exciting years with Marshak will enjoy his impressively comprehensive digestion of all these conceptual and technical developments in particle physics, over four and a half decades to the time of his death. However, he often digresses into annoying tangential or parenthetical remarks, interesting to the cognoscenti but probably unappreciated by novices. He often gets ahead of himself, using words or concepts that are explained only later, and he tends to repeat historical and expository developments. The book might have benefited from considerable editing and compression, had Marshak lived to produce a second edition.

I enjoyed Marshak's historical and classic compendium, a feat unlikely to be duplicated by participants surviving those heroic years. In its present form, it is valuable to scholars. A future revision, perhaps by one of Marshak's many accomplished past students, would make an attractive alternative to modern, more concise textbooks of particle physics.

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Hidden Attraction: The Mystery and History of Magnetism

Gerrit L. Verschuur
Oxford U. P., New York, 1993.
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Magnetism has always been the most mysterious of the natural forces. The word itself, like gravity, long ago entered the English language as metaphor and symbol. But unlike gravity, which is all-pervasive and always attractive, magnetic force appeared doubly mysterious: First, magnetism could repel as well as attract. Second, it was not a universal property of matter; only a few materials, such as lodestone, which was precious for early use in direction-finding, exhibited it. The sheer universality of gravity, by contrast, hid it from scrutiny until long after magnetism's discovery. As a result, the manifestations of magnetic interaction as seen with the naked eye must always have appeared bizarre and, in a certain sense, unnatural.

Thus, magnetism has carried with it a strong sense of the mysterious and even, at certain periods of history, the occult. It could be argued, therefore, that demystifying and eventually controlling and exploiting this remarkable force represents an even greater triumph of human reason and the power of the scientific method than the conquest of gravity by Kepler, Newton and Einstein. Against this background, Gerrit Verschuur has written a history of magnetism, not just as a major force of nature but also as a paradigm of the whole process of scientific discovery.

The sweep of Verschuur's story is breathtaking: from Pliny the Elder to the Cosmic Background Explorer, via such giants of 19th-century science as Oersted and Ampere, Faraday, Maxwell and Hertz. The path is a well-trodden one from a historical point of view, and in a book whose purpose is to tell a story, perhaps the author can be forgiven for relying nearly exclusively on secondary sources: The most frequently quoted work among the references is the *Dictionary of Scientific Biography*.

Still, much as the first impulse of a scientist scanning a review article

on his speciality is to look for his own name in the references, so I hope that, in view of my affiliation, I can be forgiven for looking especially closely at Verschuur's chapter on Faraday. It begins unpropitiously by ascribing to Humphry Davy the isolation of 47 new elements (probably a slip of the pen, though surprisingly escaping the editor's notice). Seven would be nearer the mark if, in addition to the Group 1 and 2 metals he isolated at the Royal Institution, we include his identification of iodine in Paris in 1813, assisted by Faraday. Also, so far as I am aware, there is no evidence to support Verschuur's claim that Faraday ever worked as an unpaid assistant to Davy before being formally hired.

These are small factual blemishes, but they lower confidence in the accuracy of other facts related. More surprisingly, the most complete biography of Faraday in recent times (*Michael Faraday* by L. Pearce Williams, DeCapo Press, 1987) does not appear in the bibliography. An irritating feature of Verschuur's exposition, which, after all, is gripping enough in its own right, is the interjection of sections of homespun philosophy, such as *obiter dicta* about inspiration in art, science and religion (for example, chapter 15). Furthermore, a trick much used in fiction, but out of place in a historical narrative, exacerbates the irritation: namely, the self-conscious introduction of the narrator's hindsight. This is used in several places to support the author's emphasis on the time dimension, not in a historical sense but as a vital component of the physical phenomena being expounded.

Moving to more modern times, and to the book's conclusion, yet more contentious generalizations crowd in, culminating in a personal philosophy of scientific progress. There is nothing wrong with trying to draw conclusions from history, of course, but history and philosophy remain separate disciplines, even in science. Verschuur's book is subtitled a history; it is a pity that he did not stick more closely to that appellation.

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