The Electronic Numerical Integrator And Computer (ENIAC) and its co-designers, J. Presper Eckert (front left) and John Mauchly (at pillar).

COMPUTING HISTORY

Geeks, Inc.

Jennifer Light enjoys a chronicle of the collaborations that conjured the digital realm.

Pulitzer-prizewinning historian James McPherson has described history as a dialogue between past and present: everything from social movements to scientific discovery prompts historians to ask new questions about old events. Accordingly, our era's attentiveness to networks of people and technologies has triggered an outpouring of research that places innovation in collaborations, rather than crediting the lone genius who dominated older studies.

Walter Isaacson's *The Innovators* exemplifies this newer approach. Isaacson, whose career as best-selling author was built on the 'genius' biography — such as the 2011 *Steve Jobs* (Simon & Schuster) — now aims to present the definitive history of the digital revolution with teamwork at its core. After kicking off with the visionary work of nineteenth-century pioneers Ada Lovelace and Charles Babbage on the concept of a mechanical computer, Isaacson focuses squarely on the twentieth and twenty-first centuries. His book synthesizes and reworks academic studies in computing history, and draws on new interviews with technology pioneers such as Bill Gates — covering everything from his teenage adventures in the Lakeside Programming Group in Seattle, Washington,

The Innovators: How a Group of Inventors, Hackers, Geniuses, and Geeks Created the Digital Revolution
WALTER ISAACSON
Simon & Schuster: 2014.

to the founding of Microsoft. This is a mostly sunny account, focused on the excitement of invention rather than the sometimes darker consequences of using digital technologies.

Each chapter is organized around a class of technology such as the computer, the transistor or the web. Isaacson uses the framework of collaboration to assess successes and failures. In 1939, for instance, US physicist John Atanasoff invented a machine that some deem to have been the first electronic digital computer. It was overshadowed by the mid-1940s debut of the US Army's Electronic Numerical Integrator And Computer (ENIAC) — credited by Isaacson with being the first general-purpose electronic computer. Atanasoff, he argues, failed to make his ideas pay owing to his isolation in Iowa and lack of access to the intellectual and financial resources of a team.

Atop the collaboration narrative, Isaacson layers another theory of how innovation happens, more in tune with his work on genius. Most of the gifted individuals in the creative teams he studies were, in his interpretation, as

much influenced by the arts or humanities as by technical training. For example, William Shockley, co-inventor of the transistor, "grew up with a love of both art and science". US computer scientist J. C. R. Licklider, in Isaacson's estimation "the single most important person in creating the Internet", was an art maven and collector.

The Innovators also adds a dash of anecdote. Who wouldn't be charmed to know that ENIAC project co-director J. Presper Eckert was, as a student, responsible for the 'Osculometer' — an electrical device to "measure the passion and romantic electricity of a kiss"? Isaacson also thoughtfully introduces basic themes in the history of invention. For example, he lays out how a tension between secrecy and openness characterizes much development. So on the one hand, there is the hacker ethos of the Homebrew Computer Club ("Software wants to be free"), and on the other, developers seeking compensation for their intellectual property. Isaacson also probes how technologies often evolve incrementally rather than arriving in a eureka moment, and how even in an era of electronic communication, places matter as much as environments for creative collisions of ideas. California's Silicon Valley, for instance, is now

a global model for 'innovation districts'. The book also provides simple explanations of basic technical concepts, such as analogue versus digital, and packet switching.

As a contribution to understanding of the digital revolution, however, *The Innovators* suffers from the same limitations that currently vex academic computing history: it is too white, male and insular. Aside from a nod to British computing pioneer Alan Turing, largely missing here are the stories of innovation beyond the United States — as are reflections on how non-digital games and alternative media might have shaped the design of digital technologies or the sense of what they might be used to achieve.

Questions about gender in particular demand further discussion. Isaacson begins and ends with Lovelace, whose "love of both poetry and math", which primed her to see beauty in a computing machine, frames his assertions about the interconnectedness of art and science. Early chapters mention the contributions of female programming pioneers, including the six-woman ENIAC programming team. Yet after that, women mostly drop out of the action, and we encounter stories of how an early sales brochure for Atari games featured a woman in a sheer nightgown, hired "from the topless bar down the street", or how Licklider routinely slipped photos of beautiful women into colleagues' presentations.

Did female innovators remain in this hostile environment, forgotten to history? Did they find it so intolerable that they left? Both stories would be instructive today in light of widely recognized gender problems in US technology firms, as well as in Isaacson's ambition to "explore the social and cultural forces that provide the atmosphere for innovation".

The weakest aspect of the book is Isaacson's attempt to link the arts to innovation, which he never quite backs up. Yet scholars have already shown the value in that view, and discussions about STEAM (science, technology, engineering, arts and mathematics), rather than STEM, are rife in educational institutions. The Massachusetts Institute of Technology in Cambridge — my employer — demands that science and engineering undergraduates take one-quarter of their courses in the arts, humanities or social sciences, on the basis of their recognized relevance to students' work. Isaacson's gift for digesting scholarly materials and making them accessible would have been well applied here, beyond the borders of computing history, to make the case for a multidisciplinary education. ∎

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Books in brief
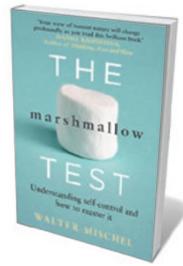
The Marshmallow Test: Understanding Self-control and How To Master It
Walter Mischel BANTAM *(2014)*
In our go-faster era, extreme impulsivity — from trolling to air rage — seems to be on the rise. So it is an apt moment for psychologist Walter Mischel to recap his much-cited "marshmallow test", which examines children's capacity for delaying gratification as an indicator of emotional balance in maturity. Mischel takes us beyond the experiment into deep research on "delay ability", his formulation of "hot" and "cool" cognition, speculation on the role of genetics, and the implications of his work for public policy.
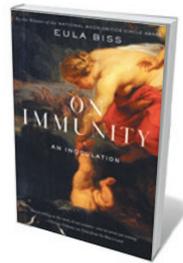
### On Immunity: An Inoculation
Eula Biss GRAYWOLF *(2014)*
Our long and intimate coexistence with viruses is less battle than balancing act, avers essayist Eula Biss. In this quietly impassioned call for responsible childhood immunization, Biss explores the currents of humanity's uneasy relationship with these microscopic hordes, interweaving science, myth and history with her own fraught parental experience. The word inoculate was originally used to describe plant grafting, she notes. Now, it signifies grafting disease "to the rootstock of the body". As Biss reminds us, immunization must be effectively communal, "a garden that we tend together".

The Body Keeps the Score: Brain, Mind, and Body in the Healing of Trauma
Bessel van der Kolk VIKING ADULT *(2014)*
War zones may be nearer than you think, as the 25% of US citizens raised with alcoholic relatives might attest. Psychiatrist Bessel van der Kolk argues, moreover, that severe trauma is "encoded in the viscera" and demands tailored approaches that enable people to experience deep relief from rage and helplessness. In a narrative packed with decades of findings and case studies, he traces the evolution of treatments from the 'chemical coshes' of the 1970s to neurofeedback, mindfulness and other nuanced techniques.
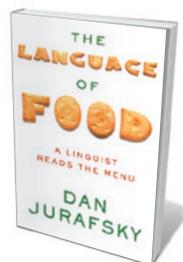
The Language of Food: A Linguist Reads the Menu
Dan Jurafsky W. W. NORTON *(2014)*
When Dan Jurafsky enters a restaurant, menu scribes beware: this linguist will pick at the wording even as he savours (or deplores) the dish. In his study probing how foods and their names co-evolved, Jurafsky crafts a gastronomic atlas. We discover how Peruvian ceviche and vinegary British fish and chips can be traced back to *sikbāj*, a sweet-and-sour stew from sixth-century Persia. We marvel at how a fermented-fish sauce from southern China is the progenitor of all-American ketchup. And we find an unexpected chemical connection between ice cream and fireworks. Deliciously erudite.
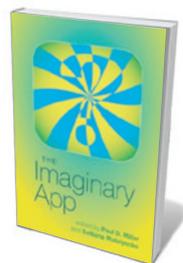
The Imaginary App
Edited by Paul D. Miller and Svitlana Matviyenko MIT PRESS *(2014)*
Are mobile apps an "oscillator between the imaginary and the realised", or "charming junkware"? Multimedia artist Paul D. Miller (also known as DJ Spooky, That Subliminal Kid) and media scholar Svitlana Matviyenko explore this vaporous realm with contributors including Björk collaborator Scott Snibbe. The theory-laced result is for the digital devotee, but the authors' apps, real and speculative, can be great fun; the optical illusion in Anna Munster's Transparent Screen app, for instance, allows you to "text and walk without fear". **Barbara Kiser**