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Michael Gazzaniga pioneered research into how the brain's hemispheres can operate independently.

NEUROSCIENCE

Halving it all

Douwe Draaisma enjoys the autobiography of Michael Gazzaniga, who has studied split brains for half a century.

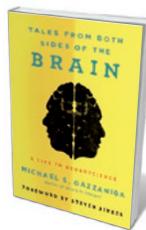
From the 1940s onwards, scores of people with intractable epilepsy were treated by surgically severing their corpus callosum, the nerve bundle that connects the left and right sides of the brain. In these 'split-brain' patients, each hemisphere operates independently. Michael Gazzaniga — known as the father of cognitive neuroscience — spent more than 50 years investigating these "splits", as he calls them affectionately in his compelling autobiography, *Tales From Both Sides of the Brain*.

As a psychology student at Dartmouth College in Hanover, New Hampshire, Gazzaniga became interested in the way brain enables mind. In the summer of 1960, he positioned himself at just the right place: Roger Sperry's lab at the California Institute of Technology (Caltech) in Pasadena. Sperry had begun a research programme on split brains, based on studies with cats and monkeys. Gazzaniga and fellow pioneer Joseph

Bogen extended this to people who had had the operation. Over the decades, as Gazzaniga relates, the programme branched out to explore perception, language, facial recognition, reasoning and many other cognitive processes. It produced a wealth of information on hemispheric specialization.

As the book unfolds, it becomes clear that split brains present a nested set of conundrums. The first is that roughly 200 million neural fibres have been cut, but nothing — apparently — happens. Memory, personality, cognition; everything is still intact.

To demonstrate that both hemispheres



Tales from Both Sides of the Brain: A Life in Neuroscience
MICHAEL S. GAZZANIGA
Foreword by Steven Pinker
Ecco: 2015.

are operating separately requires shrewd experimental procedures, which Gazzaniga pioneered in the early 1960s. These revealed the second conundrum, that the left brain can see and feel things that the right brain does not, and vice versa, yet the patient experiences a single, unitary mind. Even down-right discrepancies — the right brain seeing a picture of a naked person, leaving the left brain wondering about the blush — are explained away by the mind using cleverly improvised stories.

These stories point to yet a third conundrum. Why are humans, whether with an intact or a severed callosum, so left-sided? Split-brain experiments have pointed to the existence of a 'narrator' or 'interpreter', a faculty housed in the language hemisphere (almost always the left) that explains why we behave as we do.

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For more on split

brains, see:

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Unlike Bogen, who proposed some now-discredited theories on 'left-brained' white city dwellers and 'right-brained' Hopi Indians in the 1970s, Gazzaniga always kept a sober perspective on hemispheric differences. Much of his later work served to debunk the popular idea of a rational, cold-hearted left brain ranged against an emotional, intuitive right brain.

In his autobiography, Gazzaniga often seems to be a man of two minds himself. His style is colloquial and unassuming (Caltech "was chock full of mighty smart cookies and most of them could run circles around me"). He is a self-confessed big-picture man, leaving mathematics and technicalities to others. He acknowledges that the course of a career, including his own, is often steered by luck and coincidence, rather than strategy. There is also a shocking nostalgia for the days before ethical committees on animal research, when cats were gathered "from the alley".

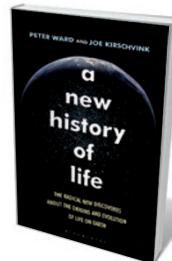
This cheerfully detached tone, however, is absent when Gazzaniga deals with credit and priority. His experiment with Bogen's epilepsy patient W. J. in 1962 was the first to reveal that each hemisphere remains unaware of stimuli processed by the other. Bogen had suggested pre- and post-surgery experiments. "Thus begins a line of research that, twenty years later, almost to the day, will be awarded the Nobel Prize," notes Gazzaniga. That 1981 prize (in Physiology or Medicine) was awarded to Sperry for his split-brain research — not to Sperry, Gazzaniga and Bogen. By then, Gazzaniga's relationship with Sperry had become tense, and Sperry refused to let him conduct further tests on Caltech patients.

Gazzaniga writes about Sperry with much admiration and little affection. He portrays him as a fierce competitor. Gazzaniga explains that at the pioneering stage of research, ideas become inextricably mixed, and that in science — as in families — people may come away from the same event with different memories. He clearly feels that the Nobel prize should have had more than one recipient.

Gazzaniga was at the heart of a pivotal research programme and struck up friendships with neuroscience and psychology luminaries, such as David Premack, George Miller, Leon Festinger, Endel Tulving and Steven Pinker (who wrote the book's introduction). Thus, his natural appetite to tell juicy behind-the-scenes stories is more than welcome. Historians in particular have always appreciated eighteenth-century philosopher Bernard Mandeville's dictum that private vices can be turned to public benefit. ■

Douwe Draaisma is professor of the history of psychology at the University of Groningen in the Netherlands. His book *Forgetting* will be published in March.
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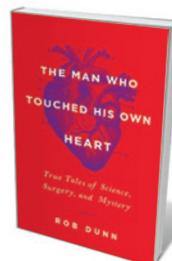
Books in brief



A New History of Life: The Radical New Discoveries about the Origins and Evolution of Life on Earth

Peter Ward and Joe Kirschvink BLOOMSBURY (2015)

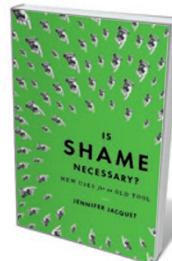
Since Richard Fortey's landmark *Life* (HarperCollins, 1997), the science on life's origins and evolution has itself evolved. Here, palaeobiologist Peter Ward and geobiologist Joe Kirschvink weave decades of findings into an audacious retelling, hingeing on catastrophic transformation; the roles of oxygen, hydrogen sulfide and carbon dioxide as well as carbon; and the importance of ecosystems. They speculate chillingly about future impacts of the biodiversity drain, and query our own evolutionary capacity.



The Man Who Touched His Own Heart: True Tales of Science, Surgery, and Mystery

Rob Dunn LITTLE, BROWN (2015)

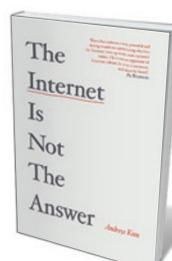
Its beat drives our lives, yet the heart — that "meat in the middle of you", as biologist Rob Dunn puts it — remains only half understood. Dunn punctuates his chronicle of cardiac biology with stories of explorers in the "human wilderness": nineteenth-century African American heart-surgery pioneer Daniel Hale Williams; Nobel laureate Werner Forssmann, who ran a catheter through a vein to touch his own heart; Helen Brooke Taussig, who studied avian hearts to understand human pathologies; and many more.



Is Shame Necessary?: New Uses for an Old Tool

Jennifer Jacquet PANTHEON (2015)

In an era when fat-cat bonuses coincide with social-service cutbacks, the baselines of shame seem to have irrevocably shifted. Yet public exposure remains a driving force for social change, argues environmental social scientist Jennifer Jacquet. In her reframing of shame, Jacquet draws on evolutionary biology, public-health research and more to examine its evolution and function, and to formulate "seven habits of highly effective shaming". Surprises are few, but the case studies add zip — not least, the mimes hired in the 1990s by Bogotá mayor Antanas Mockus to ridicule reckless drivers.



The Internet Is Not the Answer

Andrew Keen ATLANTIC MONTHLY PRESS (2015)

Silicon Valley insider Andrew Keen joins the ranks of Internet watchers such as Nicholas Carr and Jaron Lanier with this sizzling critique of claims by the web's supporters. Although he lauds some advances, Keen argues that industry billionaires and social-media cheerleaders create a "reality distortion field", where wealth distribution is the rhetoric and monopolies the reality. The portraits of plutocrats running 'disruptive' companies in San Francisco, California — a city with 7,000 homeless people and an open-defecation problem — is a salutary reminder of the need to redefine success in a digitized world.



This Idea Must Die: Scientific Theories That Are Blocking Progress

Edited by John Brockman HARPER PERENNIAL (2015)

John Brockman, founder of virtual science salon Edge.org, gathers essays from luminaries in science and the arts for this latest in his series on the big questions of our era. This time, he asks which scientific theory is due for the dustbin. Those pitching in include neuroscientist Patricia Churchland and astronomer Martin Rees. There is plenty of pith on show, from cosmologist Max Tegmark poking holes in infinity to psychologist Paul Bloom trashing the concept of science ever maximizing happiness. **Barbara Kiser**