

Discussing cell proliferation in the section on cancer, the author makes frequent reference to the “allocation model” of cell proliferation. However, if the reader has forgotten the basic principles of this model, the index fails to direct him or her to the section of the book in which it is defined. Finally, bulleted chapter summaries or take-home messages would aid the reader in retaining the critical points revealed by the analysis in each chapter.

In the final analysis, however, a truly valuable scientific contribution is usually one that raises more questions than it answers. The most powerful aspect of this book is that it establishes a series of testable hypotheses. Even if only a portion of the author’s thesis is correct, it could establish new insights into the pathogenesis of chronic disease states and may have significant implications for treatment and/or prevention. At the very least, the author’s constructs do raise a note of caution for molecular biologists in assessing the results of transfection experiments. Transfection with an “empty” vector may not be the innocuous control condition that is commonly assumed if the concepts of microcompetition are validated.

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Volta: Science and Culture in the Age of the Enlightenment.

By Giuliano Pancaldi. Princeton: Princeton Univ. Press, 2003.

Pp. xv + 381, \$35.

Most scientists and their students know that Alessandro Volta (1745–1827) invented the voltaic or wet cell battery early in the 19th century, and they are also aware that the unit of electromotive force (volt) eponymously honors him. Some also may be acquainted with an instrument that appeared before the battery: Volta’s electrophorus. This device is often used in laboratories to demonstrate the principles of static electricity. While Volta appears to have been primarily an inventor of electrical devices, he was more than that, and he managed to do significant scientific work in Italy at a time when France or England were more congenial settings for science.

Giuliano Pancaldi, a historian of science at the University of Bologna, answers many questions about the life and times of Volta. This is not a traditional biography of the Italian scientist: Pancaldi, who has read extensively in the relevant manuscript and printed sources, situates Volta in the period in which he lived and practiced science. The social, political, and intellectual life of the Italian states, along with the science and culture of Enlightenment Europe, form the background of Volta’s life and scientific contributions.

Volta, a member of the lower nobility, lived in Austrian-dominated Lombardy. He studied philosophy and literature with the Jesuits at Como but taught himself the physical sciences by reading the classics of 18th-century science. Early in his life, Volta resolved to gain social and cultural recognition by becoming a natural philosopher. Therefore, as a young man he contacted experts in Turin and Paris in his chosen field of studies: electricity. Volta's ambition to attain status as a theoretical natural philosopher was tempered by his success in the experimental side of electricity. His initial aspirations were aided by the scientific literature available to him in Italy and by the access he had to several important figures in the physical sciences in Europe. Italian universities were not strong centers of scientific research, but Italian scientists such as Giambattista Beccaria helped the young Volta to establish himself.

Volta, the would-be theoretician, first gained notice for an electrical instrument he invented. His electrophorus, not an entirely original invention, brought him instant fame, and the device was compared to the Leyden jar in its simplicity and usefulness. The electrophorus consists of a resin "cake," a metal shield, and a second optional metal disc under the cake. When announced in 1775, the electrophorus was hailed as a perpetual carrier of electricity. Pancaldi carefully delineates the technical, social, and personal dimensions of the novel apparatus that marked a turning point in Volta's career. The instrument extended Volta's reputation to England and to one of its great scientific thinkers, Joseph Priestly.

Volta moved more easily now among the top thinkers of Enlightenment Europe and still hoped for acceptance as a theoretician of electricity. Hampered by his ignorance of the calculus, and his obvious success as an inventor of instruments for private and public demonstrations, Volta tried his hand at making accurate measurements of electrical attraction. Nevertheless, his inventions continued to bring him more attention.

It is possible to give a plausible account of Volta's greatest invention, the battery, even though not all of his laboratory notebook has survived from this period. The process of invention began with Volta's dispute with Luigi Galvani over the latter's idea of a form of electricity that resides in animals. Volta argued that a separate and distinct animal, or Galvanic, electricity did not exist. Instead, he claimed that the so-called animal electricity was generated by different metals in contact with wet substances. At this crucial time in his scientific thinking, he read William Nicholson's paper on the torpedo, a fish capable of generating an electrical shock. Volta drew upon Nicholson's torpedo paper, his own electrical experiments and theories, and his controversy with Galvani to produce the first wet cell. This was a revolutionary invention: the first source of a continuous flow of electricity. News of the voltaic cell was first sent to the Royal Society of London in 1800. From there, it spread quickly to the British Isles and continental Europe. Successful attempts to replicate Volta's latest invention and improve upon it soon followed. Lombardy was then under French rule, and Volta was called to Paris to demonstrate the wet cell before Napoleon Bonaparte. He re-

ceived honors from the First Consul himself and from French scientific societies. Volta was now at the height of his career. He had become one of the select heroes of science.

Pancaldi ends his admirable book with a moral on the interaction of science and technology. This interaction includes the pursuit of useful knowledge, the spirit of quantification, and the contingent nature of the inventive process. All of the above were driven by the Enlightenment spirit that encouraged the free transfer of “people, ideas, instruments, and practices in a wide variety of different cultural contexts” (289).

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**The Midnight Disease: The Drive to Write, Writer’s Block,
and the Creative Brain.**

By Alice W. Flaherty. Boston: Houghton–Mifflin, 2004.
Pp. 305. \$24.00.

Writers tend to have an ambivalent relationship with their own psyches. On the one hand, they secretly worship the sources of inspiration, which they believe to lie halfway between the inner child and some cruel repression. On the other hand, they want to know as little about them as possible, for fear that knowledge will trivialize the Muse, and silence her voice. This is a reluctance that came in focus for me years ago, when in the course of a study of creativity I contacted a few hundred eminent individuals and asked to interview them about the way they went about their work. While scientists readily agreed, many artists, and writers in particular, were less eager to discuss their working practices.

Saul Bellow’s secretary, for instance, replied to a request to interview his employer: “Mr. Bellow informed me that he remains creative, at least in part, because he does not allow himself to be the object of other people’s ‘studies.’ In any event, he is gone for the summer.” In a similar vein, Norman Mailer wrote: “I am sorry but I never agree to be interviewed on the process of work,” and he added cryptically: “Heisenberg’s principle of indeterminacy applies.” Such answers, typical of writers, were never given by busy scientists, even those of Nobel Prize stature. Scientists trust their lab equipment rather than a fickle Muse, and therefore are less worried about revealing—first and foremost, to themselves—how they go about their business.

Given this situation, what will writers make of Alice W. Flaherty’s *The Mid-*