



INTERNET

Technology and its discontents

Jaron Lanier surveys four studies probing the vexed nexus of mind and digisphere.

Digital technology is remaking the cognitive environment in which human brains develop and function. This swift revolution is inevitably sparking much hard thinking. Books by neuroscientists Susan Greenfield and Daniel Levitin, and writers Nicholas Carr and Paul Roberts, propose either adaptation to the changes — self-help strategies to compensate for emerging cognitive misalignments — or critiques of the overall transformation.

Greenfield's *Mind Change* takes the latter approach. It proposes that global climate change can serve as a useful metaphor for

Mind Change: How Digital Technologies Are Leaving Their Mark on Our Brains

SUSAN GREENFIELD

Rider: 2014.

The Organized Mind: Thinking Straight in the Age of Information Overload

DANIEL J. LEVITIN

Dutton: 2014.

how human minds — our inner environments — are, in her view, being recklessly altered by digital technologies. Greenfield argues that because the human brain is remarkably plastic in youth, it is not unreasonable to ask how recently introduced, ubiquitous digital designs (such as those of

The Impulse Society: What's Wrong With Getting What We Want?

PAUL ROBERTS

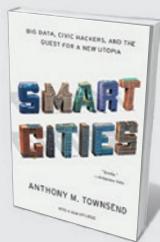
Bloomsbury: 2014.

The Glass Cage: Automation and Us

NICHOLAS CARR

W. W. Norton: 2014.

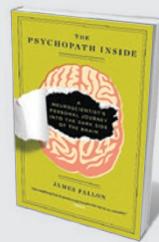
social networks or reading tablets) might affect brain development. The acquisition of speech and reading can affect human brain architecture, but there has been little precedent for the kind of sudden, uniform, pervasive change in children's cognitive environments posed by these



Smart Cities: Big Data, Civic Hackers, and the Quest for a New Utopia

Anthony M. Townsend (W. W. Norton, 2014)

As technology infiltrates urban life, Anthony Townsend observes how cities evolve in the digital sphere, from parking apps in Germany to crowd-sourced maps of African slums. (See Melanie Moses' review: *Nature* **502**, 299–300; 2013.)



The Psychopath Inside

James Fallon (Current, 2014)

After confusing his own brain scan with a psychopath's, neuroscientist James Fallon trawled his past and genealogy. Assembling evidence from obsessive-compulsive disorder to violence in his family history, Fallon considers how nurture may overcome nature.

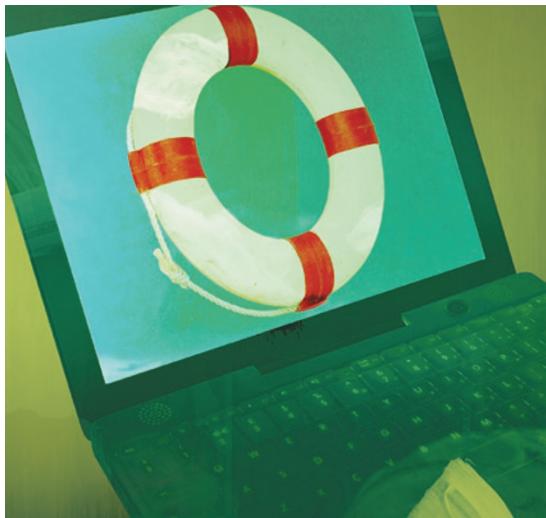
technologies. How might they affect the sense of identity or organic memory, for instance? Although she sometimes seems to push her argument beyond the reach of current research, Greenfield asks key questions — such as whether the next generation will think less critically than their forebears. And she broadly outlines the kind of research and policy agenda needed to address such haunting unknowns.

She occasionally veers into alarmism, for instance when discussing speculative links between the apparent rise in autism and the rise in the use of particular digital environments. However, some of Greenfield's caution may be justified. The neuroscience and cognitive-science communities that overlap with digital-technology developments often rely on the technology industry for support or cooperation, so it is especially important that they are not swayed by that industry's extreme enthusiasms. For all its faults, *Mind Change* is an important presentation of an uncomfortable minority position. It should be read by technologists in particular, as a check on self-congratulation.

By contrast, in *The Organized Mind*, Levitin takes the self-help approach. Accepting the design of information technology and today's information deluge as givens, he explores better brain function in that context. Our networked age often confounds the human mind, he notes, because of the kinds of cognitive quirks investigated by psychologists Daniel Kahneman and his late colleague Amos Tversky — notably Kahneman's idea of two brain systems, one 'quick and dirty' and the other slower and more reasoned. Levitin's strategy for overcoming such quirks is a set of tricks. To bypass poor intuitions about statistics, for instance, he suggests assessing data using a simple four-fold diagram.

Levitin's presentation is sensible and actionable, but I suspect that his audience is the sub-population residing between the extremes of technical ability. This group holds much of society's money and power: our highly technical society is for the most part guided by semi-technical people.

Carr's *The Glass Cage* — a meditation on



AUTOMATION IN THE AGE OF CLOUD COMPUTING IS OFTEN A FAKE FRONT. REAL PEOPLE, ANONYMIZED AND DEVALUED, ARE THE SOURCES OF THE 'BIG DATA'.

automation, from apps-for-everything to self-driving cars — asks at the start how we should define a human being in such an era. Does automation change the sense of how people act, learn, or find value in their lives and each other? Carr tells contemporary and historical tales of technologists and entrepreneurs dripping with hubris, such as aviation wizard Wilbur Wright, and of people struggling with a sense that they are becoming denatured by a reliance on automation.

Carr can be understood as part of a literary movement that does not reject technologies. Rather, it rejects ceding what Carr calls "choices about the texture of our daily lives" to technologists and their businesses. That stance is a tightrope walk: one must move forward, succumbing neither to Luddite

tendencies nor to the seductions of hot technological trends.

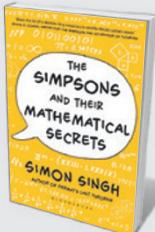
Carr is one of our most accomplished tightrope walkers. However, *The Glass Cage* does fall prey to a flawed conceit. Automation in the age of cloud computing is often a fake front. It is real people, anonymized and unvalued, who are the sources of the 'big data' that allow cloud algorithms to function. Automatic language translation is made possible only through daily sampling of human translators' work. Celebrating how people are contributing to technology in new ways could address some of the problems Carr decries, whether economic or cognitive.

For *The Impulse Society*, Roberts draws on the work of research psychologists such as Walter Mischel, who has studied delayed gratification. More lament than prescription, the book considers the many ways in which technologies encourage an infantile desire for immediate gratification. What is most striking about Robert's critique is its panoramic sweep. During the financial crises of the past decade, for instance, an urge for an instant 'hit' cropped up among individual borrowers keen on home ownership, lenders set on unbelievable deals, and shareholders eager for soaring security valuations. At every level people were disabled by a common infatuation with false gold proffered by digital networks.

Roberts trips a bit towards the end of his book: he calls for a resurgence of traditional community as an alternative to the modern trend towards impatience. The book's ultimate programme seems sentimental and ill-matched to the theatre in which the troubles arise.

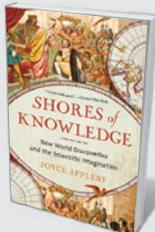
Taken together, these four books reveal a frontier of human experience. We are rapidly changing society, and in the course of it potentially laying our brains open to change. We must now become both competent and wise in our powers — not simply resisting or embracing new media technologies, but becoming instead more self-aware and discerning in relation to them. ■

Jaron Lanier is a computer scientist with Microsoft Research. His latest book is *Who Owns the Future?*
e-mail: jalan@microsoft.com



The Simpsons and their Mathematical Secrets
Simon Singh (Bloomsbury, 2014)

US television series *The Simpsons* is craftily dotted with maths jokes by numerate writers who chose comedy over academia. Physicist Simon Singh exposes and explains gags of varying complexity, although all can chuckle at Homer's naive belief in an "infinity plus one".



Shores of Knowledge: New World Discoveries and the Scientific Imagination
Joyce Appleby (W. W. Norton, 2014)

Six centuries of overseas exploration is lucidly charted by historian Joyce Appleby. While voyagers exulted over exotic species, the spread of disease to indigenous peoples exposed the high price of scientific discovery. **Emily Banham**