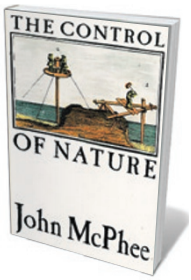
ILLUSTRATIONS BY SEÑOR SALME

SUMMER BOOKS

Plunge into a profusion of brilliant summer reads suggested by regular reviewers and editors, far away from the lab and lecture hall.



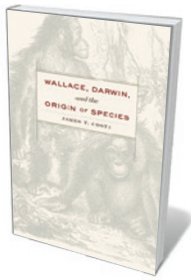
The Control of Nature

JOHN MCPHEE
Farrar, Straus & Giroux: 1989.

Icelandic lava, Mississippi floodwater, San Gabriel Mountain mud studded with car-sized boulders, in Biblical quantities, gushing intermittently but inexorably, without surcease. McPhee, a master of structure, leaves his thesis unstated but unmistakable: each of these elemental currents hurtles towards a crushing central focus, a black hole. *The Control of Nature* is ironically titled, an allegorical, pitch-perfect triptych of futility. In each locale — live volcanoes in Iceland and Hawaii, the sliding mountains above Los Angeles, California, the Atchafalaya swamp in Louisiana — disaster is immanent. The human inhabitants are in denial, living where they should not. They dam, divert, sandbag, bulldoze, firehose and blockade, trying to stem the deadly flow. It cannot be done. Their efforts are puny and, if anything, make the next inundation worse.

The Control of Nature sucked me in when it was first published. I read it slowly, letting McPhee's virtuosic prose and playful wit leaven the harrowing stories. A quarter of a century on, the book seems prescient, an early warning about a natural world responding with mounting violence as we try to bend it to our will.

Nathaniel Comfort *is professor of the history of medicine at Johns Hopkins University in Baltimore, Maryland, and is writing a biography of DNA.*



Wallace, Darwin, and the Origin of Species

JAMES T. COSTA
Harvard Univ. Press: 2014.

Did Charles Darwin and Alfred Russel Wallace really come up with the idea of natural selection simultaneously and independently? Was it the same idea? How did Darwin and his colleagues manage the delicate negotiation of co-presenting this concept to the public — without Wallace's knowledge?

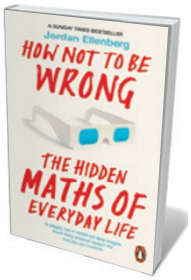
James Costa takes on these questions, and delves into the intellectual influences of the two luminaries. (This book follows two others by Costa for the Harvard University Press: *The Annotated Origin* (2011), a definitive collection of facsimiles of the first edition of Darwin's 1859 *On the Origin of Species*, and *On the Organic Law of Change* (2013), a facsimile of Wallace's historically crucial *Species Notebook*.) He also annotates a facsimile of the 1855 Wallace paper known as the Sarawak law, an important precursor to the essay 'On the tendency of varieties to depart indefinitely from the original type', which Darwin received from Wallace in 1858. That manuscript forced the question of a mechanism for evolution into the open. Costa's nuanced and well-documented reading of this episode, as well as Wallace's contributions and his relationship with Darwin, is a gift for any scientist's bookshelf.

Kevin Padian *is professor of integrative biology at the University of California, Berkeley.*

EDITOR'S CHOICE

1 THE HADAL ZONE / ALAN JAMIESON

2 THE DISPOSSESSED / URSULA K. LE GUIN



How Not to Be Wrong: The Hidden Maths of Everyday Life

Jordan Ellenberg
Penguin: 2014.

Anyone who writes about mathematics faces this problem: readers need years of training to acquire the vocabulary and basic conceptual frameworks that insiders take for granted. Mathematician Jordan Ellenberg tackles that issue at the outset. He will guide readers through mathematical ideas that are "simple and profound", which require no special techniques but reveal deep insights into our world and minds.

Ellenberg breathes life into his theme of the perils of misunderstood statistics through clear storytelling and by drawing diverse and unexpected connections. He delivers a thorough history of statistics — including digressions about taxes, basketball, lotteries and the US Supreme Court — as well as high points of the discipline such as prime numbers, information theory, geometry, logic and calculus.

The book quietly initiates the reader into thinking like a mathematician. I would call it one of the most intelligent books written about mathematics, and possibly the most entertaining.

Michael Harris *is professor of mathematics at Columbia University, New York, and Université Paris Diderot, and author of* Mathematics without Apologies.

Designing the New American University

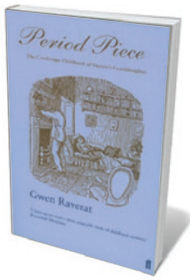
Michael M. Crow and William B. Dabars
Johns Hopkins Univ. Press: 2015.

How can universities make the world better? In *Designing the New American University*, Michael Crow and William Dabars call for a reinvention to broaden access, engage the "knowledge enterprise" to address social needs, and reflect on why we seek to understand nature and ourselves.

Crow, president of my institution, Arizona State University (ASU), and historian Dabars have the ASU model in mind, but do not propose a blueprint. Rather, Dabars' rich historical contextualization and Crow's policy and managerial experience provide design principles encouraging institutions to leverage their own place in a locally appropriate way. For instance, the University Innovation Alliance — a consortium of 11 public research universities — is working to increase retention and graduation rates for low-income students through local strategies to achieve shared goals.

Crow and Dabars push universities to boost diversity, promote the public good, develop sustainable environmental and societal practices, and achieve ideals of educated democracy inspired by Thomas Jefferson.

Jane Maienschein *is a historian and philosopher of science at Arizona State University in Tempe and the Marine Biological Laboratory in Woods Hole, Massachusetts.*



Period Piece

Gwen Raverat
Faber & Faber: 1952.

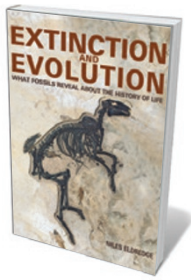
Period Piece is a delightful memoir of a late-nineteenth-century Cambridge childhood, by Charles Darwin's granddaughter, Gwen Raverat.

Readers will learn nothing here about natural selection. They will instead be absorbed into a world of "born Darwins", "married-in Darwins" and the "Anti-Darwin League" for those who had "inadvertently" married into the family, such as Gwen's own mother.

In this world, the room in which *On the Origin of Species* was written is used for flower arranging. The family hypochondria is demonstrated by each Darwin in turn — Aunt Etty's patent anti-cold mask receives special attention. And Darwin's grandchildren modestly feel due some small credit for having produced such a grandfather.

Raverat, the elder daughter of distinguished astronomer and mathematician George Darwin, draws the quirks, curiosities and narrowness of academic Cambridge engagingly. Dinner-party guests, for example, were seated according to the foundation dates of their college or chairs — so professors of Hebrew and Greek, founded in the same year, could never be invited together. For beach, balcony or a few hours' travelling, this offers wonderful, escapist reading.

Tilli Tansey *is professor of the history of modern medical sciences at Queen Mary University of London.*



Extinction and Evolution: What Fossils Reveal About the History of Life

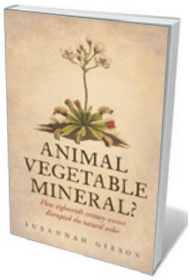
Niles Eldredge
Firefly: 2014.

Palaeontologist and acute thinker Niles Eldredge describes how life has evolved through geological time, partly through 160 beautiful colour plates depicting more than 200 specimens of fossil and living species. Among them are *Eocypselus rowei*, an extinct relative of swifts and hummingbirds that inhabited Wyoming some 52 million years ago, and the coelacanth *Latimeria menadoensis*, a 'living fossil' whose close relatives are nearly exclusively from the Palaeozoic and Mesozoic eras, 541 million to 66 million years ago. Most of the photographs are by the late, great Murray Alcosser.

Eldredge emphasizes the existence of many species that resist evolutionary change for long periods (such as the brachiopod *Mucrospirifer mucronatus*), and the importance of mass extinctions in creating conditions that aid the emergence of new species. He argues convincingly that it is palaeontology, rather than evolutionary genetics, that allows us to recognize these points. Splendid photographs, vivid language and concise text: a great read.

Xu Xing *is a professor at the Institute of Vertebrate Paleontology and Paleoanthropology of the Chinese Academy of Sciences in Beijing.*

3 THE VITAL QUESTION / NICK LANE 4 MISBEHAVING / RICHARD H. THALER 5 EXTREME / EMMA BARRETT & PAUL MARTIN 6 MELTING AWAY / CAMILLE SEAMAN



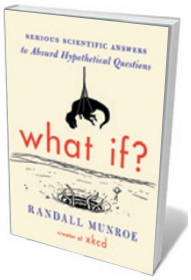
Animal, Vegetable, Mineral?

Susannah Gibson
Oxford Univ. Press: 2015.

While dallying among the rock pools this summer, spare a thought for earlier naturalists — starting with Aristotle — who scoured the boundary between earth and sea for genre-defying specimens of life. *Animal, Vegetable, Mineral?* is a book about boundaries, following the attempts of eighteenth-century men of science to classify nature, despite nature's apparent reluctance to be classified. From fossils and Venus flytraps to corals and somersaulting polyps, organisms seeped across the ancient borders between animal, plant and mineral, inciting feuds and rival theories among those who sought to place them.

Susannah Gibson unpacks the experiments and speculations that underpinned Enlightenment natural history, showing how finds pushed at disciplinary boundaries. Puzzled naturalists drew on chemistry and Newtonian physics to explain how plants breathed and embryos formed, and fossils offered a key to the new field of geology. Sensitive plants and self-generating animals also ignited religious and philosophical controversy about how to define life, locate the soul and detect God's role in creation. Gibson's story whisks us from one taxonomical can of worms to the next.

Jennifer Rampling *is assistant professor of history at Princeton University in New Jersey, where she teaches the history of science.*



What If?: Serious Scientific Answers to Absurd Hypothetical Questions

Randall Munroe
John Murray: 2014.

What if, on your summer holidays, you are invited for a swim in the spent-fuel pool of a nearby nuclear-power station? Should you go? What are the risks? Or what if you and your partner want to prolong the sunset for as long as possible by driving ahead of the dusk — for how long could you postpone the night, and which road should you use? If someone made a bullet out of neutron-star material, should you poke it? The answer is strange and repulsive, but not as deadly as you might think.

What If? is an essential holiday companion. Each chapter takes a daft-but-tractable question such as those above, and applies science, reason and critical thinking to find a rational answer. Chapter lengths vary according to the question and the relentlessness with which it is pursued. Randall Munroe — author of popular webcomic *xkcd* — is a genius. His book lets the analytical, problem-solving bits of your mind play cleverly with stupid stuff, while the rest of you relaxes. (What if everyone in the world bought this book and laughed all at once? Would that affect the weather?)

Jon Butterworth *is professor of physics at University College London and the author of* Smashing Physics.

REVIEWS: GO.NATURE.COM/DJJQID

7 PALIMPSEST / MATTHEW BATTLES 8 UNIQUELY HUMAN / BARRY M. PRIZANT WITH TOM FIELDS-MEYER

The Hadal Zone: Life in the Deepest Oceans

Alan Jamieson
Cambridge Univ. Press: 2015.

Deep trenches in the ocean harbour the strange, little-studied hadal zone, stretching from 6 kilometres to as far as 11 kilometres down (in the case of the Mariana Trench in the Pacific Ocean). Marine scientist Alan Jamieson knows this mysterious region better than most. His overview, *The Hadal Zone*, moves from the history of deep-sea science — covering HMS *Challenger*'s 1870s expedition and film director James Cameron's 2012 *DEEPSEA CHALLENGER* dive — to examining all of the species known to live in the zone, from bacteria to fish.

A serious scientific text, Jamieson's tome is so densely packed with facts on this extraordinary environment that it rewards casual dipping in and out. It includes the debate about just how deep fish can live (around 8 kilometres); the technology behind scientific equipment that can withstand pressures of 10 kilometres of water (for example, super-strong glass made of sapphire); and the wonderful 'supergiant' amphipod, which resembles a woodlouse but is one-third of a metre long.

In shedding light on a place far beyond the Sun's illumination, Jamieson has uncovered delights — and shown us just how much we have yet to discover about the hadal zone. Here's hoping for enough new findings to justify a second edition soon.

Daniel Cressey *is a reporter for* Nature *in London.*

The Dispossessed

Ursula K. Le Guin
Harper and Row: 1974.

There is no humble-bragging on the planet Anarres — its culture blends socialism and anarchism, and 'egoizing' is considered obscene. There is no income inequality, because income and ownership do not exist: everything is shared. No celebrity worship, either. Paradise? Perhaps, except that just like on twenty-first-century Earth, it is hard to get your research published.

Ursula K. Le Guin's 1974 novel *The Dispossessed* is essentially a work of political philosophy dressed in physics. Our hero, the theoretical physicist Shevek, travels to neighbouring planet Urras for the sake of his work. Its capitalist democracy and 'propertarian' behaviours offend Shevek down to the bone. The scene is set for revolutions, scientific and otherwise.

Although the ideas of equality, wealth, the role of the state and geopolitics in *The Dispossessed* were informed by the cold war and Vietnam, this science-fiction classic has aged well — particularly in themes that reach beyond classic political theory and into the roles of self-promotion, privacy and freedom in society. Le Guin's 'anarchy' is, in many ways, today's libertarianism.

Kelly Krause *is* Nature*'s creative director.*

The Vital Question: Why is Life the Way it is?

Nick Lane
Profile: 2015.

Ever since Charles Darwin's *On the Origin of Species* (1859), the best books in biology have been arguments, writes Nick Lane. In *The Vital Question*, this deep-thinking biochemist sets out to persuade the reader of his own argument about how chemistry and physics created life and constrained its later evolution. This is nothing less than a new history of life on Earth.

Lane starts with the key point that every living cell generates chemical energy by moving protons across membranes, coupling proton flow to the generation of the energy-storage molecule ATP. In Lane's view, this universal biochemical engine betrays life's origins in deep-sea vents. There, natural gradients in proton concentration could have sprung up across pores in rocks. Flowing water and carbon dioxide might have combined in chemical reactions to form organic matter. Membrane-based energy generation limited life to single-celled organisms until one swallowed another. Their co-dependency led to complex cells and to the perplexing traits — such as ageing — that all such cells share.

If Lane fans feel they have heard this before, they largely have, in his exhilarating *Life Ascending* (2009). That poppier book sketched out the argument; *The Vital Question* fills in the knotty details with mathematical equations, biochemical diagrams, laboratory experiments and clarifying objections. (It is sometimes hard to distinguish between fact and speculation in Lane's writing, as Adrian Woolfson notes in his review (*Nature* **520,** 617–618; 2015).) This book is more textbook-like, less adroit and harder to grasp than Lane's earlier works. But for those who want to understand his vision, it is ultimately more rewarding.

Richard Van Noorden *is deputy news editor for* Nature.

Misbehaving: The Making of Behavioural Economics

Richard H. Thaler
Allen Lane: 2015.

When the global financial crisis unfolded in 2008, many questioned economic theory. In *Misbehaving*, Richard Thaler relates how researchers in his budding field, behavioural economics, have brought the discipline back into the real world. From his graduate-student days, Thaler understood that when faced with price deals or decisions about saving money, people would almost never act in the way that economic models predict they should. To explain this 'misbehaviour', he looked to psychology.

This is the remarkable story of how Thaler integrated findings on judgements and behaviour into economics, and demonstrated the value of his approach. We learn of all-too-common issues of self-control and overconfidence vis-à-vis money, and how these irrationalities influence financial markets — where rational choices are supposed to reign. Thaler builds on Nobel-prizewinning psychologist Daniel Kahneman's prospect theory, the idea that people make decisions on the basis of quick judgements rather than a thorough assessment of the probable outcome. He explains important anomalies such as the equity-premium puzzle — why people overreact to the short-term volatility of stocks and prefer investing in government bonds, even though stocks have a higher return in the long term. Thaler tells, too, of the struggle to get his work published and the put-downs of resistant economists. Behavioural economics is now a growing field, and Thaler hopes that it will start to influence monetary and fiscal policies — a change long overdue.

Monica Contestabile *is a senior editor at* Nature Climate Change.

Extreme: Why Some People Thrive at the Limits

Emma Barrett and Paul Martin
Oxford Univ. Press: 2014.

Everybody has a limit to how far they will go to achieve a goal. And throughout history, people have pushed themselves beyond average human capabilities to explore, experience or simply endure extreme environments.

In *Extreme*, behavioural scientists Emma Barrett and Paul Martin reveal the depth of character required to survive in the world's most hostile places. An itch to walk along paths less travelled is not enough for some people. Pulse-raising tales of doomed polar expeditions, scorching desert walks and solo flying, sailing and diving feats highlight the true grit required to soldier on. US cavalry soldiers, lost in a desert, drank coagulated horse blood when their water ran out; explorer Ranulph Fiennes' crotch sores failed to stop his solo traverse of Antarctica. Extreme adventure becomes a test of physical and mental endurance as obvious hardships such as hunger and pain vie with unexpected boredom and loneliness. Having climbed glaciers and trekked the Scottish Highlands alone, I thought I was adventurous until I read this book.

Barrett and Martin emphasize the value of intensive training. However, even good planning can fail. In 1875, a couple of French balloonists took to the skies with bottled oxygen to breathe as the air thinned. Inhaling it, they became light-headed and reckless, pushing their balloon higher until the oxygen ran out. *Extreme* is littered with fatalities, yet the inspirational stories of survival, from Ernest Shackleton to the crew of *Apollo 13*, expose humanity's remarkable resilience.

Emily Banham *is editorial assistant for* Nature *Books & Arts.*

Melting Away: A Ten-Year Journey Through Our Endangered Polar Regions

Camille Seaman
Princeton Architectural Press: 2014.

In *Melting Away*, photographer Camille Seaman (*Nature* **492,** 40; 2012) presents stunning images capturing the beauty and fragility of the Arctic and Antarctic — a reminder of the costs to the cryosphere of climate change. Between 2003 and 2011, Seaman journeyed to both regions every year, camera in hand, on board cruise ships and research vessels. Hers is a record of strange and spectacular scenes. Icebergs loom over still, black seas. Glaciers perch perilously at the ocean's edge. Calm waters stretch seamlessly into softly lit skies. Alongside the icy vistas and washed-out seascapes, Seaman captures some of the creatures of these remote regions — a young polar bear cleaning the salt from its fur in the snow, king penguins congregating at the water's edge.

As the chronicle progresses, the consequences of climate change grow hard to ignore. An ancient granite cliff bears the scars of its encounter with a once-vast glacier, now dwarfed in comparison; the scattered remnants of summer sea ice float on an eerily open ocean; a polar bear preys on a bird colony in the absence of seals, gone with the sea ice.

Although not a systematic exploration of the shifting ecology and climate of the poles, the collection serves as a visual testament to the beauty and rapidly fading grandeur of perhaps two of the most majestic places on the planet.

Anna Armstrong *is senior editor at* Nature Plants.

Palimpsest: A History of the Written Word

Matthew Battles
W. W. Norton: 2015.

Scrawled, incised, printed or digitally rendered, the written word is indelibly inked into human culture. In *Palimpsest*, Matthew Battles meditates on how it came to represent and build meaning.

Battles sees reading as an ancient skill rooted in our distant ancestors' perusal of earth and sky to discern significant patterns. Writing is the laggard, emerging as cuneiform in 3500 BC Mesopotamia and as "oracle bone script" in 1400 BC China. From those beginnings, Battles follows the tide of writing and printing around the world, drawing on palaeontology, neuroscience, mythology and the history of technology.

He highlights illuminating transformations. Tenth-century monastic scribes, by filling the libraries of medieval Europe, created nodes of order in war-torn fiefdoms. Nineteenth-century Britons discovered a passport to social mobility in writing, as Charles Dickens revealed in his seminal novel of class transition, *Great Expectations* (1861). In the early twentieth century, a creative misunderstanding of Chinese compound ideograms by radical US poet Ezra Pound fomented a poetic revolution that played out through the Beat and Black Mountain poets decades later.

Will computer code scupper or further our ability to engage with the page? Battles dithers philosophically over the answer. But humanity will, he feels, go on writing history regardless.

Barbara Kiser *is* Nature*'s Books & Arts editor.*

NATURE.COM
For more on science in culture see:
nature.com/booksandarts

Uniquely Human: A Different Way of Seeing Autism

Barry M. Prizant with Tom Fields-Meyer
Simon & Schuster: 2015.

Two books about autism spectrum disorder (ASD) released this summer look set to be serendipitous companion volumes. Steve Silberman's *NeuroTribes* (Avery, 2015) will, in a sobering history of scientific hubris, make the case that respect for people with ASD is long overdue. Parents, teachers, researchers and carers eager for a how-to guide on what form that respect should take in the home, clinic or classroom can turn to Barry Prizant's *Uniquely Human* for ideas.

Prizant distils decades of working with autistic children and adults, and their teams, into practical advice for lowering stress, leveraging strengths and interests, building resilience and, importantly, embracing and celebrating difference. Not for him the 'cures' narrative condemned by the Autism Self Advocacy Network (rallying cry: "Nothing About Us, Without Us"). Prizant's is a message of empathy, support and empowerment.

Consider a child rocking with her hands over her ears. She is probably coping with hyperacute hearing or auditory-processing difficulties. Don't train her to put her hands in her lap so that she 'looks normal'; instead, offer ear defenders, turn off the noisy air conditioning or allow her to bolt for the library where it is quiet. Writ large, Prizant shows, such understanding creates a context in which people with ASD can thrive, not just survive.

Sara Abdulla *is chief commissioning editor of* Nature.