

Piltown Man (held by Alvan Marston, who helped to debunk the fraud), misled some palaeontologists.

HUMAN EVOLUTION

How we misread our own story

William Davies ponders a chronicle unwinding the twisted strands of thinking on human evolution.

In *The Strange Case of the Ricketty Cossack*, palaeoanthropologist Ian Tattersall outlines the history of thought on human evolution clearly and insightfully, allowing readers to make up their own minds about the motives and actions of key figures. The field, he reveals, has both benefited and suffered from involving other disciplines. Concepts rejected elsewhere have been applied to palaeoanthropology, and these have reinforced the fallacious idea that human evolution is distinct from that of other life forms. The history of the field reveals a divide between those who prefer linear sequences of speciation, and those that prefer a many-branched tree — the ‘lumpers’ and ‘splitters’.

From the mid-nineteenth century, the study of human origins bristled with self-appointed experts. The book's title refers to a case in point: in the late 1850s, physiologist

August Franz Mayer identified Neanderthal remains from northern Germany as belonging to a Cossack soldier with rickets who had died in 1814 and somehow become buried in 2 metres of fossiliferous deposits. Other anatomists, including Thomas Henry Huxley, were happy to agree that the individual anatomical features of Neanderthals fell within the range of variation in *Homo sapiens*.

The lack of connection between those who recovered the fossilized and archaeological remains of early hominins, and those who sought to interpret them, is perhaps the most striking feature of the first 60–70 years of palaeoanthropology. It ensured that wider archaeological and ecological contexts were all but ignored in the application of predetermined (and untested) theories. So, for early-twentieth-century anatomist Marcellin Boule, fossils such as the Javan *Homo erectus* and the European

Neanderthals represented extinguished side-branches on a developmental tree that led to *H. sapiens* by other means.

The archaeological situation was not much better. Gabriel de Mortillet's pronouncements in the 1870s that stone-working must have developed before bone-working led him to ignore stratigraphic evidence from Upper Palaeolithic sites in France that had been correctly sequenced by Édouard Lartet years before. The Piltown Man fraud of 1912 was designed to appeal to prejudices in favour of early development of a large brain (and even included a bone artefact carved to resemble a cricket bat; see C. Stringer *Nature* **492**, 177–179; 2012). Anyone who had focused on how the Piltown remains had been recovered and on their context would have been sceptical of such predeterminism.

Tattersall provides a useful discussion of the chaotic and idiosyncratic nomenclature created in the first half of the twentieth century. Almost every hominin fossil was classified as its own species, so people had little sense of broader patterns. Enter evolutionary biologist Ernst Mayr. A proponent of the evolutionary synthesis of the 1930s and 1940s, which unified Mendelian genetic inheritance with Darwinian natural selection, Mayr demanded that palaeoanthropology be aligned with wider evolutionary research. As a result of his address at the international meeting ‘The Origin and Evolution of Man’ in 1950, the number of hominin species was reduced. The postulated ancestors of *H. sapiens* were lumped into a single lineage of gradually evolving subspecies separated by barriers such as oceans and extending back at least 2 million years.

A change in analytic methods was needed before this single-species hypothesis could be supplanted by branching taxonomies with complex patterns of localized speciation, extinction and population replacement. In the mid-1970s, palaeoanthropologists began to use cladistic analyses (which group organisms on the basis of shared characteristics) to evaluate possible links between species. But using such methods, Tattersall and palaeontologist Niles Eldredge found it difficult to demonstrate that *H. erectus* was an ancestor of *H. sapiens*.

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Meanwhile, the idea of punctuated equilibria (periods of little evolutionary change



The Strange Case of the Ricketty Cossack: And Other Cautionary Tales from Human Evolution

IAN TATTERSALL
Palgrave Macmillan:
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MAURICE AMBLER/PICTURE POST/GETTY

interspersed with rapid diversification, a concept that Eldredge co-developed) has been applied to hominin fossils and to successions of archaeological 'cultures', solely on the basis of recovered artefacts. But as Tattersall points out, views of transitional fossils and cultures as denoting sudden shifts between stable states are poorly theorized.

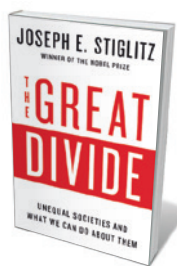
The single-species hypothesis has never quite disappeared. It has been reinvented as multiregional evolution from the 1970s onwards, by Milford Wolpoff and others. They model the transition to *H. sapiens* at the global scale, positing regional populations all effectively occupying the same niche wherever they happen to be, and interbreeding so that the species develops at the same rate everywhere. That would make increases in hominin brain size part of a universal trend. However, Tattersall identifies three separate episodes of relative brain-size increase within *Homo*: in *H. erectus* in Asia, and then, much later, in Neanderthals in Europe and *H. sapiens* in Africa. Regional and multiregional approaches still coexist, but current evidence tends to support the regionalized approach. The niches occupied by our ancestors and their relatives were likely to have been more varied than multi-regionalists would believe. There remains the question of how much the accuracy and precision of dating methods (and the quantity of data available) condition our discussions. If we had more and better dates, would we have a finer-grained view of change and variation?

The Strange Case of the Rickety Cossack is an interesting critical evaluation of how palaeoanthropology has developed. Rivalries between teams are delineated and used to explain how we know what we know. Many new hominin species have been identified in recent years, but it is not yet clear how they are related to us. More work is needed on the classification of skeletal material from Dmanisi in Georgia, which encompasses extraordinary morphological variety, and from Flores in Indonesia, where the 'hobbit' *Homo floresiensis* was found (see C. Stringer *Nature* **514**, 427–429; 2014).

Some of Tattersall's assertions will generate heated debate — particularly the claim that the large-brained Neanderthals were empirical artisans, rather than symbolic artists. Current archaeological evidence indicates that Neanderthals were able to innovate, but that these innovations may have been kept within small-scale social networks. By contrast, the future of palaeoanthropology lies in its ability to make extensive connections. ■

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Books in brief



The Great Divide: Unequal Societies and What We Can Do About Them

Joseph E. Stiglitz W. W. NORTON (2015)

That 1% of the world now owns nearly half of the wealth is weakening the global economy. So argues Nobel-prizewinning economist Joseph Stiglitz in this collection of writing originally published in *Vanity Fair* and elsewhere. He ranges with searing honesty from the deregulation and tax cuts for the rich that spurred the 2008 meltdown to the ebbing of socio-economic mobility. His solutions to the crisis are presented authoritatively as eminently doable — from boosting corporate taxes to investing in science and education.



A Natural History of English Gardening

Mark Laird YALE UNIVERSITY PRESS (2015)

In this vast, stunningly illustrated history of gardening in England, landscape historian Mark Laird focuses on a fertile moment — the mid-seventeenth to early nineteenth centuries. During that time, he argues, natural history (the discovery of order in nature) emerged from the evolution of the garden (nature's ordered microcosm). Laird marshals climatic events such as the Little Ice Age winter of 1683 and the drought a century later to contextualize advances in forestry and garden design by John Evelyn, and in horticultural science by Mary Somerset, Duchess of Beaufort, among other developments.



Domesticated: Evolution in a Man-Made World

Richard C. Francis W. W. NORTON (2015)

We humans evolve side by side with other animals in the process of domestication, and in this intriguing study, science journalist Richard Francis tracks those changes. As he shows, both natural and artificial selection have worked powerfully to create diversity in size and shape in domesticated animals, notably the dog. Yet "evolution is still fundamentally conservative", he notes: the wolf lingers in the chihuahua. Francis presents numerous case studies, from ferrets and camels to reindeer and us. Our self-domestication, he avers, has driven the cultural dynamism that has made us what we are.



Elephant Don: The Politics of a Pachyderm Posse

Caitlin O'Connell UNIVERSITY OF CHICAGO PRESS (2015)

The jaunty title belies the scholarly weight of Caitlin O'Connell's study on social behaviour in a group of African bull elephants in Namibia's Etosha National Park. O'Connell, who also works on the role of vibration in mammal communication, offers a riveting account. We see the pachyderms dipping their trunks into the mouth of dominant bull Greg; battling or welcoming would-be members; and, when Greg disappears, standing tail to tail, facing out as if listening for some seismic clue. Full of vivid detail, such as waking up to the "demonic-sounding giggling" of hyenas.



Plankton: Wonders of the Drifting World

Christian Sardet UNIVERSITY OF CHICAGO PRESS (2015)

They have vital roles in climate and food chains, but their minuscule size means that plankton impinge little on the public consciousness. In this beautiful book, marine scientist Christian Sardet shows that tiny plankton, not enormous blue whales, are the real stars of the ocean. Macro pictures of the huge variety of plankton forms and short details of their lives force a reconsideration of our view of them as part of an amorphous soup. A celebration of the small, and an unalloyed joy. (See the *Nature* video at go.nature.com/gegecq.) **Barbara Kiser**