The Battery: How Portable Power Sparked a Technological Revolution FREE

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books

Poles, piles, and the invention that changed everything

The Battery

How Portable Power Sparked a Technological Revolution

Henry Schlesinger
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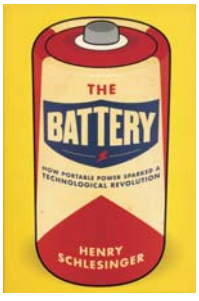
Reviewed by John C. H. Spence

In *The Battery: How Portable Power Sparked a Technological Revolution*, journalist Henry Schlesinger tells us how the battery got its name: a bank of them resembles a battery of troops. But this delightful, well-written history offers much more and it couldn't have come at a better time, given the high global priority now accorded to clean energy production and the need to store it.



Schlesinger's history of the battery necessarily includes much familiar history of electricity itself. In the 16th century, William Gilbert, Queen Elizabeth's physician, provided the first systematic analysis of electrical phenomena, in which he distinguished magnetism from electrostatics and identified Earth's magnetic poles. That period marked the end of Aristotelian science and the beginning of modern science. Throughout the next century, electrostatic generators—friction-based devices that created static charges—became commonplace entertainment for dinner guests.

The first breakthrough in electricity storage, the Leyden jar capacitor, followed soon after Charles du Fay's suggestion, circa 1734, of a positive and negative "two-fluid" model for electricity. Luigi Galvani's famous frog experiments followed in 1786, but it was Alessandro Volta, whose tongue tingled when touched by coins of different metals, who built the first useful battery. The torpedo fish, a type of electric ray, was Volta's inspiration for the voltaic pile. Its design—a stack of silver and zinc disks separated by saltwater-saturated plasterboard—was presented at a meeting of the Royal Society in 1800. The availability of a continuous flow of current changed everything, especially for Humphry Davy and Michael Faraday, chemists at the Royal Institution of Great Britain, and also for novelist Mary Shelley; the birth of her fictional monster in *Frankenstein* was inspired by lecture demonstrations of electrified corpses.

From the beginning of the 19th century on, the battery was rapidly improved. Faraday's 1828 discovery of induction would lead to the development of the generator as a competing source of electricity. (Contrary to Schlesinger's confusing description, Faraday was able to create an induced voltage using a bar magnet, a process that does not require a battery.) Also highlighted in *The Battery* are American Joseph Henry's undervalued contributions to the development of series and parallel connections, to high-powered electromagnets, and according to the book, to induction-at-a-distance in 1844, perhaps preceding Heinrich Hertz's radio waves. Yet for most people in the 19th century, the main manifestations of electricity were the electric doorbell, the ticker, electroplating, and the telegraph. All needed batteries, as did the telephone, invented in 1876 by Alexander Graham Bell. Not until 1917 did a quarter of US homes have electricity.

The Battery also recounts the story of the telegraph—the first internet—and its global spread following the installation around 1860 of the transatlantic cable. Schlesinger includes the charming poem by James Clerk Maxwell on love affairs conducted by telegraph. He also recalls musician and physicist David Hughes's 1879 demonstration of radio communication to George Gabriel Stokes, his colleague at the Royal Society. More details on that story can be found in J. J. Fahie's superb 1901 classic, *A History of Wireless Telegraphy, 1838–1899* (reprinted by General Books, 2009). Some of Schlesinger's descriptions of radio technology are misleading: Surely the coherer's trembler must vibrate continuously for the full duration of a dot or dash. I also suspect that Guglielmo Marconi's spark-gap induction coils stepped up voltage, not current.

The history Schlesinger gives of Paul Galvin's walkie-talkie fascinated me. I recall lugging Galvin's 14-kg SCR-300 World War II communications sets during military training in Australia in the 1960s; most of the walkie-talkie's weight was from the battery. Readers will learn about the invention of the mercuric oxide button cell, devised to survive the tropics in World War II and subsequently used in the first *Sputnik*. The book ends with some discussion of lithium-ion batteries and a review of the impact of batteries on modern solid-state electronics, beginning with the development in 1954 of the first transistor radio.

Given the importance of batteries for transportation, portable communication, and computing, I felt that the book ended prematurely, with too little space devoted to current research. Also, the rather US-centric view of battery history may be appropriate for the 20th century but is less so for the 19th century. And for a popularization on batteries, it might seem important to learn how they work, but the single paragraph devoted to the chemistry of ions in an electrochemical cell is inadequate and confusing. (*Wikipedia* is much clearer.)

Nonetheless, modern battery researchers will find in *The Battery* many amusing anecdotes to use in their talks. For example, Schlesinger recounts alarming stories of medical remedies based on electromagnetic therapy being peddled (as they still are) by a host of charlatans. Not reported in the book, but one I particularly like, is the story of a Philadelphia mayor who, in 1880, looked forward to the day when *every* US city would have a telephone. If he only knew how far we'd come.

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