

Artistic responses to Darwinism

Darwin: Art and the Search for Origins

Shirn Kunsthalle, Frankfurt, Germany
Until 3 May 2009.



Darwin200

When he boarded HMS *Beagle*, Charles Darwin made room in his luggage for a copy of Alexander von Humboldt's *Personal Narrative*, the account of the German explorer's 1799–1804 journeys in Latin America. Humboldt's view of the natural world was a major influence on the young Darwin, until his own experiences led him to a different interpretation. Where Humboldt the romantic saw unity and harmony, Darwin the scientist saw strife and struggle.

With the spread of illustrated print magazines, artists of the time could hardly overlook the debate among scientists, theologians and philosophers over Darwin's destabilizing theories of evolution and ruthless natural selection. The exhibition *Darwin: Art and the Search for Origins*, running until 3 May at the Shirn Kunsthalle in Frankfurt, Germany, looks at how artists responded in the century following the publication of Darwin's *On the Origin of Species*.

Some of the works are straightforward attempts to promote one side of the argument, but most incorporate concepts that evolutionary theory made inevitable, such as 'deep time'. Not all of the displayed works embrace Darwinism; for example, those of Frederic Edwin Church (1826–1900) tried to reconcile

geological and religious accounts of Earth's history in support of anti-evolutionist positions. But the attitude of his contemporary, Martin Johnson Heade (1819–1904), shifted in favour of Darwinism as he became more familiar with it — as his sublime late series on hummingbirds and orchids shows.

Some of the most interesting artistic responses to Darwinism happened in German-speaking countries in the intellectual wake of Humboldt. The exhibition includes many works by Ernst Haeckel (1834–1919), the German scientist and artist who promoted Darwin's theories in continental Europe with his exquisite illustrations of sea creatures, particularly



the radiolarians. But it is also replete with works less well known as Darwinian.

Arnold Böcklin's *Meeresidylle* (1887) references the evolutionary continuity of humanity with creatures of the sea. It was painted a few years after the Swiss artist forged a friendship with Anton Dohrn, a former student of Haeckel who established a zoological institute in Naples, Italy. The institute's mission was to collect empirical data substantiating Darwin's ideas. Böcklin's work was steeped in mythology, and few critics understood it. Karl Scheffler was an exception: in 1921 he proclaimed Böcklin to be "the painter and poet of Darwinism".

The exhibition also contains works by the convinced Darwinist, Gabriel von Max (1840–1915). As a friend of Haeckel, von Max was a passionate naturalist, but eventually departed from Haeckel's view that humans were the pinnacle of Darwinistic achievement. He came to prefer the pet monkeys he used as models, painting them carrying out human activities (as in *Monkey Before A Skeleton*; pictured, left) such as teaching or learning. In another famous image, his monkeys are portrayed as art critics (see *Nature* 438, 289; 2005).

A successful artist in his day, von Max made enough money to accumulate a vast collection of more than 60,000 zoological, anthropological and ethnological objects. Sold to the German city of Mannheim in 1917, renowned prehistorian Carl Schuchhardt described it as "the richest and most interesting private collection in the field of science since the death of Goethe". Part of this collection is included in this thought-provoking exhibition. ■

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The body as a commodity

Biofutures: Owning Body Parts and Information

by Robert Mitchell, Helen J. Burgess and Phillip Thurtle

Penn Press: 2008. \$39.95, £26 (DVD-ROM)

It is appropriate that a commentary on the possible futures and dangers associated with owning parts of the body — a discussion anchored in biology as information — should be presented as a hypertext DVD rather than as a conventional book. *Biofutures* deploys multimedia information sources, including video, text, interviews, film clips, web links and animations, all accessed through a central menu. The interactive format allows for nonlinear exploration of the three main themes of law,

biology and culture, and users may create their own links with digital bookmarks that can be managed with password protection.

Each theme is subdivided into two chapters based on case studies that have been marked by controversy. In the law section, the case of John Moore in the United States is highlighted by the resulting dispute over the patenting of cell lines derived from his tissue. The DVD also investigates the creation of the patient lobby group PXE International to promote research on the genetic disease PXE, pseudoxanthoma elasticum, and the tensions this created between the community and individual patient rights.

Biology is discussed through the case of the Nexia spider goat, the transgenic goat that contains spider genes that produce a silk-based material in the goat's milk. The lightweight but

strong 'biosteel' will make biodegradable cables with multiple industrial applications. In another case study, the use of cryonics to freeze bodies offers a chance to explore the control of biological clocks in the lab and how this relates to wider economic and financial temporalities.

The section on culture discusses the role of biology-based art as a form of science, a form of critique and a disrupter of natural boundaries. An extended commentary on the fictitious narrative of the films *Jurassic Park* and *Resident Evil* tells us about different possible futures.

Each case study takes about 30 minutes to read and listen to, with an accessible range of clips, interviews and images on each page. Pitched at undergraduate students, it is designed to be used as a teaching aid, bolstered by additional detailed reading. Most sections provide background material, often filmed in labs, such as the creation of immortal cell lines that are key to understanding the John Moore case.

The authors use their broad backgrounds in science policy, history and English literature to locate the question of body ownership within the wider fields of social science and bioethics. Their primary argument is that developments in biocommerce are best understood within the emergence of the ‘information society’. Body parts and tissues, such as gene sequences and cell lines, become information products that are mobilized and gain value in the wider tissue economy.

Most importantly, the authors make the point that the tensions this creates — in terms of who should have the right to own tissue — is not specific to nor created by the advent of biotechnology. Instead, debates over ownership rights are endemic to an industrial society where knowledge and information are allowed to take on a commodifiable form, as in a patent. This is nicely captured in the case of John Moore, in which it is observed that “Moore

couldn’t own the cell line [because] research would stop — but if no one owned the cell line, research would also stop”. The authors explain how each case study reveals a particular aspect of the information society.

Any bioethicist would struggle to find principles that might act as an arbiter of the moral dilemmas posed by the different cases in *Biofutures*. Indeed, the authors steer clear of this, concluding that we need to attain a deeper understanding. There is not one bio-future but many, articulated in both dystopian and utopian images. Futures are traded as expectations that shape markets for biotech products — so the future itself becomes commodified, not just its body parts. ■

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ancestry. How can very different animals such as bats and humans be related? Coyne clarifies the basics of geographic speciation and its importance to evolution: it produces lineages that are initially similar, which then diverge through successive speciation events. Given billions of years of lineage splitting and extinction, the result is bats, humans and everything else on Earth.

Also useful is Coyne’s distinction between ancestors and transitional fossils — a common source of confusion. Transitions are exhibited by fossils such as *Archaeopteryx*, which has both dinosaur and bird traits, and the deer-like *Indohyus*, which has traits of both even-toed hoofed mammals and whales, but such fossils may occur at the wrong time or have the wrong suite of features to be ancestral to modern forms. Given the nature of the fossil record, Coyne explains, we would not expect to find or identify ancestral fossils, but we can find cousin species that share transitional features with the elusive direct ancestors. Transitional features therefore delineate how the tree of life branches. Unfortunately, Coyne never quite defines ancestral and derived traits, which would help to clarify the discussion.

A book for the public must simplify, but there lurks the possibility of subsequent distortion. Many people misunderstand evolution as a great chain in which simple forms evolve into more complex ones, rather than the branching and extinction of lineages. Amphibians did not evolve into reptiles, and reptiles did not evolve into mammals and birds. Rather, a population of early tetrapods — four-legged vertebrates — gave rise to a diverse group of organisms that included ancestors of modern frogs and salamanders, and to a separate branch characterized by having an amniotic egg. A primitive amniote gave rise to reptiles and birds on one branch, and mammals on another. Given that the branch leading to mammals preceded that leading to reptiles, it is misleading for Coyne to use the outmoded term ‘mammal-like reptiles’ instead of ‘non-mammalian synapsids’.

It remains a dismal truth that in the United States, almost half of the population does not accept the common ancestry of humans and chimpanzees; anti-evolution sentiments are also manifest in the rest of the developed world, albeit less virulently. Coyne’s book will be a good choice to give to the neighbour or teacher who wants to know more about evolutionary biology. Lamentably, his book is still needed. ■

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Primed for evolution

Why Evolution is True

by Jerry A. Coyne

Oxford Univ. Press/Viking Press: 2009.
336 pp/304 pp. £14.99/\$27.95



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Jerry Coyne, an accomplished population geneticist at the University of Chicago in Illinois, has devoted much time recently to attacking creationism. His articles in popular publications neatly dissect the scientific claims of the creationists, clearly showing their logical and empirical failings. In *Why Evolution is True*, he shifts his concerns to demonstrate to an open-minded reader the strength of evolutionary biology. The book is one long argument for why the theory so often associated with Charles Darwin should — as much as any other well-founded scientific explanation — be recognized as true.

Writing in a conversational yet authoritative tone, Coyne makes evolutionary biology accessible. As befits his speciality, he stresses the genetic foundations of natural selection and adaptation, offering examples from the field and laboratory for how natural selection shapes morphology and biochemistry to adapt species to their environments. Attention is devoted in this balanced book not only to genes and molecules, but also to the fossil record, sexual selection and biogeography. The patterns of distribution of plants and animals over geographic areas provided a key clue to

Darwin, and Coyne gives this finding its due.

Speciation is the missing link in the general public’s understanding of evolution, so it is good to see it discussed early in the book and developed fully in a later chapter. Simple natural selection — microbes becoming resistant to antibiotics, weeds developing resistance to pesticides — is not objectionable to evolution sceptics. What they object to is the tree of life — evolution’s core concept of common



Archaeopteryx's fossilized feathers hint at how birds evolved.

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