

Can Two Frozen Testicles Bring Back the Spix's Macaw?

The discovery of a parrot named Presley could help resurrect a near-extinct species.

By Roberto Kaz

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In August 2002 Mickey Santi, then a 41-year-old manager of a veterinary clinic in Denver, received an anonymous phone call. It was from a lady who lived nearby and claimed to own a Spix's Macaw. The woman hoped that Santi, who owned seven parrots, would know how to return the animal to Brazil, its home country.

At first Santi was skeptical. She was aware that the species was considered extinct in the wild. And she knew there were probably fewer than a hundred of the birds left in captivity—none in the United States. But when Santi arrived at the woman's house, she was surprised to find that the medium-sized domesticated bird with a bluish-gray head and body was, in fact, a Spix's Macaw.

To an astronomer, this would be almost like finding water on Mars. To a physician, like discovering the cure to a disease. To ornithologists, the discovery of an unknown Spix's Macaw stoked hope that, just maybe, a remarkable species might not dwindle down to one last bird in a zoo, like Martha, the Passenger Pigeon. Santi had just found what might be the world's lone unaccounted-for Spix's Macaw. His name was Presley.

By then Presley had racked up at least two decades in hiding. His exact path to Colorado is hard to track, but he was probably born around the São Francisco River in a savanna region that unites Bahia and Pernambuco, two states in northeastern Brazil. Captured as a fledgling in the '70s, he was likely taken by car to Paraguay, where he was sold to the British importer Gordon Cooke—who would later be sentenced to six months in prison for animal trafficking.

After a likely stopover to change planes in Madrid and a short stint in London, he eventually joined another very young Spix's Macaw purchased by a Colorado collector. The collector, probably aware that he was being investigated, gave the birds to the woman who would later call Santi.

The fate of the second macaw was unclear. Presley, on the other hand, had been named after the King of Rock and Roll and received the company of a female green parrot, with whom he set up housekeeping. Santi said that the owners "were good people who had children. The birds were part of the family.

The lady knew she owned a rare bird, but she had no idea how rare and precious it was.”

Presley and his companion lived in relative harmony for about two decades until 2012, when the female died. This caused Presley to sink into a depression. The owner, after seeking help from Santi, eventually signed an agreement with the feds that, in exchange for turning over Presley, she would not be prosecuted. Once informed about the bird, the U.S. Fish and Wildlife Service and the World Parrot Trust began to coordinate an effort to return him to Brazil. Since neither organization had an office in Denver, Santi was appointed Presley’s guardian.

That day Santi wrote in her diary: “Taking Presley from the home where he lived for 23 years was very difficult. I developed a relationship with him and his family, who trusted me. The family said good-bye knowing that he would be safe.”

There are three surviving species of blue macaws, all from Brazil. The largest, the Hyacinth Macaw, has a wild population of about 6,500 birds, mostly in the Pantanal region. The intermediate-sized Lear’s Macaw numbers roughly 1,000 and lives in an area known as Raso da Catarina, in northeastern Bahia. The smallest, rarest, and most famous blue parrot, the Spix’s Macaw, was formerly endemic to the caatinga, a habitat of semi-arid scrub forest in the Brazilian savanna.

The Spix’s Macaw was named for the German biologist Johann Baptist von Spix, who collected a specimen on the outskirts of Juazeiro in 1819. He and botanist Carl Friedrich Philipp von Martius had arrived in Brazil two years earlier as part of the entourage of the Archduchess Leopoldina of Austria. They were on the hunt for unusual plants and animals.

According to Carlos Yamashita, Brazil’s leading authority on parrots, Spix and Martius were probably by a river when they spotted the parrot, which is described in the book *Avium Species Novae* as “large and blue-gray in tone.” The bird was likely mummified and sent to Europe in 1820 aboard the ship *Nova Amazona*, along with thousands of insects, mammals, fish, and other birds collected by Spix. The Spix’s Macaw would not be observed again in the wild by a scientist until 1903, when the Austrian ornithologist Othmar Reiser reported seeing the species at two sites near Juazeiro. Then, in 1927, German naturalist Ernst Kaempfer recognized an individual caged in the city’s train station. After that, said Yamashita, “the whole generation of ornithologists of the ’40s and ’50s tried to find that animal.”

The search continued until 1986, when a Swiss ornithologist, Paul Roth, reported finding what he judged to be the last three macaws in the wild, near Curaçá, in the region around Melancia Creek, about 70 miles from Juazeiro. Based on the location, Roth surmised that the birds were likely related to the macaw collected by Spix. He speculated that the population had been wiped

out by hunting, wildlife trafficking, and the introduction of African bees, which compete with the birds for nest holes.

When Roth returned to the Melancia Creek area in early 1987, he found that one of the three macaws had disappeared, probably poached. The following year he heard from residents that between Christmas and New Year's Eve, the other two had also been captured. "As these trappers are not exactly gentle in their operations and they penetrated the area on this occasion with a band of armed men, none of the local people employed by us as lookouts dared to interfere," he [wrote](#) in 1990 in an article for the German magazine *Papageien*.

The species was considered extinct in the wild for the first time.

In January 1990 Brazilian wildlife photographer Luiz Claudio Marigo sent a fax to the International Council for Bird Preservation (now known as BirdLife International). Despite the supposed extinction of the species, Marigo had heard rumours of a wild Spix's Macaw. In 1986 Paul Roth had photographed three birds. Still, a little while later, IBAMA (Brazil's federal environmental protection agency) declared the species finished. "This was not making sense," said biologist Francisco Pontual. The ICBP agreed, and decided to finance a new expedition.

In June a group comprised of Marigo, Pontual, and ornithologists Yamashita, Roberto Otoch, and Tony Juniper left Rio de Janeiro in four-wheel-drive vehicles. They planned to spend a month in the areas previously mapped by Roth.

Arriving in Curaçá, the search party made camp at a farm called Concordia, the place where Roth had reported seeing the trio of macaws. Pontual remembers that the next morning he woke up early, "before the sun came up," and drove with his companions to a location indicated by a worker. "When we left the car to walk up the creek, we began to hear the macaw, as if it was the voice of a ghost. From the sound, we knew it was him."

Tony Juniper described the scene in *Spix's Macaw: The Race to Save the World's Rarest Bird*: "The cry grew louder, then louder still. Finally, the source of it came into view. Its blue plumage was visible in the first proper daylight. With a pale head, a distinctively long tail, and deep wing beats, there was no doubt what it was. We had found a Spix's Macaw. . . . We were speechless as we simply stared at a creature we had come to regard as almost mythical."

They spent a week following the animal, which was clearly uneasy about being stalked. "Repeated attempts had been made, after all, to trap it," wrote Juniper. "Its natural suspicion was what had kept it alive." When the researchers returned from the expedition, they published an account of their discovery in *Manchete* magazine. According to Pontual, IBAMA then threatened to sue them. "They said that the disclosure [of the bird's location] would be good for traffickers, as if they, the traffickers, did not know [about] that animal." IBAMA's ire was not surprising. It had established the

Permanent Committee for the Recovery of the Spix's Macaw, and it was on the verge of creating the Spix's Macaw Project to reintroduce captive birds into the wild. The project, based in Curaçá, would be headed by Brazilian biologist Marcos Aurélio Da-Ré, then 25.

Born to a family of Italian descent, Da-Ré shared with the newfound macaw the burden of being the only one of his kind in the region. He went to Curaçá in August 1991 imagining, from what IBAMA had proposed, that he would spend eight months there. (In truth, it would be seven years.) He needed to restore the habitat and protect the last of the newly discovered wild macaws. But he also needed to involve the community so that if captive animals were reintroduced, they would also be protected.

Da-Ré boldly sought the assistance of wildlife trafficker Luis Carlos Ferreira Lima, known as "Carlinhos das Araras" (Little Charlie of the Macaws), who had dominated the local pet trade since the '80s. Da-Ré had received a tip from Pontual that Carlinhos was interested in cleaning up his criminal profile. At their first meeting, Da-Ré remembered, "Carlinhos seemed cocky; he wore a gold necklace and had a luxury car." He also had an ax to grind. "He was enraged with the traffickers from a neighboring state, which, he said, took every single bird, not letting the species breed," Pontual said. Carlinhos maintained that he, on the other hand, had sold only fledglings. In a week, Carlinhos, Da-Ré, and Pontual visited four areas where traffickers were known to be active. While they found no trace of the bird, the meeting did yield one dividend: Carlinhos assured them that he would never again sell a Spix's.

The following year the Permanent Committee decided that the macaw from Curaçá would not be captured. Instead, as soon as its gender could be determined, a captive bird would be released to keep it company. "From a genetic point of view, the ideal solution would be to catch it and bring diversity into captivity," Da-Ré said. "But there were two other concerns. By removing the animal from nature, we would lose the culture of the species. It was important to keep a nucleus, so that the macaws that came after would know where the resources were." The second issue had to do with the locals. "To keep the habitat preserved in the future, it would be essential to count on the community. If we captured the animal, [they might] feel betrayed."

Feathers collected from the bird's roosting sites were sent to England for analysis, which showed the bird was a male. It was decided that the released Spix's Macaw would be a female that had been captured and sold in 1987 to a Brazilian collector. "She was not very imprinted," Da-Ré said. "She had an aloof personality, which would be advantageous in her return to the wild."

The bird was driven by car to Concordia farm, where a 70-foot-high cage would serve as her training base. When she arrived she could fly only about 165 feet a day. Four months later she could go a full two miles. Gradually, she was conditioned to a new diet featuring the seeds available in the *caatinga*. The nuts were tough to crack, and at first it took her 15 minutes to open one. But by week four, she had cut that time to three minutes.

The cage was opened at 7:22 a.m. on March 17, 1995, and 25 minutes later the female flew into the forest. “She had been born there, and must have been captured in her adulthood,” Da-Ré said, “because she knew the exact location of the tree where the macaws gathered in the past.”

Within the month she was flying 18 to 25 miles a day, and on May 15 she finally found the wild male. But she still had to seduce him away from his partner. Without a mate of his own species, the male had paired with a Blue-winged Macaw, a multicoloured bird, smaller in weight and size. Da-Ré said that women from the community were divided: “Half cheered for the Spix’s, half for the Blue-winged Macaw.”

Within a week, the female Spix’s had won over the male. Then, oddly enough, the three birds established a new kind of bond, travelling together and seemingly watching over one another. The two Spix’s would escort the Blue-winged to her overnight nest, and then return to their own. Before long, the Blue-winged was seen mating with a male of her own species. It would have been a happy ending if the female Spix’s Macaw hadn’t vanished less than three months after being released. (A cowboy would later say he had found her dead under a power line.) Da-Ré said he did not regret his decision to release the bird. “We were looking for the greatest chance of survival for the species. We chose to do something high-risk, but if we had taken the male from the wild, we would be burying the last information about the habitat.”

Months later the male Spix’s restored his relationship with the Blue-winged, and stayed true to her until 2000, when he disappeared. In the absence of a body, there were rumors that he had been captured. For the second and last time, the species was pronounced extinct in the wild, and the project was discontinued. At about the same time, in the United States, Presley was being discovered.

Arriving at his new home in September 2002, Presley was taken to Mickey Santi’s room, where he met his roommate, an African Grey Parrot named Rikki. “We thought he should have the company of a bird,” Santi said.

Lean and moody from his bereavement, Presley was greeted with toys (his favorite was a small stuffed frog) and a spray bath to polish his feathers. Santi changed Presley’s diet from industrialized food to one rich in seeds, grains, and fruits. And unlike the other seven birds of the house, he was allowed to walk across the room (good exercise for him after living for so long in a small cage). On occasion, he did the tour to the tune of Elvis’s “Blue Suede Shoes.” He “loved the song,” said Santi, who also recorded the bird’s own singing and reproduced it in a loop so that he grew accustomed to the sound of his species.

The next step was to restore his muscles. Santi left food in different parts of his cage, encouraging Presley to jump from one perch to another. Twice a day she also exercised his wings, spreading them open and moving them up and down. In time, Presley began to help, receiving pine nuts—his favorite food—in return. After three months of training and recovery, a veterinarian at the

Denver Zoo determined that Presley was strong enough to make the 20-hour journey to Brazil.

In December, Santi and U.S. Fish and Wildlife Service agent George Morrison flew from Denver to Miami, where they met Brazilian wildlife protection official Iolita Bampi, a former department head at IBAMA. Presley traveled at Santi's feet in an animal carrier provisioned with pine nuts and stuffed frogs, and Santi periodically put her fingers inside the crate so he could feel her company. Before handing Presley off to Bampi, she took him in her hands and said farewell. "It was very sad—I cried," she said. "But it was also a good cry, because I knew he would meet other birds."

Bampi and Presley transferred to another plane and hours later, after more than two decades of involuntary exile, Presley had returned to his country. "We flew straight to São Paulo, and once we got there, we drove to the zoo that had experience in dealing with the species," said Bampi. "Our expectation was that once paired with a female, Presley could mate."

After living the domesticated life for so long, Presley weighed less than a pound and showed an obvious fondness for his human handlers. They gave him a radio for company and dialed it to a news station so he'd have the constant sound of human voices. "I also put a chair in the room to spend time with him," said biologist Fernanda Vaz, head of the zoo's aviary. "And, of course, he had his toys from the United States."

Presley was placed in a cage adjacent to that of a macaw couple, but he remained a bachelor for two years. Then the owner of an aviary in Recife was forced by the government to hand over four Spix's Macaws he had obtained illegally. One of the macaws, named Flor, had been the first female born in captivity in Brazil.

In September 2004 Presley and Flor exchanged their first look. In the beginning, they stayed in separate cages so they could get used to each other. Six months later they were united. "Any approach with macaws takes time," said Vaz. Their first physical contact was anticlimactic, in part because Flor was distracted, constantly looking for her sister, who was squawking in a nearby cage. Things stayed that way for a year until the Permanent Committee for the Recovery of the Spix's Macaw decided that it was too risky for all seven of the zoo's birds to live in one place. If a disease broke out, they could all die at once.

When Presley and Flor were transferred to an aviary overlooking the forest at the Lymington Foundation, a private breeding facility two hours from São Paulo, something clicked. "The two started to actually act as a couple," said Vaz. "They were always in the nest." Between May and August 2006, Flor laid 13 eggs. Unfortunately, all of them were infertile. The committee decided that Flor would be transferred to the Loro Parque Foundation in Spain (where she would again fail to reproduce). Presley, by then in his third decade, would be retired. He would live in a cage with a Golden Conure named Killer.

Despite their differences (one was blue, the other yellow), Presley and Killer got along fine until 2013, when Killer died. Presley took it hard, falling into another deep depression. “We could not leave him alone,” said Linda Wittkoff. She and her husband, both Americans living in Brazil, were the main supporters of the Lymington Foundation. So, after just three days, Presley, like a sultan, received yet another bride. The chosen female, a Vinaceous Amazon, was named Priscilla—in honor of Elvis’s wife. Presley seemed to take to her right away, cleaning her feathers and sleeping close to her under the heat lamp. But on June 20, 2014, biologist Patricia Serafini called the vet to tell him that Presley, possibly in his 40s, wasn’t looking so good. He had barely eaten for a week, and now he was breathing hard. The next morning Presley was taken to the hospital, where veterinarian Ramiro Dias and his team put him on oxygen and treated him with medicines for his heart, lungs, and kidneys, along with antibiotics to prevent infection. They wanted to do a closer examination, but Presley appeared too weak to withstand the anesthesia. Four days later he was dead.

The Wittkoffs quickly published a statement: “As the sun rose this morning on Lymington, the world lost without exaggeration the best-known name in the bird world.” They lamented how they would miss Presley’s “cheery vocalizations as we often pass by his aviary,” and concluded: “We truly believe he had a very good life for his nearly eight last years.”

Receiving the news by email in Colorado, Mickey Santi opened her diary and wrote: “I miss you Presley and feel so honored that you shared part of your amazing life with me. I know you are at peace.”

Within a half-hour of Presley’s death, Dias was already in his car, driving the 150 miles from Botucatu to São Paulo. The bird’s body was on the passenger seat, inside a refrigerated Styrofoam box. “I felt the loss,” he said. “But I had to think immediately about the species.”

In São Paulo, Dias was met by University of São Paulo veterinarians Ricardo Pereira and Jose Luiz Catão Dias. They took Presley from his Styrofoam sarcophagus and put him on the operating table to begin the delicate task of removing his testicles. “Patricia Serafini had asked about the possibility of using his cells in the future,” Pereira said. “I said I could freeze them.”

Pereira, a leading figure in the field of captive breeding, had pioneered the neat trick of having a healthy animal ejaculate the semen of another animal—alive, dead, or even of a different species. So far, he’d had relative success with roosters, getting them to ejaculate semen from quails. “In Presley’s case, we can transplant his cells to another macaw or to a Blue-winged Macaw,” Pereira said enthusiastically.

The procedure is a two-step process. First the cells are extracted from one bird’s testicles. Then the tissue is filtered to collect a stem cell called the spermatogonia, which undergoes a transformation to become sperm. Bird No. 1’s spermatogonia is injected into bird No. 2’s testicles, where the

transformation becomes complete. But here's where it gets tricky: Only 0.05 percent of the extracted cells are spermatogonia; what's more, to avoid confusion, it's necessary to sterilize the similar cells in the recipient—a technique that hasn't yet been perfected.

The work on Presley is currently in its initial stage. "We removed the testicles and processed his cells, which are in liquid nitrogen," said Pereira. He believes that the bird, though dead from old age, still has a chance to generate heirs. "Males have this advantage over females. They may have children in later life."

A month after Presley's death Linda Wittkoff said she was still sad, though not surprised that it had happened. "Birds disguise—they do not expose themselves. For him to have shown such a serious symptom such as to stop eating, it was because the end was near."

She was pondering the future of the species. Most of the hundred or so Spix's Macaws still alive today are outside Brazil—60 of them belong to the Al Wabra Wildlife Preservation in Qatar. There is an international plan to repatriate some of those animals and reintroduce them to the wild—a risky undertaking because, with their numbers so low, losing many of the released birds could dash the long-term goal of restoring a healthy wild population. The expectation is that once the captive population grows to at least 150, some birds can be moved to Brazil.

There is also an ethical issue to consider. The current owners of macaws, including the preservation center in Qatar, played a part in the bird's decline because they illegally purchased wild birds. If captive-bred macaws are released, what's to prevent them from being poached? Wittkoff said she thinks there needs to be a legal review of the punishment for animal trafficking. "There is no use in releasing them if there aren't stronger laws."

Even some of the birds' devotees say the Spix's Macaw will never fly wild again. The macaw is an "evolutionary relic," said ornithologist Carlos Yamashita. "It was made for other times. Every organism has a peak and a decline, which can last several thousand years. This species of macaw is senile, and at the end of its line."

Pedro Develey, a partner with BirdLife International in Brazil, agreed with Yamashita—to a point. "We accelerated a lot of what would be a natural extinction," he said. In the hope that it's still possible to reverse the damage, he has made a proposal to the Ministry of the Environment for the preservation of 170 square miles in Curaçá so that the macaws may one day be released there. His proposal is currently under review.

"We cannot wait. There is still some habitat," Develey said. "People who have these macaws need to have the courage to give them up, even if it is risky. If 10 are born per year, we should release 10 per year. We can lose some animals, but we have to try. The biggest risk is to wait indefinitely. The ideal situation is now."

Roberto Kaz is a journalist from Brazil. Presley's story here, adapted from an article that ran previously in Piauí magazine, will be part of a book Kaz plans to publish next year.

National Audubon Society