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23

The Art of Unnatural Selection

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Our relationship to plants and other animals has evolved over thousands of generations of coexistence. Over time, domestication has allowed for the creation of human-induced or artificially selected new life-forms. This progressive understanding of inheritance and eventually genetics has allowed us to refine our living creations to artistic levels.

Nature has appeared as a dominant subject in painting and sculpture since the beginning of image making. By the late twentieth century, conceptual artists such as Jannis Kounellis, Joseph Beuys, and Hans Haake had explored using living materials in the context of their work. In 1972, Helen and Newton Harrison began to study the edible crab Scylla serrata. The team worked to create aquatic environments in which the crabs could be sustained while being exhibited in art galleries.[1] While conducting these experiments, the team discovered a methodology by which the crabs could be bred in captivity, something that had never been done before.

In her 1993 work *A-Z Breeding Units for Averaging 8 Breeds*, Andrea Zittel satirically employs counter-domestication strategies to generate ancestral chickens.[2] For the project, Zittel created architectural chick incubators designed to regress several domestic breeds of chickens back to a more "original" state. In theory the three-tiered sculpture contained channels that allowed eggs from the upper tiers to mingle and hatch with eggs from the middle level. Chicks from these mixed eggs would hatch and mix with others breeds to create new eggs that would be funneled down to the bottom layer. Here the process would culminate with the creation of a mixed chicken more "wild" than the initial breeds it was created from. Based more on conceptual notions of anti-utilitarianism and Rube Goldberg–like design, the "Units" looked better than they actually worked to produce chickens.

Another Zittel work, *A-Z Breeding Units for Reassigning Flight*, also was designed to create a more "wild" chicken, one with the ability to fly. Years of selective breeding have left

domestic chickens with "short stubby wings" unable to carry their large bodies more than a distance of a few feet. Working with the notion of selection based on fitness, Zittel's installation funneled eggs to varying heights. Hens would have to fly up to reach their nests. Eggs from hens unable to reach their eggs did not hatch, and thus were selected out the gene pool. Exhibited in the window of the New Museum of Art in New York City, viewers were able to watch this backward evolutionary drama being played out in front of them.

Christopher Ebener and Uli Winters collaborated to create mice capable of paralyzing computer networks.[3] The piece, entitled *BYTE*, used reward-based training methods developed by B. F. Skinner to encourage mice to destroy electronic cables. Individual mice were housed in a cage with a computer wire running through it. When the mice chewed through the cable a monitoring device automatically rewarded the destructive act by feeding them. The actions of the mice were recorded and shown on a monitor for comparison. While installed in 1998 at Ars Electronica, viewers could see the tested mice performing and analyze which animals would be the fittest for breeding. Subjects that performed well (by eating the most cables) were bred with other high-rating animals, the idea being that the offspring would have greater tendency to gnaw through wires than the previous generations.

Selectively inbreeding of species of fish can create genetic mutations that result in physical variation and often malformations. This practice is common in the North American pet industry, in which dozens of species of fish have been aesthetically "designed" to appeal to customers. In his work, *Natural Fish*, artist davidkremers is experimenting with the common pet store zebra danio fish.[4] Apparently this species is quite genetically malleable and is able to be physically transformed through selective breeding. The artist exhibits the living animals and refers to the them as "sculptures."

While an artist-in-residence at MASS MoCA, Natalie Jeremijinko documented pattern diversity in 10,000 ladybugs.[5] The piece called *The Great LadyBug Animation* involved digitally recording each animal and creating animated frames from the stills. Although members of the same species and genetically similar, each insect has distinct individual features. Jeremijinko also invited others to submit images of ladybugs to the archive via the Internet. The final animation was exhibited on a miniature LCD monitor, where viewers could see the remarkable variation. By simply contrasting the images with one another, Jeremijinko was able to show differences instead of similarities in genetics. This piece also calls into question traditional biological methods of categorizing species based on similarity.

Jeremijinko has also been observing pattern variation in monarch butterflies.[6] In this case the artist not only recorded the animals' characteristics, she raised and actually bred them. On her sixth generation, Jeremijinko documented females from each of the generations: "The frames in this animation are a daughter of a daughter of a daughter, etc. In

this way we can see that the genetic variation and phenotypic plasticity of simple but beautiful 2d variation."[7] Again presenting the frames on a miniature LCD monitor, the viewer is able to view almost lifesized brilliantly colored images of the creatures morphing from one to the next.

Also working with insects, artist Tara Galanti grew 2000 silk moths to get over her fear of them.[8] Over time, fear became devotion and Galanti began to experiment with a breeding campaign aimed at creating a fully flying adult. Silk moths have been domesticated for hundreds of years. For the silk industry, moths with the largest cocoons (with more silk) are selected out and bred. Larvae that are not chosen are boiled and eaten while their cocoons are refined to create silk works. The majority of the animals never reach adulthood, and those that do are believed to have lost their ability to fly over numerous generations of domestic care. When exhibiting her moths, Galanti creates flower-like sculptures with multileveled platforms on which she places female moths. Males, on the other hand, hatch from a central element. Fertile females release pheromones encouraging the males to fly over. Though still in the early stages of the project, the artist has recorded an individual male that flew 4.5 inches. The eggs fertilized by this individual have been kept and Galanti intends to carefully breed his offspring.

Since 1996, I have been studying the occurrence of deformities and population declines in amphibians. These studies have involved numerous ecological field surveys as well as primary biological research. A long-term experimental project I have been working on involves breeding Hymenochirus family frogs (figure 23.1). This tropical family is native to the Congo region of Africa. Hymenochirus curtipes was once a widely distributed species in the pet and laboratory specimen trade. Recent literature suggests that biodiversity in the Congo is threatened by the clearing of forests for agricultural use and increased economic demand for rain forest wood (primarily from the U.S. and European markets). Over the past forty years, the species, or perhaps the entire Hymenochirus family, may have been depleted or become extinct from their native range. Political chaos and civil turmoil in the Democratic Republic of Congo, formerly Zaire, over the past decade have severely limited biological studies. Data available on the remaining species of amphibians in the Congo is inconclusive.

Working with what I believe to be several domesticated subspecies, I am attempting to selectively breed generations backwards to produce a Hymenochirus curtipes. An investigation into historic scientific literature leads me to believe that H. curtipes is a shorter-limbed wild-type version that differs considerably from the domesticated laboratory frogs that I began with. In what Darwin referred to as regression, I have bred like with like attempting to resurface historically described physical traits. When exhibiting this project in a museum or gallery context, I have displayed documentary photographs and text explaining the progression and methods employed in this project. But more importantly, I have exhibited multiple generations of the living Hymenochirus frogs. I consider them

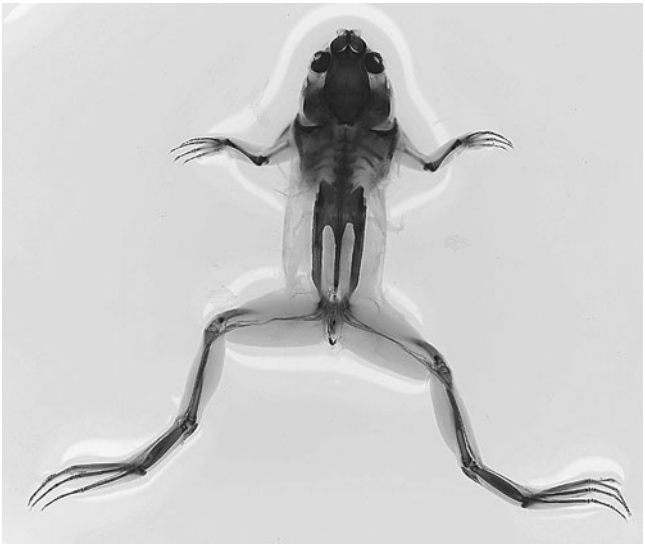

Figure 23.1
Brandon Ballengée, *Adult Cleared and Stained Hymenochirus Family Frog,* from *Species Reclamation Via a Non-Linear Genetic Timeline: An Attempted HymenochirusCurtipes Model Induced by Controlled Breeding,* 1999–2002.

to be the actual artworks. Each generation is stylistically different just as each individual animal is unique and should be viewed simultaneously as a living creature and a work of art.

One cannot deny a certain level of arrogance when it comes to selective breeding or any other kind of human-induced manipulation of nature. Concerns arise from the possibility that an experimental organism could be accidentally released into the environment. The introduction of invasive species that outcompete native ones is a major force behind global losses of biological diversity.[9] Great care should be given to assure that no non-native domestic species should be allowed to enter the wild. Although selective breeding alters the physical matrix of a given genetic line, which has had major influences on civilization, the ability of an altered breed to cross freely with its wild ancestors (resulting in regression) can produce a minor evolutionary phenomenon.[10]

In addition to selective breeding, numerous artists have experimented with transgenic manipulation of organisms as artwork. Transgenics refers to the process by which genes from one organism are transplanted into another organism, creating a new species. These artists are small in numbers, but transgenic art is certainly a field that will continue to be explored in the coming decades. Yet with transgenic manipulation, too, potentially new environmental concerns arise. Accidental release is again a major concern. In this case the

organism would not be able to regress, but instead could hybridize with native species, resulting in a kind of artificial genetic drift. Creating organisms through selective breeding or transgenic technologies involves a special kind of responsibility associated with the lifelong welfare of the organism and the surrounding environment. The care of the organism should in no way be compromised by its placement in the context of art. It is my hope that new discoveries in genetic research and artworks will help us to fully realize how connected all life-forms are. With this understanding, our role as stewards of this small, fragile planet may yet be realized.

Notes

1. Helen Mayer Harrison, and Newton Harrison, *The Lagoon Cycle* (Ithaca, NY: Office of University Publications, Cornell University, 1985).

2. "Andrea Zittel's A–Z: An Institute of Investigative Living," http://www.zittel.org/Pages/A–ZBreedingUnits.html.

3. "The Homepage of Christopher Ebener and Uli Winters," http://www.c-ebener.de/winters.html.

4. Annick Bureaud, "Art Biologique: Rétrospective-Gallery," *Art Press*, no. 276 (February, 2002): 45.

5. Natalie Jeremijenko, "The Great LadyBug Animation," http://cat.nyu.edu/natalie/projectdatabase/.

6. Natalie Jeremijenko, Personal conversation (September 6, 2000).

7. Natalie Jeremijenko, "Butterflies Animations Series," http://cat.nyu.edu/natalie/projectdatabase/.

8. Tara Galanti, "Moths/ecovention," email correspondence (June 28, 2002).

9. Greenpeace, "Effects on the Environment," http://www.greenpeacesoutheastasia.org/en/seaissuege01.html.

10. Paul Siegel, "All Roads Lead through Animals Genetics," http://agbio.cabweb.org.