Richard Dawkins, pictured at home in 2010, popularized a gene-based view of evolutionary biology.

GENETICS

Dawkins, redux

Nathaniel Comfort takes issue with the second instalment of the evolutionary biologist's autobiography.

In 1976, Richard Dawkins, then a 35-year-old Oxford lecturer in animal behaviour, published his first book, *The Selfish Gene* (Oxford University Press). Distilling a body of recent population-genetics research — notably that of W. D. Hamilton — it argued that genes, not organisms, were the targets of natural selection. An organism, Dawkins wrote, was simply a gene's way of replicating itself.

The book was a surprise best-seller. Along with E. O. Wilson's *Sociobiology* (Harvard University Press, 1975), it helped to spark a new nature–nurture debate that pitted sociobiologists against socialist biologists. Notable among the latter were the palaeontologist Stephen Jay Gould and the population geneticist Richard Lewontin, who accused the sociobiologists of rationalizing social evils such as racism and infidelity as genetically hard-wired, evolutionarily programmed. Yet

Dawkins's fiercely reductionist, materialist world view exuded a transgressive sexiness, and his suave, swaggering prose appealed to many readers, lay and professional.

Dawkins's greatest gift has been as a lyricist. With terms such as selfish genes, memes and the extended phenotype, he has provided much of the vocabulary of modern evolutionary biology. He has published a sackful of books laying out the evidence for evolution, against design in nature, and for natural selection as the only mechanism of adaptive evolution. A skilled and popular lecturer,

Brief Candle in the Dark: My Life in Science
RICHARD DAWKINS
Bantam: 2015.

he also discovered a taste for the camera, hosting numerous television documentaries.

In the early 2000s, he saltated from popularizer into evangelist. His 2006 book *The God Delusion* (Bantam) was an ecclesiophobic diatribe, published around the same time as Christopher Hitchens's *God Is Not Great* (Twelve, 2007) and similar books by Daniel Dennett and Sam Harris. The gospels of Christopher, Daniel, Sam and Richard form the scripture of the 'new atheism', a fundamentalist sect that has mounted a scientific crusade against all religion.

Now, *Brief Candle in the Dark* revisits Dawkins's career since *The Selfish Gene*. Its predecessor, *An Appetite for Wonder* (Bantam, 2013), was a memoir of a young upper-class Englishman becoming a scientist, replete with African adventures, British public schools and Oxonian traditions. Some reviewers wondered whether the sequel would have more heft and focus, reflection and introspection. At 450 pages, it is certainly heftier.

Dawkins has organized *Brief Candle* thematically, making it less memoir than annotated catalogue. The first few chapters are a scattershot record of his duties as an Oxford don, a rare field trip and the Royal Institution Christmas lectures. The next few devolve into a series of lists: his books, his debates, his television appearances.

Finally, he abandons the memoir format to do what he does best: write about science. The book concludes with a mammoth 120-page chapter recapitulating the ontogeny of his thought. Like Francis Galton, the hereditarian Victorian biostatistics pioneer, Dawkins has a quantitative turn of mind, but is better at algorithms than theorems. So indeed is life itself, which is why biology has so few laws.

Much of Dawkins's research has been *in silico*, writing programs for evolutionary simulations. In his simulations, life is utterly determined by genes, which specify developmental rules and fixed traits such as colour. The more lifelike his digital animals ("biomorphs") become, the more persuaded he is that real genes work in roughly the same way. Dawkins's critics accuse him of genetic determinism. This synopsis of his work shows that his life virtually depends on it.

A curious stasis underlies Dawkins's thought. His biomorphs are grounded in 1970s assumptions. Back then, with rare exceptions, each gene specified a protein and each protein was specified by a gene. The genome was a linear text — a parts list or computer program for making an organism — insulated from the environment, with the coding regions interspersed with "junk".

Today's genome is much more than a script: it is a dynamic, three-dimensional structure, highly responsive to its environment and almost fractally modular. Genes may be fragmentary, with far-flung chunks of DNA sequence mixed and matched in bewildering

combinatorial arrays. A universe of regulatory and modulatory elements hides in the erstwhile junk. Genes cooperate, evolving together as units to produce traits. Many researchers continue to find selfish DNA a productive idea, but taking the longer view, the selfish gene per se is looking increasingly like a twentieth-century construct.

Dawkins's synopsis shows that he has not adapted to this view. He nods at cooperation among genes, but assimilates it as a kind of selfishness. The microbiome and the 3D genome go unnoticed. Epigenetics is an “interesting, if rather rare, phenomenon” enjoying its “fifteen minutes of pop science voguery”, which it has been doing since at least 2009, when Dawkins made the same claim in *The Greatest Show on Earth* (Transworld). Dawkins adheres to a deterministic language of “genes for” traits. As I and other historians have shown, such hereditarianism plays into the hands of the self-styled race realists (N. Comfort *Nature* 513, 306–307; 2014).

His writing can still sparkle. He excels at capturing the scenes behind a scene, deftly explaining a scientific principle, capping a story with an amusing anecdote. His tale of palaeoanthropologist Richard Leakey hauling his legs (amputated after a plane crash) to Kenya in his hand luggage for burial is funny and touching. Dawkins also makes an important case for the “poetic” side of science, arguing that the imperative to justify research in terms of potential medical or financial benefits bleeds the beauty out of it. Amen.

At such moments, one feels transported to a tweedy evening at Oxford, pouring the sherry as a charming senior faculty member holds court. But too often, the professor rambles. He quotes friends’ and colleagues’ tributes from dust-jackets and afterwords. He mentions the fish genus *Dawkinsia*. He repeatedly slams his late rival, Gould (“whose genius for getting things wrong matched the eloquence with which he did so”). His digressions often come off as twee and self-indulgent. Mentioning the limping family dog, Bunch, in an apt example of an acquired characteristic that cannot be inherited, he is reminded of an unfinished poem his mother wrote after Bunch died, which he prints. “If you can’t be sentimental in an autobiography, when can you?” he asks.

For a time, Dawkins was a rebellious scientific rock star. Now, his critique of religion seems cranky, and his immovably geocentric universe is parochial. *Brief Candle* is about as edgy as Sir Mick and the Rolling Stones cranking out the 3,578th rendition of ‘Brown Sugar’ — a treat for fans, but reinscribing boundaries rather than crossing them. ■

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Books in brief

Brain Storms: The Race to Unlock the Mysteries of Parkinson's

Jon Palfreman FARRAR, STRAUS & GIROUX (2015)

In 2011, journalist Jon Palfreman was diagnosed with Parkinson's disease. The progressive neurodegenerative condition, characterized by tremors and muscular rigidity, affects 7 million people worldwide. In this lucid overview, Palfreman interlaces the history of research into the disease — linked, like Alzheimer's, to a rogue protein — with therapeutic approaches from deep brain stimulation to the drug L-DOPA. Extraordinary case studies abound, such as that of a man who can ride a bicycle but not walk, and dancer Pamela Quinn, who has devised workarounds that ‘trick’ the body into movement.

Places of the Heart: The Psychogeography of Everyday Life

Colin Ellard BELLEVUE LITERARY (2015)

Why would a street evoke unease, or a shopping centre the desire to spend? Psychologist Colin Ellard explores the intersection of neuroscience and urban design for answers. Meshing recent findings with thoughtful appraisals of their implications, Ellard looks at spaces and the awe, lust, boredom, affection or anxiety that they trigger. He is richly insightful, particularly on digital encroachments into the experience of place: can augmented-reality gear ever vie with the hair-prickling thrill of being there? Ellard argues that virtual immersion could take a “metaphysical toll”; it is hard not to agree.

Elephants and Kings: An Environmental History

Thomas R. Trautmann UNIVERSITY OF CHICAGO PRESS (2015)

The intelligence, majestic presence and physical prowess of the Asian elephant was not lost on India's monarchs. As historian Thomas Trautmann shows in this scholarly environmental history, the beast's usefulness in warfare and its prodigious dietary needs ensured royal protection for swathes of forest in ancient India, where the wild animals were captured for specialized training. That the country still has 30,000 elephants is a testament to their enduring place in the collective imagination; but as Trautmann argues, India's surviving patchwork of 31 elephant reserves may not sustain them.

Why You Can Build It Like That: Modern Architecture Explained

John Zukowsky THAMES & HUDSON (2015)

From the squat circularity of New York City's Guggenheim Museum to Abu Dhabi's swooning, tornado-shaped Capital Gate skyscraper, extreme architecture is here to stay. This illustrated roll call by architectural historian John Zukowsky zips through 100 “iconic and iconoclastic” structures of the past 50 years — shapely, hideous or energizingly weird. Norman Foster's Spaceport America in New Mexico, for instance, resembles a giant horseshoe crab in thin-shelled concrete, whereas Myron Goldsmith's McMath-Pierce Solar Telescope in Arizona is a minimalist ode to the right angle.

Nature and Wealth: Overcoming Environmental Scarcity and Inequality

Edward B. Barbier PALGRAVE MACMILLAN (2015)

In this cogent analysis, economist Edward Barbier reveals an economic landscape of degraded environments and social inequality. The culprit, he argues, is a structural imbalance in which natural resources are overexploited and human capital is undersupplied. Examining current challenges such as ecological scarcity, he concludes that a strategy to rebalance natural and human capital is the way forward, however difficult. *Barbara Kiser*