"SciArts Spotlight: Brandon Ballengee." Science Friday, April 4, 2014. http://www.sciencefriday.com/blogs/04/04/2014/sciarts-spotlight-brandon-ballengee.html?series=20

Read

APR. 04, 2014

SciArts Spotlight: Brandon Ballengée

BY ANNIE MINOFF

DFA 147: Phaethon, Brandon Ballengée, 2013. Iris print on Arches watercolor paper. Cleared and stained Pacific tree frog collected in Aptos, California in scientific collaboration with Stanley K. Sessions.

Brandon Ballengée had just graduated from the Art Academy of Cincinnati when he saw his first deformed frog. It was 1996. Months earlier, a group of Minnesota school kids had made international news by discovering dozens of deformed frogs on a field trip to a local farm. Ballengée remembers seeing the frogs' pictures in the press. "Visually, they really [looked] like victims of Agent Orange or dioxin or Chernobyl," he says. "That, from an environmental standpoint, really concerned me." It concerned him so much that he's spent much of the past two decades exploring the causes of amphibian malformation, both in scientific journal articles and in artworks that cast a haunting light on species' struggle to survive against unfavorable environmental odds.

After hearing about the Minnesota frogs, Ballengée began traveling the country, volunteering with the United States Geological Survey to capture and record data on malformed amphibians. The animals he found were often too deformed to survive long on land. A frog missing limbs might starve, for instance, while one weighed down by too many limbs might not outmaneuver predators. Finding these frogs in the wild could be heartbreaking. "You have this animal that's just struggled its very short life, trying to make it to land, and suddenly they get to land, and they don't have the tools to survive," Ballengée says. "They're just laying there dying."

As a way of memorializing the frogs he found, Ballengée began painting their portraits. In the field, he used the materials he had on hand: odd bits of old sketches collaged together, pond water, coffee, and cigarette ash. "The idea was to give a presence to this animal with a short life," he explains. Without some kind of testament to its existence, a tiny deformed frog could "just vanish" without anyone being aware of its struggle.

Hyla Regilla, Brandon Ballengée, 1999. Pond water, ash, and coffee on recycled paper.

Those early portraits were the precursors to Ballengée's "Malamp" series—one of his longest-running, ecologically inspired art projects. ("Malamp" is short for "malformed amphibian.") After almost 20 years, the Malamp portraits have evolved from dashed-off pond-side studies to elaborately constructed memorials—what Ballengée calls his "Malamp Reliquaries" (examples are in the audio slideshow above).

Ballengée, who went on to earn a Ph.D in biology and art, creates his portraits using a technique borrowed from lab biology called "clearing and staining" (for more on the process, watch this SciFri video). At his New York studio, he uses a series of chemical soaks to clear specimens and dye their bones red and cartilage blue. The process is scientifically useful: It allows Ballengée to make educated guesses about how the frogs' deformities might have developed. But it also transforms the frogs so that, as Ballengée writes on his website, "they resemble gems, or the stained glass windows found in some cathedrals."

To create the portraits, Ballengée first scans the cleared and stained frogs at high resolution. Then he overlays those scans with upwards of a hundred individual photos in Photoshop. The process is time-consuming, but it allows him to make sure that every part of the frog is in focus. Though the final prints are two-dimensional, the frogs have a crystal clear, almost three-dimensional appearance. *Morpheus*, *Erebus*, and *Phaethon* float against celestial backgrounds, like ghosts or jewels lit from the inside. (In fact, what viewers read as a black sky and stars is actually the natural result of how the

scanner's laser hits each frog and the glycerin in which it's suspended.) Ballengée augments the frogs' otherworldliness by giving them names cribbed from Greco-Roman mythology. "Heroic and terrible things happen to [those] characters," Ballengée says. "I wanted to somehow recall that."

DFA 204: Erebus Brandon Ballengée, 2013. Iris print on watercolor paper. Cleared and stained North American green frog collected in North Hempstead, New York in scientific collaboration with Peter Raymond Warny.

Printed with watercolor ink on watercolor paper, the "Malamp Reliquaries" have the soft, antique feel of 19th century scientific illustration (unfortunately this isn't clear from digital reproductions). That's not a coincidence. Ballengée says he's a "huge fan" of the natural history watercolors of John James Audubon. In fact, the Malamp portraits are printed at the same size as Audubon's original *Birds of America* prints, which depict American birds in their natural habitats. Ballengée hopes that by printing the frogs about the size of a human toddler, viewers will identify with an animal they might otherwise dismiss. "If we start to look at the environment as made up of individuals just as unique as each and every one of us," he says, "I think that has the potential to really reframe our approach towards our own actions every day."

As Ballengée's portraits have become increasingly complex, so has his understanding of what's causing frog deformities. Like most amphibian researchers in the '90s, Ballengée believed chemical pollutants were to blame. But years spent documenting rates of amphibian malformation at sites in Yorkshire, England and Quebec, Canada have convinced him and his scientific collaborators that natural predation may be the more direct cause of most deformities. At a Yorkshire pond, Ballengée watched as dragonfly nymphs captured English toad tadpoles, chewed off their legs, and released them back into the water. Amazingly, he says, these tadpoles often survive for a time, healing in ways that resemble severe malformations. Many amphibian biologists now pin frogs' multiple limb growth on a parasite: *Ribeiroia ondatrae*. Once inside a tadpole's developing limb, *R. ondatrae* undermines normal cell-to-cell communication—cells growing next to parasitic cysts are "tricked" into dividing abnormally. As a result, "frogs end up blossoming limbs," Ballengée explains.

That's not to say that we humans haven't played our part in frogs' plight.

Ballengée's latest field research suggests that wetlands contaminated with agrochemicals and fertilizers are more likely to be "hot spots" for malformation, most likely because those ecosystems support fewer large predators that might keep dragonfly populations in check.

DFA 155: Morpheus, Brandon Ballengée, 2013. Iris print on Arches watercolor paper. Cleared and stained Pacific tree frog collected in Aptos, California in scientific collaboration with Stanley K. Sessions. The white dots near the base of the frog's tail are the parasitic cysts that caused it to develop additional limbs.

Asked why he's continued to pursue both art and science, Ballengée insists that the fields are "absolutely complementary." "It's so important that we have a really rational and systematic understanding of the way things work," he says. "And at the same time, we're emotional creatures. I think it's also really important that we have the other side, the arts side, which [allows] for reflection and thinking and feeling what the world means around us."

Brandon Ballengée's "Malamp Reliquaries" are currently on view at the Alden B. Dow Museum of Science and Art in Midland, Michigan and at the Museum Het Domein in The Netherlands.

"SciArts Spotlight" highlights creators working at the intersection of science and the arts. Have a nomination for the series? Email SciArts producer Annie Minoff at aminoff@sciencefriday.com.