nema for the 1951 Festival of Britain and the overall design and architecture of Expo '67 (informally known as McLuhan's Fair), for Worlds; and the Toronto-based experimental cinema group CineCycle in conversation with Agnès Varda's *Les glaneurs et la glaneuse* (2000) and the US Buckminster-Fuller-inspired architecture collective Ant Farm.

The eclectic ambitions of these projects are matched by the equally sweeping range of theorists that help Marchessault think through debates surrounding "anthropocentrism, ontology, plurality, universality, history, sustainability, and (post/trans) humanism" (pp. 2–3) through the lens of expanded media studies, including Georges Bataille, Jean Baudrillard, Rosi Braidotti, Buckminster Fuller, Félix Guattari, Donna J. Haraway, Marshall McLuhan, Catherine Malabou, Maurice Merleau-Ponty, Jean-Luc Nancy, Mary Louise Pratt, Isabelle Stengers, and many others. It is an impressive list and Marchessault does well by them, marshaling deft linkages across theoretical positions and arguments that do not necessarily sit well together. Though I would not suggest that the list needs to be longer, the absence of Gregory Bateson from an ecologically-oriented theoretical frame for envisioning potential worlds and futures during this fecund historical period is somewhat striking. That said, Marchessault's book is intelligent, heartfelt, and, more importantly, wise. It is one to inspire further historically-informed media, art, and architecture studies with an emphasis on deep time, as she ponders the memento mori we have made of the earth, or at least our collective position on it, as well as how it might be otherwise.

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Matthew L. Jones. *Reckoning with Matter: Calculating Machines, Innovation, and Thinking about Thinking from Pascal to Babbage.* Chicago: University of Chicago Press, 2017. 336 pp.

Lorraine Daston

When was the last time that you added up a long column of numbers by hand? Have you ever held a slide rule, manipulated an abacus, or cranked an office calculating machine? All of these technologies of numeracy, including paper and pencil, are now archaic. Calculation has been blackboxed and electrified, a matter of electronic impulses and silicon rather than paper, wood, or metal. Our only contact with calculation, a scribal achievement of the first order in many cultures and epochs, now consists of pushing buttons and reading screens. Perhaps this is why we lack a history of numeracy, in contrast to the vast and rich histories of writing and reading, the other two pillars of elementary education for millennia.

Matthew Jones tells the surprisingly long story of how calculation came to be mechanized, and uses this meandering tale of try, try, try again to make a deep point about the history of technology. Already by the seventeenth century, astronomers like Johannes Kepler and John Flamsteed were complaining bitterly about the tedium of the heavy-duty calculation required to reduce observations or compute planetary objects: Kepler filled large folio volumes full of crabbed calculations, most of which had to be done twice over to check for errors. Bureaucrats and navigators also groaned under the burden of performing increasingly complex calculations by hand. The Scottish mathematician John Napier published his ingenious invention of logarithms in 1614 as an aid to calculators; the young Blaise Pascal designed a calculating machine in the 1640s; Gottfried Wilhelm Leibniz and a long line of inventors and artisans also threw their hats into the ring over the next two hundred years.

The duo "inventors and artisans" is key to Jones's argument. As he demonstrates in fascinating detail, almost all of these machines, including Charles Babbage's Difference and Analytical Engines, faltered when they came to realizing a paper design in metal, wood, ivory, and other materials. Only those inventors who worked closely with artisans—whose improvisations often altered the original designs in significant ways—came anywhere near to achieving success. Famous figures such as Pascal and Babbage were decidedly not of their number. The first reliable calculating machines, Thomas Arithmometers, were not manufactured in large numbers until the mid-nineteenth century. The moral of this part of Jones's story is that matter matters—and so does skill, hand and mind working in tandem.

The moral of the other part of his story is that the history of technology has become misleadingly and anachronistically besotted with notions of individual genius and, above all, innovation. Jones argues instead in favor of "emulation," as both a historical category and a more accurate description of how eventually transformative technologies evolve. The bare fact that luminaries such as Pascal and Leibniz had halfway succeeded in making calculating machines spurred on other inventors, even if they'd never seen these earlier prototype machines and their own models worked on quite different principles. "An honest competition without mere 'aping' or imitation of the work of another, emulation inspired and challenged creators to produce yet better things" (p. 127)

Woven like a scarlet thread through Jones' account of the ingenuity, stamina, skill, and sheer will to believe required to keep at the improvement of calculating machines until they were reliable enough to be used widely (not until the 1870s) is the puzzle of what, if anything, mechanical calculation has to do with thinking. Pace almost all histories of computers that trace a lineage from Babbage to John von Neumann via Alan Turing, Jones answers: not much. Although some of the inspired tinkerers, such as Charles Stanhope, did toy with the idea that mechanical calculation was a materialization of thought, Jones concludes that the fact that machines could (eventually) be made to calculate did not immediately suggest the idea of artificial intelligence. On the contrary: calculation ceased thereby to count as intelligence.

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Jasbir K. Puar. *The Right to Maim: Debility, Capacity, Disability.* Durham, N.C.: Duke University Press, 2017. 296 pp.

Lennard Davis

Jasbir Puar's new book *The Right to Maim: Debility, Capacity, Disability* serves an important position in the panoply of books and articles about disability. Puar steadfastly reminds us that in considering various kinds of debility we need to keep a broad horizon concerning the interrelation among race, gender, war, work, and all the harms that these categories embody. Similarly, she focuses on the global and reminds us that individual national solutions are inadequate to getting the full scope of injury.