

► of the normal, as people constantly try to approximate it. Yet the construction is a modern invention. Norms have been set by both valid and specious science, as well as by society, and those who deviate from them are deviants.

The tension between the qualitative and the quantitative emerges as the central narrative of this book. The ascendancy of the normal is part of the overall move towards statistics, that tendency to dictate human behaviour by quantifying it. It is the story of how breadth, ostensibly represented by aggregate numbers, came in many contexts to displace narrative depth, which is often based in anecdote. There can be specious work in either mathematics or storytelling, but each has value and neither mode can, or should, replace the other.

Cryle and Stephens describe *Middletown*, the 1929 study by Robert Lynd and Helen Merrell Lynd that established the idea of 'Middle America'. This canonized unity at a time of a burgeoning diversity that was spawned in part by immigration. Through such works, anthropometrics seeped into academia from prisons and hospitals, allowing 'normal' to advance into public life. But it was the Grant Study at Harvard University in Cambridge, Massachusetts — a longitudinal study of 268 undergraduate men started in 1938 — that defined normality in the modern sense by drawing on both medical and statistical data. In 1945, descriptions of the study were published simultaneously in Earnest Hooton's popular *Young Man, You are Normal* and Clark Heath's study *What People Are*, codifying the idea in both common parlance and academia.

Kinsey's mid-century studies on human sexual behaviour, known as the Kinsey Report, are covered in the final chapter. This was qualitative masquerading as quantitative, and relied on a punch-card system to reconcile stories that were in fact complex, nuanced and hard to quantify. Radical though it professed to be, it contributed more than incidentally to the hegemony of normalization in the 1950s. Cryle and Stephens recall that this postwar era was a time of "mass marketing and public surveys, of self-help and consumer culture ... This normal emerged not from the prison but the office and suburban home." We did not dictate the values of industry and standardization, but became subject to them. Those who measured us, made us. ■

**Andrew Solomon** is a professor of clinical psychology at Columbia University Medical Center, New York City, and the author of *Far and Away* and *Far from the Tree*.  
Twitter: @Andrew\_Solomon

## TECHNOLOGY

# The internet that wasn't

Sharon Weinberger weighs up a history of PLATO, a prescient but doomed 1960s US computer network.

“Imagine discovering that a small group of people had invented a fully functioning jet airplane capable of flying long distances at hundreds of miles per hour, decades before the Wright brothers”. So writes Brian Dear in *The Friendly Orange Glow*, his history of a computer system that most people have never heard of, but perhaps should have. That system, Programmed Logic for Automated Teaching Operations, or PLATO, brought together dreamers, gamers and engineers in a network at the dawn of the 1960s, long pre-dating the Internet. But was this collective venture really as ahead of its time as Dear claims?

The story he tells is both intriguing and a familiar one in the history of technology: a set of determined visionaries break down barriers to make way for a brilliant advance. What differentiates *The Friendly Orange Glow* is that the vision behind PLATO ultimately failed. The product created was overshadowed, forgotten by all but its most devoted users, and shut down many years later.

As Dear relates, PLATO's origins go back to an unexpected source: B. F. Skinner. The pioneer of behavioural psychology was famous for his operant conditioning chamber (also known as the Skinner box), in which animals learned to receive food by pushing a lever. He believed that humans, too, would respond to such conditioning, and soon conceived of a 'teaching machine' that would allow students to learn through immediate feedback. His 1954 design, a wooden box housing a rotating-disc contraption, allowed users to move through questions at their own pace. It never quite caught on, but it laid the intellectual foundation for 'teaching' computers.

The concept got a second lease of life a few years later, when panic over the Soviet Union's launch of the Sputnik satellite fuelled renewed interest in education and the nascent field of computers. As Dear reveals, in the late 1950s, the Control Systems Laboratory at the University of Illinois at Urbana-Champaign — a military-funded facility eager to emerge from the shadows of covert work — sought to mesh the digital with learning. Scientists there, particularly physicist Chalmers Sherwin and lab head Daniel Alpert, seized on the idea of a "book with feedback".

In June 1960, the laboratory launched PLATO under the direction of forward-thinking engineer Donald Bitzer, known



Students use PLATO computers in 1969.

affectionately as Bitz. One of its key innovations was a graphics terminal: the "friendly orange glow" refers to the colour of its flat-panel gas-plasma display.

PLATO was in some ways inadvertently revolutionary. The initial system relied on ILLIAC, a 5-tonne "formidable beast" of a computer that took up most of a room. Decades before personal computing, it was not feasible to have a classroom filled with computers, so students worked at terminals hooked up to a mainframe.

Thus PLATO was an early demonstration of time-sharing and networking. Yet in Washington DC, Dear notes, something even more intriguing was taking place. A defence organization, the Advanced Research Projects Agency (ARPA), was also working towards connecting computers on a single network. Their eventual system, ARPANET, rejected the mainframe paradigm and linked host computers called interface message processors into a network.

ARPANET and PLATO expanded in parallel in the 1970s — and in isolation. This was, Dear notes, "one of the great tragedies in PLATO's history". Incredibly, a PLATO terminal was sitting right

**The Friendly Orange Glow**  
BRIAN DEAR  
Pantheon: 2017.

next to an ARPANET terminal at the University of Illinois, as the

COURTESY UNIV. ILLINOIS AT URBANA-CHAMPAIGN ARCHIVES, RECORD SERIES 39/2/20

latter network was expanding to universities around the country. Dear compares them to “two televisions permanently tuned to different channels”. But the difference was deeper. PLATO was never meant to communicate with other computer systems; it was just connecting terminals across phone lines. And therein lies the fundamental problem with Dear’s thesis. Unlike ARPANET, PLATO was not designed to be a seed that sprouted into a tree of networked computing. Rather, it was a single branch that grew in the wrong direction, and subsequently withered.

So, even as PLATO attracted growing interest for its capacity to connect users, licensing company Control Data Corporation stuck stubbornly to the original educational goals. And PLATO’s designers remained fixated on ‘dumb terminals’ hooked up to a mainframe computer — the ultimate digital dead end. By contrast, engineers at the influential technology-innovation lab Xerox PARC in Palo Alto, California, believed that the future lay in desktop computers. In hindsight, the rejection of personal computing by PLATO’s proponents is maddening, Dear points out. He quotes William Norris, head of Control Data Corporation, as saying, “We found the proliferations of Apples and IBMs a roadblock to PLATO.”

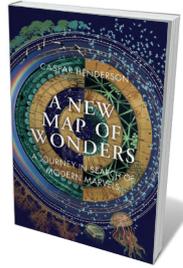
Although it’s hard to accept Dear’s contention that PLATO was a jet in a Wright-brothers scenario, his prodigious research makes this book a worthy addition to the history of computer science. The narrative suffers from extended quotes at times, but the story shines through — a fascinating tale of missed opportunities and blind spots. PLATO lumbered along, ignoring the “coming freight train known as the micro-computer revolution” that would overtake mainframes and leave graphics terminals choking in the dust.

Dear also rightly bemoans the failure of teaching machines: online education today focuses on less interactive approaches, such as massive open online courses, or MOOCs, which are far from Skinner’s vision of immediate feedback. As Dear writes: “The field of educational technology, largely ignorant of its own history, seems eternally condemned to repeat itself.”

Yet when, in 2015, administrators of NovaNET (as PLATO was rechristened) prepared to take the network offline for good, the users who stayed up late to experience its final moments weren’t there for educational reasons. This was an online community of nostalgics. The digital future was always right there in front of them, glowing orange, if only PLATO’s creators had grasped it. ■

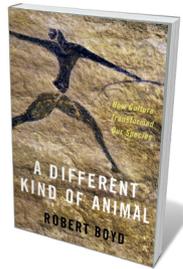
**Sharon Weinberger** is an executive editor at Foreign Policy, and the author of *The Imagineers of War*.  
e-mail: [sharonweinberger@gmail.com](mailto:sharonweinberger@gmail.com)

## Books in brief



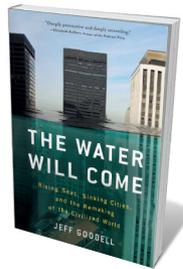
### **A New Map of Wonders: A Journey in Search of Modern Marvels** Caspar Henderson GRANTA (2017)

In his *Book of Barely Imagined Beings* (Granta, 2012), Caspar Henderson crafted a recherché bestiary for the twenty-first century. Here he mines the cosmos for other wondrous phenomena, from light to transformative technologies. We veer from Saturn’s moon Enceladus — spraying water into space through cracks in its ice sheath — to the human embryo, which at 18 days resembles “a tiny jam sandwich”. Strung through Henderson’s virtuosic meditations on such marvels is an exploration of felt wonder — those moments when, as Plato put it, “philosophy begins”.



### **A Different Kind of Animal: How Culture Transformed Our Species** Robert Boyd PRINCETON UNIVERSITY PRESS (2017)

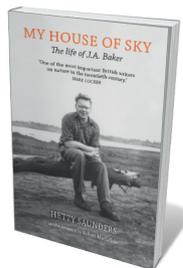
By 10,000 years ago, *Homo sapiens* had surged into almost every corner of Earth, barring Antarctica and a number of islands. What explains that unique dominance? In this lucid, well-argued treatise, anthropologist Robert Boyd avers that we are “culture-saturated creatures”, and that it is culturally transmitted knowledge that sets us apart and explains our dramatic range of behaviours, from rampant violence to great feats of cooperation. Philosopher Kim Sterelny, evolutionary anthropologist Ruth Mace and others provide considered and spirited counter-arguments.



### **The Water Will Come**

Jeff Goodell LITTLE, BROWN (2017)

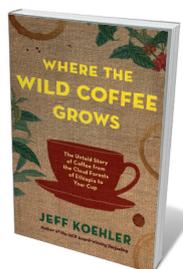
Humanity’s “fossil fuel party” is ending in tears: damage from sea-level rise alone could cost US\$100 trillion by 2100. So notes Jeff Goodell in his cogent reportage on a world going under, from the Maldives to NASA’s Kennedy Space Center in Cape Canaveral, Florida. Goodell visits imperilled communities in hurricane alleys; joins climatologists studying Greenland’s disintegrating Jakobshavn Glacier; and muses over the planned “Big U” wall to protect lower Manhattan in New York City. To adapt, he concludes, two things are needed: a halt to fossil-fuel burning and a mass move to higher ground.



### **My House of Sky: The Life of J. A. Baker**

Hetty Saunders LITTLE TOLLER (2017)

J. A. Baker’s *The Peregrine* (1967) was a watershed in British nature writing, so it’s astounding that Hetty Saunders is the first to train binoculars on the man himself. This outwardly unassuming amateur, she reveals, was not just a stylist of piercing originality. Baker’s mid-century field observations of raptor populations driven down by pesticide use offer rare insight into both human destructiveness and the power of nature in the liminal estuarine landscapes near London. This beauty of a book is as much paean to those bleak reaches as to the hawk-like mind that explored them.



### **Where the Wild Coffee Grows**

Jeff Koehler BLOOMSBURY (2017)

Blearily sipping a morning espresso? Jeff Koehler’s scientific and anthropological chronicle will lend context to your cup. Exploring the origins of *Coffea arabica* in the rain-drenched highland forests of southern Ethiopia — notably Kafa — Koehler interweaves narratives on botanist Carl Linnaeus, centuries of coffee trading and today’s barista boom. With Latin America’s crops at risk from a lack of genetic diversity, the wild Arabica now protected in Kafa’s biosphere reserve may just, Koehler argues, save our ‘daily grind’. **Barbara Kiser**