

support from well-placed contacts in Scotland, and the great advantage of a wife he met on the outward voyage and whose family was very well connected in Dutch official circles in Batavia. Thus armed, the firm finally flourished. It profited first from the temporary collapse of Dutch cotton exports, with the loss of the southern Netherlands, and later from diversification into trade throughout the archipelago. By 1840 he had sufficiently made his fortune to return to Scotland with the capital needed to obtain his long-sought “independence” as a land-owning laird. Sadly, his ship foundered in a storm near Mauritius, and all on board perished.

Knight has delivered an engaging canter through some complex economic history. The many quotations from Maclaine’s letters reveal how financial trust and obligation worked, and often bitterly failed, among a remarkable Scottish commercial diaspora. Though the prose can be a little labored, this book is a very welcome addition to the knowledge of both Java’s nineteenth-century commerce and the habits of the Scottish trading diaspora.

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R. W. Sandwell (ed.). *Powering Up Canada: A History of Power, Fuel, and Energy from 1600*. Montreal: McGill-Queen’s University Press, 2016. x + 482 pp. ISBN 978-0773547858, \$120. (cloth); ISBN 978-0-7735-4786-5, \$37.95 (paper).

R. W. Sandwell’s edited volume, *Powering Up Canada*, is the first comprehensive overview of Canada’s energy history. It covers nearly all energy resources and carriers, and discusses their various uses over time while addressing the roles of individuals, society, industry, and government. The volume is structured chronologically. Using E. A. Wrigley’s (*Continuity, Chance & Change: The Character of the Industrial Revolution in England*, Cambridge: Press Syndicate, 1988) distinction between organic and mineral regimes, it is subdivided into two parts, with six chapters each. In addition to an introduction and conclusion, an extensive forty-two-page “Primer on Technology,” by Colin A. M. Duncan, is provided. Statistical appendices, figures, images, and maps further complement this book.

Although the history of energy is a topic that is not always best told within national confines, Sandwell makes a convincing case in her introduction about Canada's distinct energy past. Even though Canada followed the energy trajectory of industrialized countries, it "demonstrated variations from the norm set by Britain" (4). Per-capita energy consumption in this northern country has always been high, but because of its wealth of organic energy resources, it entered the mineral energy regime much later. Thus, Canada shifted to the modern energy era only in the 1950s. Since then, it has risen to the ranks of the world's top producers of fossil fuels while becoming one of the leading hydropower nations.

Stretching from Canada's colonial period to the early twentieth century, the first part is devoted to the organic energy regime. George Colpitts (Chapter 2) discusses the link between food energy and the economic expansion of Canada's settler society during the colonial period. He argues that the availability of Indigenous pemmican on the Plains provided enough nutritional energy to voyageurs, and thus it facilitated extension of the fur trade to the Canadian West. The following two chapters by J. I. Little (Chapter 3) and by Joanna Dean and Lucas Wilson (Chapter 4) highlight the importance of animal muscle power for life in both rural and urban Canada. While oxen were used for farm work, horses often transported produce to the mills and markets. Tracing the history of these "living machines" (59) from the seventeenth century to the twentieth century, and discussing the late introduction of mechanic machines in rural areas, Little maintains that the transition in prime movers was a complex process, as horses continued to play an important role well into the twentieth century. Explaining how some mechanization developments led to an increase in horse-powered applications, he contests Wrigley's claim that horses belonged only to the organic regime, which had disappeared by the early twentieth century. In cities, horses continued to play an equally important role beyond the preindustrial and organic eras. Defining urban workhouses as "industrialized organisms," Dean and Wilson transcend the divide between organic and mineral regimes. Whether horses powered machines or transported and hauled goods and people, they functioned as a bridge between human-muscle and steam-powered work in the city. However, as with human beings, these "organic machines" constituted a "troublesome source of power" (122) because they were able to resist.

Joshua MacFadyen (Chapter 5) provides a similar story of the persistence of the organic regime through a history of wood energy in Canada. Traditional energy systems persisted much longer in Canada, because wood "remained a critical source of energy" (129), peaking only in the "middle of the fossil fuel century" (130). According to

MacFadyen, the easy availability of wood made it such a natural part of Canadian life that its use was often not recorded, and it remained understudied. As his new calculations demonstrate (149), wood consumption remained important for home heating purposes in the industrial era, and it followed regional patterns; meanwhile, trade in wood was often connected to that of coal, making the distinction between organic and mineral energy regimes less clear.

The same applies to the next two energy forms that are discussed in the book: wind (Eric W. Sager, Chapter 6) and water (Jenny Clayton and Philip Van Huizen, Chapter 7), both of which can be found in the organic and mineral regimes. The difference lies in their usage through mechanical versus electrical conversions. There is a separate chapter on hydropower in the volume's second part ("The Mineral Regime"), but there is no comparable chapter on wind energy. Instead, Sager discusses wind as part of both regimes, focusing on wind energy in transportation through sails as well as on windmills and wind turbines. Because of Canada's wealth of alternative energy sources, wind never played a central role. There were fewer windmills than in other Western countries, and application of wind turbines proceeded slower than elsewhere. Clayton and Van Huizen focus on the one alternative energy source that has been much more prominent in defining Canada's energy landscape during every energy era: water. They trace the history of water wheels and turbines, which powered Canada's industry in the nineteenth century, and they highlight more generally the importance of waterways as a motive force. Although steam power and the railways surpassed these, water manifested its continued significance in the Canadian energy regime through hydropower.

Before Matthew Evenden and Jonathan Peyton (Chapter 9) expertly pick up the story on hydropower, which has been the primary source of electrical power in Canada since the late nineteenth century, Andrew Watson (Chapter 8) introduces the trajectory of coal, which not only symbolized the transition from the organic to the mineral regime but also "fuelled dramatic economic, environmental, and social changes in Canada" (213). Heavy reliance on coal developed because of its availability and accessibility in North America, while markets in the United States and Canada guaranteed returns on investments in coal mining. Watson offers an overview that addresses the different regional histories of coal extraction, marketing, distribution, and consumption. His chapter is the most comprehensive in covering both production and consumption.

Perspectives shift when the focus is on either the production or consumption side of the story. A good example of this is the contribution by Steven Penfold (Chapter 10) on petroleum liquids, which

is much stronger on telling the story of petroleum consumption than of production. He frames his story around car usage and highway congestion in southern Ontario, drawing landscapes of petroleum consumption rather than elaborating on the history of oil production in Canada. This is provided in more detail in the following chapter by Colin A. M. Duncan and R. W. Sandwell, who cover manufactured and natural gas, the latter of which is closely connected to petroleum, and which is currently “the second largest source of primary energy consumed in Canada, after oil” (300–301). This consumption pattern is not unlike that of many Western industrialized countries, but Canada is also one of the net producers of oil and gas. In addition to this distinct role, Canada’s reliance on hydropower makes it “an energy anomaly internationally” (252). The contribution by Laurel Sefton MacDowell (Chapter 12) on nuclear power shows it is this wealth in resources—whether it is water or uranium—that makes Canada’s energy history unique and worth of further study. Nuclear power played its role in the electricity generation, but it is uranium mining, with its impact on the environment and Indigenous communities, as well as the Canadian heavy-water CANDU reactor technology, that contributes to the Canadian story.

As all the chapters reveal, Canada’s energy history is rather unique. However, regional variations within Canada constitute an equally integral part of that distinct history, as do the strong transnational connections to the United States through integrated energy markets and electricity grids. These aspects, while present in a number of contributions, need more attention; but, as Sandwell rightfully explains, this edition is a starting point—it is “part energy primer, part energy sampler” (6). In that, the book constitutes an immensely valuable contribution to both energy and Canadian historiography. The authors offer a comprehensive overview and introduction into almost all facets of Canada’s energy history—although some readers might miss a chapter on renewable energy more generally—and highlight the complexity of energy transitions and the hybridity of energy resources, which cannot easily be compartmentalized into the organic or mineral regime. As MacFadyen proposes, maybe energy historians should focus less on the emergence of new energy regimes and more on the persistence of established ones (148).

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