

The Darwin Archipelago: The Naturalists' Career Beyond Origin of Species
 STEVE JONES
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supports the principle that, driven by natural selection, small changes “given time, can produce gigantic ends”. Anatomy, behaviour, biogeography, embryology — so many characteristics of organisms can be explained by selection on precursors that gave some advantage to their possessors. The peculiar “contrivances” of insectivorous plants to attract and capture prey, for example, can be explained only by natural selection.

Darwin's works also show what his contemporary William Whewell referred to as “consilience”: the confluence of evidence from a variety of sources. As Jones puts it: “The great naturalist's lifelong labours generated an archipelago of information; a set of connected observations that together form a harmonious whole.”

Time and again, Jones's book caused me to reflect on how delighted Darwin would have been to have had some titbit of evidence discovered after his death — such as the fossilized bee found with a pollen sac attached, which sheds light on the evolution of plants, or the discovery of genes for olfaction in mice. This latter finding supplements Darwin's observations of the importance of urine marking in mice for choosing a mate and avoiding inbreeding.

The last chapter is depressing but important. Introduced plant and animal species sometimes spread at the expense of natives, reducing diversity, Jones notes. Similarly, our own species has become less diverse: as our ability to manipulate the environment has grown, the variance in human death rates and birth rates has fallen, and variation within and between populations has declined because of migration and intermixing. Yet this variation is the key to adaptation by natural selection.

What does this say for the future? We know that environmental pressures will require adaptation. “One day, [Darwin's] machine will take its revenge,” Jones warns. “We may well fail in the struggle for existence against ourselves, the biggest ecological challenge of all.” Natural selection bats last. ■

Eugenie Scott is executive director of the National Center for Science Education, Oakland, California 94609, USA.
 e-mail: scott@ncse.com

Q&A Christiaan Zwanikken

The machinist

Dutch artist Christiaan Zwanikken makes computer-controlled mechanical sculptures, many of which use animal skeletons he has found. As a film about Zwanikken's work and life at an isolated Portuguese convent premieres in Edinburgh, UK, he discusses human relationships with other animals and machines.

Can you describe your artworks?

I take the remains of animals and plants and bring them back to life by means of computer-controlled motors, or servos. The sculptures can interact with people and each other. There is a strong natural element and a technological part; for example, one of my sculptures has two goat skulls that bang into each other using a pneumatic system. Another is a snake eagle that dives down from a height of ten metres to meet a Duracell bunny. There is a hare skull to which I gave a new copper face. And I have five masks with little tongues that repeat lines from the 1982 film *Blade Runner*, in which an android asks for a longer life.

How did you become interested in machines and animals?

My grandfather was an aeroplane technician, and as a child I worked with him in his basement full of exotic parts of aeroplanes. Then my family moved to an isolated convent in rural Portugal and I explored the natural surroundings. I had dreams of machines that could fly, jump and swim. When I was at art school I had three dog skulls in my studio, and I arranged them into a mechanical Cerberus, the many-headed dog that guards the underworld in classical mythology. People were really shocked by it.

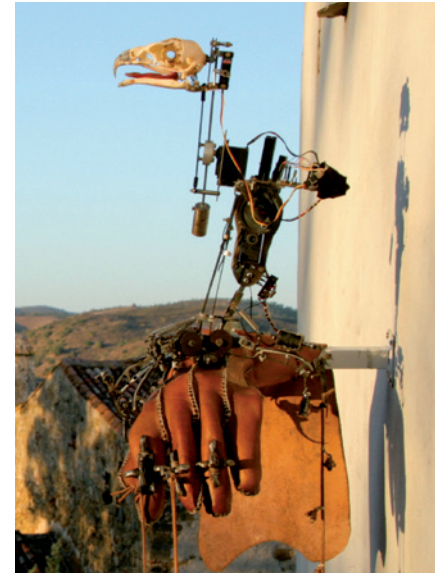
What technologies do you use?

I use old-fashioned materials such as cogs and wheels, clockwork devices, electromagnetic coils and servos, as well as radar and ultrasonic sensors. I create an illusion, but also give away my tricks by leaving the mechanisms exposed. Although computer-aided manipulation of materials is getting cheaper, I build my machines by hand. The biggest part of



Convento
 DIRECTED BY JARRED
 ALTERMAN
 Edinburgh
 International Film
 Festival, 19 June.
 Sculptures on show
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Paranoia
 Gare Saint Sauveur,
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 Until 15 August.



Mechatronics gives an eagle skull new life.

my work is programming them so that they seem to behave naturally.

What point are you trying to make?

I am trying to unravel humans' relationship with nature. We have rudimentary reactions to other animals, often a fight-or-flight reaction. There is a dark side to my work, perhaps a warning about the loss of species. But I also try to merge the worlds of animal and machine, so that they coexist peacefully. I try to make something that appears to be real, using technology to create a world that no one has seen before.

What is your most recent piece?

My installation *Scorched Earth*, on show until 15 August at an exhibition in Lille, France, is a post-apocalyptic landscape in which all flora and fauna are extinct and the remains of animals have been combined with machines to populate the world. The artificial animals are autonomous, intelligent and uncontrollable. Humans exist only as a memory. The morning it was finished, I saw the images from Japan after the tsunami. They seemed strikingly familiar. ■

INTERVIEW BY JASCHA HOFFMAN

C. ZWANIKKEN, MONSIEUR HOUDIN, W'OELEZ PAS VOTRE OISEAU! (2008)/PHOTO: J. ALTERMAN (CONVENTO)

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