

## What's the big idea?

It is not obviously the business of a physics journal to mark the anniversary of a major development in biology. But the repercussions of Darwin's theory of evolution are relevant to all.

It is 150 years since the publication of *On the Origin of Species*, and 200 years since the birth of its author, Charles Darwin. This coincidence of anniversaries is being widely celebrated, even in the pages of *Nature Physics*. In this issue, in amongst the regular diet of superconductors, cold gases and quantum dots, there are several articles about Darwinism — from its original incarnation, through ongoing controversy, to modern interpretations in overtly physics contexts. The story of Darwinism, we believe, has something for everyone, including physicists.

In 1859 — after years of careful observations and development of his idea, and fearing the publication of a similar idea by rival naturalist Alfred Russel Wallace — Darwin revealed his theory of evolution through natural selection. In Books and Arts (page 169), Patrick Goymer revisits

the text of *On the Origin of Species*, and finds it still well worth the read. Darwin's original is a model of careful exposition, accessible and scientific. Well aware of the controversy that would meet his work, Darwin was conscientious in explaining its claims and its limitations. Mark Buchanan, recognizing the role of Darwin's thinking in a wider scientific context (Thesis, page 167), salutes Darwin as a “bold scientist”, one of few “leaving the comfortable confines of the accepted theoretical framework of their day and launching themselves out into territory unknown”.

Moving back into familiar territory, quantum physics, and specifically the quantum measurement problem, is the focus of Wojciech Zurek's Progress article, on page 181. But the approach may be less familiar: Zurek has borrowed from Darwin an essence of natural selection and applied

it to quantum states (which are the fittest and will survive their environment?). This is ‘quantum Darwinism’, which leads, posits Zurek, to the meaningful emergence of the classical from the quantum. And what you might call ‘digital Darwinism’ is the topic of Seth Lloyd's Commentary (page 164) — “quantum mechanics has a profound effect on the naturally selected world”.

It is, of course, impossible to discuss the theory of evolution without also acknowledging its sociological impact, and the controversy that continues to surround it. Michael Shermer, publisher of *Skeptic* magazine, broaches the subject in his Commentary, on page 162. He considers why it is evolution — not gravity, or plate tectonics, or any other science — that is so persistently an area of conflict for those with religious beliefs.

Indeed, the fallacy that evolution is there to be believed in or not believed in is still pervasive. But no science is a matter of belief. Gravity is fact, not something that can be disbelieved at will. And for evolution, beyond Darwin's careful studies, we have 150 years of evidence accumulated (see, for example, the ‘15 evolutionary gems’ collected at [www.nature.com/darwin](http://www.nature.com/darwin)). Evolution is falsifiable science, and although Darwin did not incorporate the (then) just-published work on genetics by Gregor Mendel, the overarching concept of evolution is unchallenged scientifically.

That is something to be understood from this year's anniversary celebrations, perhaps — that science has a unique place in human culture, and is not counter, or equal and opposite, to anything else. Science just is. After all, isn't it appreciation of that purity, that integrity, that ultimately motivates us as scientists?

It's not so long since we were marking ‘World Year of Physics’, the 100th anniversary of Einstein's 1905 landmark papers on the photoelectric effect, Brownian motion and special relativity. Now here, again, is a celebration of a big scientific idea (and an iconic scientist). It rather begs the question, for all of science: whose is the biggest idea? □

Our articles on ‘Darwin and physics’ are collected online at [www.nature.com/nphys/focus](http://www.nature.com/nphys/focus).

Charles Darwin, from an 1874 photograph.

