Evolution Art talk

Presentation by Michele Banks at Institut Jacques Monod, Paris

I'm going to talk today about how artists, including myself, explore evolution in their work. I'll start by saying that, if you look at art history, there's a lot more art about religion than there is about evolution, which probably reflects the realities of funding for the arts as much as anything else.

This is a short talk, and I am not an art historian, so I am leaving a lot out. I'll be pointing out some interesting examples of artists who were inspired by the idea of evolution. I'll tell you many names and show you a lot of pictures, but obviously I can't go into great depth, so I will give you the text with all the names and I hope you will be intrigued enough to google for yourself later.

Darwin and The Theory of Evolution

Charles Darwin was a naturalist and an observer, not an experimentalist. At the time when Darwin was developing the theory of evolution through natural selection, nobody understood genetics, so his theory was largely based on observation. Therefore, his ability to provide visual proof of evolution was crucial for people to understand and accept his ideas.

Obviously at that time photography was in its infancy, so illustrators were important to the visual documentation of science. However, unlike Santiago Ramon y Cajal, the father of Neuroscience, Darwin was not a great artist. But he did make a lot of sketches as he explored, he had an artist on the *Beagle* for a while, and he had artists illustrate his books with drawings and paintings of the specimens he gathered on his voyages.

And clearly those visual images were important in expressing the main points of his theory of evolution. Think for example of the beaks of the Galapagos finches – this is a great example of a picture being worth 1,000 words.

Early art about Evolution

Long before biology was an established field of science, people were observing plants and animals and drawing and painting what they saw, starting with cave painters. Over the centuries, this grew into a tradition of natural science illustration.

Maria Sibylla Merian, the 17th c German illustrator, was a pioneer in scientific accuracy, showing many stages of life of various species in her work.

John James Audubon, the great nature painter, was slightly older than Darwin – his masterpiece *Birds of America* came out in stages between 1827-1838, which encompasses the time when Darwin was on the Beagle but before his major works were published.

So, we see that many people at the time were fans of natural history as art and would use it as both a study tool and, in the form of prints and engravings, as decorations for their homes.

This is an interesting piece by Robert Farren, called "Life in the Jurassic Sea." This painting is from 1850, 9 years before publication of *On the Origin of Species*, but we should remember that the first dinosaur fossils discovered in England in early 19th century, so people at the time were already beginning to be aware of prehistoric creatures and the idea of extinction, if not precisely of evolution.

A little bit later, Ernst Haeckel, who was a scientist, philosopher and artist, began to explore the microscopic world with his paintings and engravings of radiolarians and other microorganisms.

After the publication of Darwin's *On the Origin of Species* in 1859, artists began responding to his work - positively, negatively and imaginatively.

Even though Haeckel is a controversial figure for a number of reasons and is generally considered more a follower of Lamarck, he was definitely inspired by Darwin and created a lot of work based directly on *The Origin of Species* and *The Descent of Man*. It's interesting that his tree places man squarely on top. This might suggest a misreading of Darwin, but it's pretty common for visual representations of evolution to portray humans as its end point.

Of course, not everybody agreed with Darwin – as we know, a lot of people don't agree with him today.

An interesting case is Abbott Handerson Thayer, an American artist in the late 19th/early 20th centuries.

Thayer became obsessed with the idea (important in evolution) that the shapes and coloration of animals/ were designed for camouflage only. He rejected the idea of bright colors and flashy feathers as a means of sexual selection. He wrote a whole book about animal camouflage illustrated with his paintings. The pinnacle of his theory was this painting of a peacock using its feathers for camouflage.

Odilon Redon took Darwin's ideas and spun them off in a more fanciful direction, producing his own book called "Les Origines" in 1883 with images of creatures blended from humans, plants and animals.

Later on in the 20th and 21st centuries, as the theory of evolution became more widely accepted and at the same time remained extremely controversial, contemporary artists used it as a theme or starting point for their work.

One major figure working in the tradition of natural history illustration is Walton Ford, an American artist who is considered the Audubon of today. He works in a similar style, usually making large, highly naturalistic watercolors, but with an edge. Instead of leaving nature pure and pristine, he usually makes some reference to how humans are messing with it. (Notice the detail of the burning building)

Some of his work deals directly with extinction, which of course is both a crucial feature of evolution and an enormous threat to the survival of the world as we know it.

Let's take a look at how two different modern artists approach the idea of extinction through the image of the passenger pigeon, a species that was very widespread in the United States in the 19th century, but was hunted to extinction in the early 20th century. First, here's a classic painting by Louis Agassiz Fuertes of the passenger pigeon.

Here's how Walton Ford sees it. I personally find this image kind of terrifying. I don't know if I want to save this bird from extinction!

And here's how another American artist, Brandon Ballengee, portrayed the loss of this species – he just snipped it right out of the picture. It's a little more sad and poignant.

Alexis Rockman is another artist who deals with extinction in his work – he specifically looks at the effect of man-made climate change and habitat destruction in his paintings. He uses a sort of surrealistic twist on natural history painting to portray his vision of the future of life on earth, and it doesn't look great.

Possibly on the plus side, the humans are pretty much gone, but they left the place a mess, and other species have suffered a lot, like this mutant frog in the painting Washington Square, which envisions a future New York City.

That theme of mutations caused by environmental damage is also explored in Brandon Ballengee's work. Ballengee is an environmental scientist as well as an artist. In these "Reliquaries" he used cleared and stained frogs to show the effects of water pollution.

One of the people doing some really fascinating work with evolution is the Mexican artist Damian Ortega. About 10 years ago, he spent some time in Nigeria with the Gashaka Primate Project, observing scientists working with a community of apes. He created an exhibition called "Apestraction" based on his thoughts about the experience, including the huge genetic overlap between apes and humans, the dynamics of the ape community and the apes' use of tools. One of the centerpieces of the show was this DNA helix made of the tools that the apes had fashioned out of sticks.

I'll mention a couple of artists who are working directly with DNA to make art. First, Eduardo Kac, who created what he calls "a plantimal", a new life form he created and that he calls "Edunia", a genetically engineered flower that is a hybrid of himself and a Petunia. The Edunia expresses the artist's DNA exclusively in its red veins.

Another interesting project is by an English artist, Charlotte Jarvis. Jarvis worked with scientists at the Netherlands Proteomics Centre to bio-engineer a bacterium so that it has The Universal Declaration of Human Rights encoded into its DNA sequence. Apples which were grown at The Hague, seat of the International Courts of Justice, were 'contaminated' with the synthetic DNA extracted from the bacteria. These 'fruits from the tree of knowledge' have been sent to genomics laboratories around the world and participating scientists asked to sequence the DNA, find the message hidden within and send back a translation. Scientists were also asked to eat the fruit.

Next I'd like to discuss a few artists who are using motifs based on the model organisms used by scientists in their work. This is really inspiring to me as an artist, the idea that you can learn so much about humans, which are extremely complex beings, by looking at such simple creatures.

First our old friend C. elegans, one of the workhorses of evolutionary biology

Here are some beautiful C. elegans by Greg Dunn. Greg Dunn is a neuroscience PhD turned artist. He often works in a style influenced by Asian art, and he's inspired by what he sees under the microscope.

And a glass one by Luke Jerram

Brian Knep is an artist who has done a lot of work with C. elegans, including this project called Worm/Constructs where he created a habitat for worms and filmed them while they explored it, lived and died in it. Eventually other creatures came to live in it also. I encourage you to go to his website and watch his videos, they're very interesting and oddly beautiful.

Now of course our best friend, Drosophila Melanogaster!

I love this breathtaking image of a drosphila brain by Greg Dunn.

Helen Pynor has been combining art and science for years. Her current show at the Crick institute in London was made in collaboration with scientists from the Crick and includes images of drosophila

brains also. This show is still on, so if you happen to be in London in the near future, I encourage you to go see it.

Here's some drosophila embryos that I painted as a commission for a scientist who studies them. This was my introduction to these little guys, and I've painted them a lot since. They are very visually appealing, and it amazes me how we can see their development right through the surface.

And here are some beautiful glass pieces by Jiyong Lee of drosophila embryos and development.

Of course, while we're at the Institut Jacques Monod, we should talk about bacteria, and this is where I've done a lot of my work.

For me, as an artist, looking at cells and microbes, in particular, is a fascinating way to explore the ideas of what it means to be alive, to be human. I mean, sure, we're all unique individuals with our own ideas and tastes and weird little idiosyncrasies. But we're also collections of cells all acting in remarkable patterns of rhythm and harmony. And we're all little environments, carrying around colonies of microbial friends and foes.

This piece is called *Hosts and Invaders*, it's a watercolor that considers this idea of humans and our microbiomes as a society, where we have some long-term residents and sometimes some dangerous invaders.

These are some paintings from a show I did at NIH called *Love and Death.* It's a very dramatic title – I wanted to focus on the most important inflection points in our lives – falling in love and dying, or having loved ones die – and look at what's going on at a cellular and microbial level. What makes us react emotionally to skin or hair or eyes or lips? What happens to the cells of our bodies when we do?

This piece is called *Portrait of a Human*. A lot of art, and culture in general, focuses on differences between human beings. And portraiture in particular focuses on our exterior uniqueness. But for all our unique individuality, at a cellular level we are all pretty essentially alike. So here my goal was to take that and flip it two ways – to show the inside, rather than the outside, and to create a "portrait" that could be of anybody.

Some of the other science-based work I've done has focused on climate change. This piece, *Culture Dishes*, looked at some of the changes in the microbial environment of the Arctic that are caused by warming. The theme was the same for this piece, *Protista Borosilicata*, which was an installation based on marine protists that I made using lab glassware.

So, you're probably thinking, this doesn't have much to do with evolution. That's true! Well, I've only been here for two days. That's what I'm doing here in the lab, hoping to learn a lot more about genetics and evolution so that I can use it in my upcoming art work. So please stay tuned as my art evolves.