations has threatened the world's fish stocks."

According to the World Resources Institute, nearly 70 percent of the globe's marine fish stocks are now being exploited at their biological limit or are already overfished. Fishing fleets have proliferated and are harvesting the oceans at levels far beyond their ability to replenish fish populations.

Since 1960, consumption of fish and fish products has risen by 240 percent, Hagedorn says. "What's more," she adds, "the demand for edible fish is expected to rise by at least 34 percent, if not higher, by 2010." Within a generation, a major food source for people living in developing countries will become even scarcer. If the National Zoo and several other institutes in the United Kingdom and Russia are successful in finding techniques to cryopreserve these embryos, fish farming would become possible year-round, not just seasonally.

Long-term benefits

Fish embryo cryopreservation could also have benefits close to home, not just in developing countries. "Cryopreservation would be invaluable for the preservation of endangered fish species," Hagedorn says. "It would help ensure that embryos of fish species now threatened or endangered, such as some of the Pacific Northwest salmon, could be maintained frozen in genome resource banks for several decades. They could then be reintroduced once their natural habitats were restored."

For conservation, the development of frozen or "insurance" populations would preserve genetic diversity and assist efforts to prevent extinction of wild fish species in natural aquatic ecosystems.

A human link

The ability to cryopreserve fish embryos may also help geneticists and medical researchers as they learn more about the role of individual genes in human disease. "Most people are unaware that fish—especially the tiny zebra fish—are a popular model for investigating human diseases and the function of genes," Hagedorn says. Although the zebra fish genome is smaller than the human genome, the genes are arranged similarly to those in their human counterpart.

In addition to working in the laboratory at the National Zoological Park, Mary Hagedorn also studies endangered electric fish populations in Amazonian rivers. Here, she is shown wearing a fish monitoring device, which consists of a homemade amplifier and probe attached to a bicycle helmet. The device amplifies the weak electric signals of fish in the water and turns these signals into sound. Each fish species produces a unique electric signal that identifies them, similar to songs produced by certain bird species. (Photo by Jessie Cohen)

While most of the human genome is now known, researchers still do not understand what many of the individual genes do. Researchers will be able to use these specially created zebra fish stocks to study the role of individual genes. In addition, zebra fish are inexpensive to maintain, easy to care for and simple to breed. Fish generations span a much shorter period of time than mammal generations, so a great deal can be learned in a short amount of time.

Currently, these stocks must be bred and raised in fish tanks using traditional husbandry techniques. The fish, products of years of breeding, are extremely vulnerable to technical problems, such as filtration lapses, overheating and diseases like tuberculosis. An overnight malfunction in the aquarium could wipe out a population of zebra fish that took a decade to breed. The ability to preserve the medically important stocks would permanently stabilize genetic lines and provide geneticists with an enormously valuable tool in advancing human health studies, Hagedorn says.

'Portraits,' continued from Page 1

Fortunately, "scrolls are constructed with the expectation that they will need to be repaired, and so, the wheat starch paste used to attach them to the backing is easily removed," Jett explains.

The conservation process

Where the original mounting was to be kept, creases were reinforced with backing strips of Japanese Uda paper. The combined strength and flexibility of the paper make it ideal for this purpose. The dust on the pigments of all the paintings was painstakingly cleaned off using a damp cotton swab. Special care was needed because the paint is made of mineral and vegetable pigments with an animal glue binder and is very sensitive to water, Gu notes.

Distorted paintings that were not being remounted were moistened and pulled back into shape. To strengthen the fragile pigments of the ones being remounted, 1 percent sturgeon glue was applied intermittently with an air brush, or a small brush, to the surfaces after the paintings were cleaned, explains Valerie Lee, a conservation specialist on East Asian art who was hired to assist with this project.

Xiangmei Gu, left, and Yuan-Li Hou apply the first of four layers of backing paper to one of the portraits showcased in "Worshiping the Ancestors: Chinese Commemorative Portraits."

The old silk borders and paper backings were then dampened and removed from the paintings by hand or with the aid of bamboo spatulas or tweezers. "A layer of Japanese Mino paper was then attached to the painting using a wheat starch paste," Gu says.

"We had ordered two lots of patterned and unpatterned silk from China for the borders and consulted Jan [Stuart] on the best choices for each painting, where the silk was to be dyed and the best color to be used," Lee says.

After the remounting was complete, the backs of the paintings were softened, and new rods constructed from lighter-weight powlonia wood were inserted at the top and bottom. The lighter-weight wood would help reduce the weight of the hanging portraits and prevent future tearing, Gu says.

The final results

The end product is a series of fascinating, imposing and visually stunning portraits. "Worshiping the Ancestors: Chinese Commemorative Portraits," which also features examples of clothing, furniture and jewelry similar to that found in the

A conservator uses a cotton swab to remove surface dust from one of the

portraits, is on view in the Sackler Gallery through Sept. 9.

For more information, visit the galleries' Web site at www.asia.si.edu.

'Ipswich house,' continued from Page 2

Yeingst says the call was from "a group of concerned citizens who had paid the bulldozer operator to stop work, to prevent demolishing this house, which they thought had a lot of great stories to tell."

Museum officials heeded the call. After taking measurements and making drawings and photographs, a team from Washington, D.C., dismantled the house and moved it to the museum that September. The house's massive chimney was taken apart brick by brick, and the team collected clay from Ipswich for the new mortar that would be mixed at the museum when the structure was rebuilt.

Preparing for display

To prepare for the exhibition, a variety of specialists made a thorough study of the old Massachusetts house. Hired by the museum's Division of Social History, a team of New England architectural consultants went to work determining the precise dates and sequences of modifications made to the house over the centuries.

A dendrochronologist, an expert in analyzing growth rings in wood, helped date the timber used in building the house. Another specialist performed a microscopic analysis of paint cross-sections to identify the kinds and colors of finishes that different owners had applied to inner and outer walls.

Meanwhile, the curatorial team, headed by the museum's Shelley Nickles, project co-curator, assembled the story of Ipswich house's former residents. Using research compiled over several years; visiting courthouses, libraries and other archives; and studying sources such as census data and old phone directories, the museum team identified some 75 people who lived in the home since its construction.

Finding a former resident

Historians even tracked down a living, breathing former resident. Now in his 60s, Richard Lynch lived in the Ipswich house during the 1940s. "He really helped us, because the only surviving photos of the house interior are basically as it was being brought down," Nickles says. "A lot of the interior had already been taken apart."

Lynch was able to sketch the house as he recalled it from the years when he and his parents lived there with his grandmother. "One of the big surprises is that they continued to use an outhouse until 1946, when [Lynch's] uncle, who also lived in the house, put in a toilet," Nickles says. "Not a bathtub, just a toilet."

Another prized discovery for the team was a diary kept by Mary Scott, Lynch's grandmother. The diary provides a vivid picture of life on the American homefront during World War II, when the family sent its sons to serve in the military. Richard Lynch's mother worked in a factory making bomb fuses, and his grandmother planted a Victory Garden.

The Scotts are another one of five families whose stories are told in the Ipswich house exhibition. These former residents include a veteran of the Battle of Bunker Hill, slave owners, abolitionists and immigrants fleeing Ireland's potato famine.

"It is striking that many of the largest themes of American history figure in the lives of the house's occupants—it's almost like we scripted this," Yeingst says. "We didn't."

William Yeingst, left, and Lonn Taylor stand on the second floor of the reconstructed Ipswich house on view in the National Museum of American History. (Photo by Jeff Tinsley)

Research Highlights

Science commission. The Smithsonian has established—at the request of its governing body, the Board of Regents—a science commission to advise the Secretary and the Regents. The 18 commission members, whose areas of academic interest span the disciplines from anthropology to zoology, come from universities, research institutions, museums and government agencies in the United States and the United Kingdom, as well as from the Smithsonian. Jeremy Sabloff, the Williams Director of the University of Pennsylvania Museum of Archaeology and Anthropology, will serve as chairman. The first meeting of the commission is scheduled for Sept. 6 and 7, at the Smithsonian. To assure both the candor and the confidentiality of its discussions, the commission is expected to meet for the most part in executive session, according to a schedule to be determined at the first meeting. All commission reports will be available on the commission's forthcoming Web site. Smithsonian Secretary Lawrence M. Small recommended the establishment of a commission to advise the Institution as it refines and focuses its scientific research activities.

Star-Spangled Banner. Conservators at the Smithsonian's National Museum of American History working on the Star-Spangled Banner, the 188-year-old flag that inspired the words of the national anthem, have concluded that it is more fragile than originally believed. The last year of conservation work has revealed the true shape and condition of the banner. Now that the linen backing and the approximately 1.7 million stitches that attached it to the flag have been removed, the full extent of the damage and the extreme fragility of the aging flag have become clear. Because there are areas that are completely threadbare and show evidence of old restoration efforts that have distorted the true shape of the flag, conservators and curators have

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concluded that the flag is too delicate to be hung. It must be displayed to the public on a slight incline that will protect the fabric from stress.

Wild Bill. A research team led by Douglas Owsley, a forensic anthropologist at the Smithsonian's National Museum of Natural History, has located the remains of Wild Bill Longley, a hard-talking, gun-slinging Texas outlaw who died by hanging more than a century ago. Scientists mapped about 60 graves and exhumed 24 bodies during digs that took place in 1992 and 1994. In 1998, however, the scientists struck "gold." They found Wild Bill, buried in his boots in a plain pine coffin outside a cemetery in Giddings, Texas. After extensive tests, DNA from one of Wild Bill's teeth confirmed the remains. Owsley took on the project 15 years ago to solve the mystery of Wild Bill's death. But what started out as a simple, straightforward case became a complex, rigorous project.

African American celebrations. A research project under way at the Anacostia Museum and Center for African American History and Culture that addresses African American holidays and celebrations will culminate in a new book titled *Jubilee.* It is expected to be released in 2002. The project is the brainchild of Senior Historian Portia James, who, for the last 3½ years, has been researching these traditions. They range from "Watch Night," a religious celebration that takes place the last night of the year, to historically black university homecomings and commemorative events hosted by fraternities and sororities.

Baptism is an important religious rite in the African American community, as represented in this painting (detail), titled "Born Again," by Arthello Beck Jr.

Globular clusters. A team of scientists led by astrophysicists Josh Grindlay and Peter Edmonds of the Harvard-Smithsonian Center for Astrophysics in Cambridge, Mass., used the Chandra X-ray Observatory to examine the globular cluster 47 Tucanae, located about 15,000 light-years from Earth. As some of the oldest systems in our Milky Way galaxy, globular clusters are excellent laboratories for studying stellar and dynamical evolution. Nearly all objects detected by Chandra in 47 Tucanae were found to be "binary systems," in which a normal, sunlike star companion orbits either a white dwarf or a neutron star. The data also reveal the presence of a class of exotic objects known as "millisecond pulsars," extremely dense collapsed stars that rotate between 10 and several hundred times per second.

Series Publications

The following publications on research in various fields were issued during the period March 1 through June 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 Anthropology

- 45 *An Analysis of Forensic Anthropology Cases Submitted to the Smithsonian Institution by the Federal Bureau of Investigation From 1962 to 1994*, by Gretchen A. Grisbaum and Douglas H. Ubelaker. 15 pages, 5 figures, 3 tables.

Smithsonian Contributions to Paleobiology

- 90 *Geology and Paleontology of Lee Creek Mine, North Carolina, III*, by Clayton E. Ray and David J. Bohaska, editors. 365 pages, 127 figures, 45 plates, 32 tables.

Smithsonian Contributions to Zoology

- 612 *Systematics of the North and Central American Aquatic Snail Genus* Tryonia *(Rissooidea: Hydrobiidae),* by Robert Hershler. 53 pages, 29 figures, 2 maps.

Books & Recordings

Hunting and the American Imagination, by Daniel Justin Herman (Smithsonian Institution Press, 2001, $29.95). By tracing American hunters' ideas about who they were and what they represented, the author shows how Americans claimed a continent and forged enduring ideas about manliness, race and a nation.

Moon Lander: How We Developed the Apollo Lunar Module, by Thomas J. Kelly (Smithsonian Institution Press, 2001, $27.95). The author, who was chief engineer on the Apollo lunar module project, gives a firsthand account of designing, building, testing and flying the module.

The Mind of War: John Boyd and American Security, by Grant T. Hammond (Smithsonian Institution Press, 2001, $29.95). This book offers the first complete portrait of Boyd—a first-rate fighter pilot and a self-taught scholar who, among many accomplishments, wrote the first manual on jet aerial combat; spearheaded the design of both the U.S. Air Force's premier fighters, the F-15 and the F-16; and shaped the tactics that saved lives during the Vietnam War.

Smithsonian Institution Secretary Charles Doolittle Walcott, by Ellis L. Yochelson (Kent State University Press, 2001, $55). This biography traces the administrative and scientific career of the fourth Secretary of the Smithsonian, who served from 1907 to 1927 and was the last Secretary to die in office. To order copies, write to Kent State University Press, P.O. Box 5190, Kent, Ohio 44242-0001, or call 1 (800) 247-6553. Send e-mail requests to www.bookmaster.com/ksu-press.

The Technological Arsenal: Emerging Defense Capabilities, edited by William C. Martel (Smithsonian Institution Press, 2001, $29.95). The author and a dozen contributors, all experts who are actively involved in shaping U.S. defense policy, explore the ways in which new defense technologies could change the nature of war and the basic foundation of national and international security.

Nuclear Weapons and Aircraft Carriers: How the Bomb Saved Naval Aviation, by Jerry Miller (Smithsonian Institution Press, 2001, $32.95). During the so-called "Revolt of the Admirals," respected naval leaders lobbied for the U.S. Navy's role in the new era. The book traces this struggle, which also involved serious conflicts with the U.S. Air Force and, ultimately, led to innovations in the design and engineering of carriers and aircraft.

On Biocultural Diversity: Linking Language, Knowledge and the Environment, edited by Luisa Maffi (Smithsonian Institution Press, 2001, $65 cloth; $34.95 paper). An interdisciplinary group of scholars from the social and natural sciences, as well as cultural advocates, human-rights specialists and indigenous experts, come together to discuss ways in which the losses of biological, linguistic and cultural diversity are linked.

An Archaeology of Elmina: Africans and Europeans on the Gold Coast, 1400-1900, by Christopher R. DeCorse (Smithsonian Institution Press, 2001, $45). The author examines an African settlement on the coast of present-day Ghana from the 15th through the 19th centuries, where West Africans dealt on equal terms with Europeans.

Grave Undertakings: An Archaeology of Roger Williams and the Narragansett Indians, by Patricia E. Rubertone (Smithsonian Institution Press, 2001, $40). Focusing on 17th-century Narragansett Indians, the author describes a more complicated and dynamic history of native cultural survival and persistence than previously documented by Roger Williams, who, in 1643, wrote about the languages and lifestyles of these natives in *A Key Into the Language of America.*

Herpetology: An Introductory Biology of Amphibians and Reptiles, by George Zug, Laurie J. Vitt and Janalee P. Caldwell (Academic Press, 2001, $69.95). This second edition is completely revised and provides an up-to-date overview of amphibians and reptiles, and their roles in today's environment. To order copies, write to Academic Press, Order Fulfillment Department DM63826, 6277 Sea Harbor Drive, Orlando, Fla. 32887.

Catalogue of New World Grasses (*Poaceae*: I. Subfamilies *Anomochlooideae, Bambusoideae, Ehrhartoideae* and *Pharoideae*), by Emmet J. Judziewicz, Robert J. Soreng, Gerrit Davidse, Paul M. Peterson, Tarciso S. Filgueiras and Fernando O. Zuloaga (Department of Botany, National Museum of Natural History, 2000, free). This catalog, an "in-progress" effort led by the authors, presents the current nomenclature, taxonomy, types and distribution of grasses for the region. To order copies, write to CUSNH, Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0166, or send an e-mail request to CUSNH@nmnh.si.edu. Copies are available while supplies last.

Catalogue of the Vascular Plants of Guaramacal National Park, Portuguesa and Trujillo States, Venezuela, by Laurence J. Dorr, Basil Stergios, Alan R. Smith and Nidia L. Cuello A. (Department of Botany, National Museum of Natural History, 2000, free). This catalog focuses on the latest attempt of researchers to better understand the geology, soils, climate, vegetation and flora of Guaramacal National Park in the northeastern-most portion of the Venezuelan Andes. To order copies, write to CUSNH, Department of Botany, National Museum of Natural History, Smithsonian Institution, Washington, D.C. 20560-0166, or send an e-mail request to CUSNH@nmnh.si.edu. Copies are available while supplies last.

New York City: Global Beat of the Boroughs (Smithsonian Folkways Record-

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Off the Shelf

Anuran Communication

Edited by Michael J. Ryan (Published by Smithsonian Institution Press, 2001, $50)

Frogs and toads do communicate. Studies conducted by 25 herpetologists—all experts in disciplines ranging from evolution and animal behavior to ecology and neurobiology—indicate this to be the case. Research by these scientists has culminated in a new book, published by Smithsonian Institution Press, titled *Anuran Communication.*

It is the result of a symposium in honor of the retirement of Stanley Rand, a staff scientist at the Smithsonian Tropical Research Institute in Panama since the mid-1960s and an expert on frog communication and tropical biology. The book discusses recent studies on how the frog's brain recognizes sound, how its larynx makes sounds and how both of these processes are influenced by the animal's internal physiological state.

Anuran Communication also looks at the strategies males use to call to one another; how female preferences for call variation contribute to sexual selection, speciation and hybridization; and how the structure of the auditory system might generate sensory biases that direct signal evolution.

The book is divided into five parts—"Introduction to Anuran Communication," "Physiology and Energetics," "Acoustic and Visual Signaling," "Neural Processing" and "Behavior and Evolution."

Michael Ryan, editor of the book and one of its contributors, first began working on frog communication on Panama's Barro Colorado Island in 1978 as a graduate student at Cornell University. Despite his years of research, "this very simple communication system [among toads and frogs] only grudgingly yields answers to our questions," says Ryan, a STRI research associate and a professor of zoology at the University of Texas, Austin. "We have found that to truly understand their

This newly released book discusses recent studies on frog and toad communication.

behavior, we have to do more than study the behavior itself. We need to 'peer' into their brains and into past evolutionary history."

Though an extremely technical and scientific book, sections of *Anuran Communication* read like chapters on human courtship. For example, in the chapter on "Male Advertisement Calls," contributor Sharon Emerson writes: "Some species spend only a few nights calling during an entire breeding season. Others may call over protracted time periods of days, weeks or even months.... In some species, males call in distinct bouts punctuated by periods of silence. Often, males adjust the timing and number of their call notes in response to the calls of other males."

These call parameters, as well as the amount of time a male spends calling, are primary factors in determining male mating success, writes Emerson, a professor in the Department of Biology at the University of Utah. "There is evidence for anuran amphibians and other animals that females often are attracted to males that give signals that are long, loud or delivered at high rates...," she writes.

The book also addresses the mechanisms by which amphibians recognize their kin, the contexts in which kin discrimination occurs and the functional significance of kin discrimination.

Bruce Waldman, a professor at the University of Canterbury in New Zealand and one of the book's contributors, notes that despite the propensity of some toads to return to their natal pond to breed where they will most likely encounter their brothers and sisters as potential mates, "our recent work suggests that adults also have the ability and the opportunity to recognize their close relatives.

"Kinship information encoded in males' calls might enable females to recognize their close relatives and to avoid mating with them," he writes.

"But can females decode this information and use it?" he asks. To answer this question, Waldman and the research team individually tested 29 females in a laboratory arena, observing their responses to recorded calls of two males, alternately broadcast from speakers on either side of the arena.

In each test, Waldman writes, both males were from the same pond as the female, but they were probably unfamiliar to her because the research team had recorded the males in the field during a previous year. "The females could, indeed, discriminate between relatives and nonrelatives by their calls," he notes in the book.

—Jo Ann Webb

'Recordings,' continued from Page 7

ings, 2001, $23 CD). Featuring grass-roots ensembles from New York's most vibrant ethnic communities, this double compact disc pairs the traditional with innovative cross-cultural fusions.

Red Allen: The Folkways Years, 1964-1983 (Smithsonian Folkways Recordings, 2001, $15 CD). The late Red Allen is considered to be one of the most influential bluegrass singers of all times.

The Country Gentlemen: On the Road and More (Smithsonian Folkways Recordings, 2001, $15 CD). Originally released in 1963 by Folkways Records, this compact disc offers the music of one of the most important progressive bluegrass bands.

Richard Dyer-Bennet 2 (Smithsonian Folkways Recordings, 2001, $12 CD). This reissue of the second album released on the Dyer-Bennet record label in 1956 presents some of the early tunes of Dyer-Bennet (1913-1991), who played a pivotal role in the 1950s and 1960s folk music revival.

Folkways Recordings, 2001, $12 CD). Reissue of Dyer-Bennet's fifth release on his own record label includes folksongs and ballads such as "Greensleeves," "Barbara Allen," "John Henry" and "I Ride on Old Paint."

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.

This compact disc is one of the reissues from Richard Dyer-Bennet's record label.

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