

# Nature's history

To celebrate the 150th anniversary of *Nature*, we survey some highlights from the journal's ecology and evolution archives.

The first issue of *Nature*, on 4 November 1869, opened with an extract from Goethe as part of an article by Thomas Henry Huxley. The second article, by Alfred W. Bennett, described some recent work by Charles Darwin on the fertilization of winter-flowering plants, and Darwin himself wrote in two issues later to respond. *Nature's* origins were very much bound up in the early intellectual excitement caused by the theory of evolution. This is, therefore, a welcome opportunity for the editors of *Nature Ecology & Evolution* to indulge in their own retrospective on *Nature's* record in ecology and evolution.

A good place to start is to fast forward 146 years to a genomics study of Galapagos finches that ties in Darwin's work on how ecology affects evolution with the molecular revolution of the twentieth century. This study also touches on the evo-devo of beak development and our growing appreciation of the importance of hybridization and gene flow in speciation. In a similar vein, but probably even more noteworthy in terms of evo-devo and the molecular basis of adaptation, is the slightly earlier study of threespine sticklebacks, which are a more widely used model developmental system.

One of the most iconic evolutionary model systems of the past 30 years is Richard Lenski's long-term evolution experiment with *Escherichia coli*. The results from this have featured in *Nature* several times, most recently with a detailed molecular analysis of the evolutionary and ecological changes that have occurred over 60,000 generations. Of course, it is worth noting that it was *American Naturalist* rather than *Nature* that published the first study from this system.

If such studies inform us about the mechanisms of evolution, *Nature's* archive is just as illuminating on the actual history of life, particularly in terms of fossils. Working chronologically, rather than by date of discovery, we can start with the still-debated recent finding of evidence for 3.77-billion-year-old microfossils. Jumping forward to the origin of tetrapods, *Tiktaalik roseae*, *Acanthostega gunnari* and *Pederpes finneyae* have proved particularly informative, with the latter two being among many contributions by palaeontologist Jennifer Clack. The explosion in discoveries

of feathered dinosaurs, particularly from China, that help elucidate the origin of birds, has also been well represented — for example, *Protoarchaeopteryx robusta*, *Caudipteryx zoui* and *Anchiornis huxleyi*. In terms of hominins, *Homo habilis* is one of many discoveries in *Nature's* pages by the Leakey family, *Homo floresiensis* has captured the public attention possibly like no other fossil discovery of the twenty-first century, and the identification of Denisovans from DNA extracted from a bone fragment marks a turning point in our understanding of ancient hominin diversity. That said, successful identification of important fossils has its pitfalls — *Nature* enthusiastically embraced *Pitdown Man* in 1912!

*Nature* has also published important work on living non-human primates, including that of Jane Goodall on chimpanzee tool use, Cheney and Seyfarth on reciprocal altruism in vervet monkeys, and Silk et al. on a lack of prosociality in chimpanzees. This last study in particular complements the innovative work of Fehr and Gächter on prosocial behaviours in humans.

Social evolution has perhaps provided the largest share of controversies in *Nature's* evolutionary history. Rumours have circulated for decades as to whether William D. Hamilton's seminal work on inclusive fitness in the *Journal of Theoretical Biology* was partially scooped by John Maynard Smith in *Nature* by underhand means, an event that has even been dramatized. The record was partially set straight in Robert Trivers' *Nature* obituary of Hamilton, in which he described the work as the "only true advance since Darwin in our understanding of natural selection". Nearly half a century after Hamilton's work, an attack on inclusive fitness by Nowak, Tarnita and Wilson elicited heated responses from over a hundred researchers.

Let's now turn to ecology. Perhaps the work in fundamental ecology that editors see referenced most is that of Robert May on the instability of complex ecosystems (itself a precursor to the more substantial treatment in book form). This work has challenged ecologists ever since to explain the observed stability of complex ecosystems, and has itself spurred important further theoretical work in *Nature* such as that of Allesina and Tang.

*Nature* has also published some key works in applied ecology, including an early attempt to put a value to ecosystem services and natural capital, the identification of biodiversity hotspots for conservation and an assessment of the effectiveness of protected areas. Bridging the gap between the pure and the applied, *Nature* has played an important role in the study of biodiversity and ecosystem function, from early works on grasslands by Tilman and colleagues through to the influential consensus review of the field nearly two decades later.

Not all studies published in *Nature* have met with universal acclaim, and many have remained hotly debated. Examples include the discovery of Rutherford and Lindquist that the heat-shock protein Hsp90 can act as an evolutionary capacitor and the finding by Enard et al. of positive selection in humans on the language gene *FOXP2*. A fairly technical 2011 study by He and Hubbell on estimating extinction rates using the species-area relationship caused such controversy that the debate was featured in the *New York Times*. Even more controversial was the claim in 1988 by Cairns et al. that mutations do not arise randomly. While largely debunked, this idea did contribute to our understanding of the more orthodox Darwinian phenomenon of hypermutability.

As well as original research, the news and comment section of *Nature* provides a window into the history of ecology and evolution, in particular the book review section. Classics such as Darwin's *The Descent of Man* and E. O. Wilson's *Sociobiology: The New Synthesis* were given a favourable reception, even though the latter was reviewed by V. C. Wynne-Edwards, who might have been expected to be hostile. In contrast, Richard Dawkins' *The Selfish Gene* was reviewed by Richard Lewontin with predictably scathing effects. One book that has consistently won favour in *Nature's* pages, and remains an inspirational work with lasting relevance, is Rachel Carson's *Silent Spring*. She was hailed (albeit in somewhat arcane style) as 'An American Prophetess' in the original book review, discussed at length by *Nature's* then editor John Maddox a decade later in his uncompromisingly titled 'Pollution and Worldwide

*Catastrophe*, and then celebrated in a retrospective [review](#) to mark 50 years since publication.

These are just some of *Nature's* many influential contributions, and the selection here is the personal choice of the editors

rather than any attempt at being systematic. The selection is also as much a reflection of the present as it is of the past, with our own biases compounding those of previous generations of *Nature's* authors, editors and reviewers. With that in mind, please do get

in touch to let us know what you think we've missed.

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