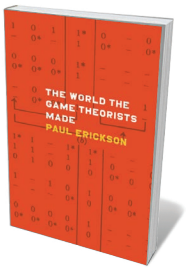
ILLUSTRATION BY TOM CLOHOSY COLE

SUMMER BOOKS

As labs and lecture halls empty, go out of this world with our regular reviewers' recommendations for stellar holiday reading.



The World the Game Theorists Made

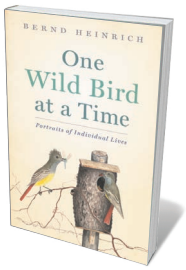
PAUL ERICKSON
Univ. Chicago Press: 2015.

In this deeply researched and readable book, historian Paul Erickson chronicles the passage of game theory from mathematical economics to arms-control theory to evolutionary biology, and back to economics. Along the way, it has changed considerably, and now is dominated almost entirely by "non-cooperative" games that obey the equilibrium laid out by mathematician John Nash.

Until now, there has been remarkably little written about the history of game theory since its creation in 1944 by mathematician John von Neumann and economist Oskar Morgenstern, beyond recounting a storied intellectual lineage studded with economics Nobel laureates. Such accounts do little to explain how game theory came to be applied to the novels of Jane Austen (among much else). Some concepts — the prisoner's dilemma, the tragedy of the commons — are today almost impossible to discuss without someone scribbling down a 2×2 grid.

Erickson — with whom I collaborated on *How Reason Almost Lost Its Mind* (Univ. Chicago Press, 2013), a history of cold-war rationality — brings a distinctive voice to the material. The book will edify and surprise even specialists, let alone the rest of us, who have to live in a world created by game theorists whether or not we can articulate the pay-offs in the matrix.

Michael D. Gordin *is a historian at Princeton University in New Jersey.*



One Wild Bird at a Time: Portraits of Individual Lives

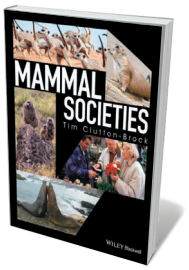
BERND HEINRICH
Houghton Mifflin Harcourt: 2016.

Here, renowned biologist Bernd Heinrich shows us how to find adventure in the nature in our neighbourhood. Heinrich examines the behaviour of the wonderful birds — from flycatchers to owls — that throng the vicinity of his Maine cabin. He invites us to witness his well-honed scientific process as he demystifies seemingly inexplicable behaviours, from crow-on-crow murder, sapsucker drumming and the 'snow caves' of grouse to some raptors' predilection for adding greenery to their nests.

The book inspires us to become backyard sleuths. Some solutions require more than patience and a keen naturalist's eye. The northern flicker (*Colaptes auratus*), for example, nests in cavities and so is rarely visible — although not to Heinrich, who chainsaws a hole in his cabin wall to install an observable nesting box. This home 'improvement' project, along with Heinrich's insights into the ethological riches to be found in forest and field, will propel you outside this summer, to follow the denizens of your own patch of the wild.

John M. Marzluff *is the James W. Ridgeway Professor of Wildlife Science in the School of Environmental and Forest Sciences at the University of Washington, Seattle. His latest book is* Welcome to Subirdia.

© 2016 Macmillan Publishers Limited, part of Springer Nature. All rights reserved.



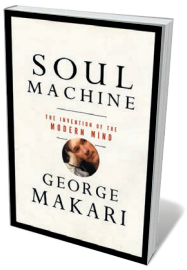
Mammal Societies

TIM CLUTTON-BROCK
Wiley-Blackwell: 2016.

Mammals come in all shapes and sizes, but they share key features of their reproductive biology. For instance, females give birth to live young and produce milk to nourish them. The costs of gestation and lactation shape the females' reproductive strategies, and this, in turn, influences the reproductive strategies of the males.

Over the past 40 years, behavioural ecologists have documented how these dynamics play out in a range of species. Tim Clutton-Brock has had a leading role in this endeavour, conducting long-term studies of Scottish fauna (red deer — *Cervus elaphus* — on the island of Rum, and Soay sheep in the St Kilda archipelago) and meerkats (*Suricata suricatta*) in Africa's Kalahari Desert. In *Mammal Societies*, he provides a masterful synthesis of what we know about the behavioural ecology of mammals. Clutton-Brock skilfully weaves an immense body of material into a coherent narrative that emphasizes the processes that shape adaptation, and reveals common patterns that have evolved. The text is gracefully written, enlivened by well-chosen examples and beautifully illustrated. (A few of my own photographs of baboons appear in it.) This is a book that Charles Darwin would have wanted in his library; it should be in yours.

Joan B. Silk *is at the Institute of Human Origins at Arizona State University, Tempe.*



Soul Machine: The Invention of the Modern Mind

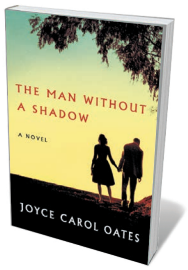
GEORGE MAKARI
W. W. Norton: 2015.

In this brilliant mixture of history, philosophy and science, psychiatrist and historian George Makari explores the origins of our ideas about self and that ephemeral phenomenon, the mind. Focusing on the 'long eighteenth century' (1660–1830), Makari explores how early-modern thinkers and Enlightenment philosophers shaped the way we think about reason, knowledge, language and consciousness.

Makari traces disputes between philosophers René Descartes, Thomas Hobbes and John Locke in this arena, vividly linking modern neuroscience with thinkers whom many scientists may not have read. He also looks at changing attitudes to mental health, describing how the York Lunatic Asylum in England chained up naked inmates, leading to the death of a Quaker patient in 1790. In response, Quakers set up the York Retreat, with its moral and behavioural treatments — a model that had gained broader support by 1814.

Insightful, thought-provoking and encyclopaedic, Makari's book shows how we came to understand where the mind is located and something of its nature. He closes on science's present impasse: the inability to properly explain consciousness or what happens when mental illness affects us. We remain, he argues, "modern hybrids of soul and machine".

Matthew Cobb *is professor of zoology at the University of Manchester, UK.*



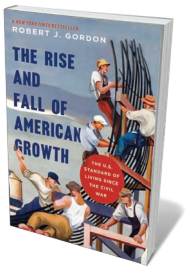
The Man Without a Shadow: A Novel

JOYCE CAROL OATES
Ecco: 2016.

The acclaimed US writer Joyce Carol Oates's 44th novel follows the career of fictional neuropsychologist Margot Sharpe and her interactions with "E.H.", a man with anterograde amnesia who can hold on to newly made memories for a mere 70 seconds. Charismatic and clever, but perennially confused, E.H. can recall only events that happened before his brain was damaged, and is haunted by vivid, mysterious recollections of a drowned girl. Sharpe is far from normal herself: friendless and work-obsessed, she struggles to succeed as one of the few female scientists in her field.

Reflecting real-life research, the story borrows from famous experiments used by neuroscientists such as Suzanne Corkin in her studies of celebrated amnesiac patient Henry Molaison. The claustrophobic action takes place over decades, almost entirely in Sharpe's research lab. As Sharpe is slowly drawn over the ethical line in her obsession with E.H., we witness her triumph and shame. In illuminating the science of memory, this uneasy thriller makes us question how much our capacity to revisit the past allows us to contemplate the future.

Jennifer Rohn *leads a cell-biology group at University College London. Her most recent novel is* The Honest Look.



The Rise and Fall of American Growth: The US Standard of Living Since the Civil War

ROBERT GORDON
Princeton Univ. Press: 2016.

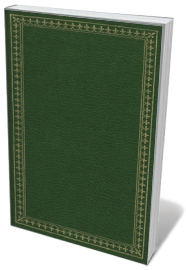
The must-read book of the moment for economists is Robert Gordon's *The Rise and Fall of American Growth*. The adjective 'magisterial' applies (making it perhaps too hefty for beach reading). The first half is a fine, detailed description of the dramatic increase in US living standards, which mirrors those of other industrializing economies, from the mid-nineteenth to late twentieth centuries. Gordon concentrates on the role of technological progress, particularly innovations in public health and transportation, as the main driver of growth. In the second half, Gordon airs his more controversial belief that today's advance in digital technologies is much less important, and amounts to a technological slowdown that has flat-lined productivity. However, he has narrowly (and thus unpersuasively) focused on too few technologies.

More convincing on the gradual adoption of innovations in industry, and their influence on jobs and living standards — again with plenty of history — is James Bessen's excellent and comparatively optimistic *Learning By Doing* (Yale Univ. Press, 2015).

Diane Coyle *is a professor of economics at the University of Manchester, UK, and author of* GDP: A Brief but Affectionate History.

© 2016 Macmillan Publishers Limited, part of Springer Nature. All rights reserved.

STOCK/GETTY IMAGES PLUS



The Descent of Man

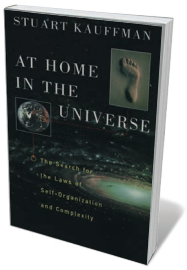
CHARLES DARWIN
John Murray: 1871.

In my archaeological career, I often find myself taken right back to Charles Darwin. A recent visit to the Museum of Mankind in Paris was one such moment. Touring the human-evolution displays in the new permanent galleries, which reopened last year, I found that aside from twenty-first-century twists such as an explanation of the human genome, the exhibits are in many respects like an illustrated edition of Darwin's 1871 *The Descent of Man*.

In this book, Darwin first establishes that humans carry indelible signs of our origins, such as physiological similarities to the great apes. He then sets out to show that, despite representing a minuscule part of the living world, we have had the greatest impact. Crucially for archaeologists, he identifies the elements that make us human as culture, mind and conscience. Finally, he puts us right back in our biological place by attributing these distinctions to sexual selection.

Arguments about selection are now more nuanced, but who we are, where we come from and where we are going remain fascinating questions for philosophers and scientists. Darwin's Victorian language about women and race is outmoded, but his ideas set the course for debates on what defines humanity, while incorporating instructive observations from nature, from tool use to nest building.

Jill Cook *is acting keeper in the Department of Britain, Europe and Prehistory at the British Museum in London.*



At Home in the Universe: The Search for the Laws of Self-Organization and Complexity

STUART KAUFFMAN
Oxford University Press: 1995.

If we could rewind the tape of life to its inception around 3.6 billion years ago, and press the 'play' button, would humans emerge once more? Are we the expected and inexorable products of evolutionary processes, or are we chance occurrences that might never evolve again? If natural selection were the only organizing principle that determined the structures of living things, it is unlikely that the historical pageant of evolutionary form would recur.

More than two decades ago, in *At Home in the Universe*, theoretical biologist Stuart Kauffman argued that life's history has been guided and constrained by an additional source of order: the self-organizing and emergent properties of complex, far-from-equilibrium systems poised at the edge of chaos. The well of natural order that issues from such critically tuned complex systems may be driven by a set of deep laws that invisibly guide the evolution of life on Earth, and presumably throughout the Universe. Kauffman explores these by modelling the behaviour of highly interconnected Boolean networks. His prescient observations may have a new relevance in the era of genome editing and microbiome dynamics.

Adrian Woolfson *is the author of* Life Without Genes.

ILLUSTRATION BY TOM CLOHOSY COLE

© 2016 Macmillan Publishers Limited, part of Springer Nature. All rights reserved.