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actually disliked it", an opinion that raises several questions about the motivation of the man credited with the introduction of chlorpromazine.

By way of apology for the impenetrability of the text, Healy points the non-psychopharmacologist reader to his *The antidepressant era* (Harvard University Press, 1997), but even so, much that would be of genuine interest to the medical historian will, sadly, be lost. And that is a great shame—Healy himself is deeply knowledgeable about the field and its recent history, and on the whole the interviewees respond well to his questions and challenges, and there is much of value here.

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Nicolas Rasmussen, *Picture control: the electron microscope and the transformation of biology in America, 1940–1960*, Writing Science, Stanford University Press, 1997, pp. xv, 338, illus., £37.50, \$55.00 (0-8047-2837-2).

It is clear to scientists that conceptual advances are almost invariably connected with advances in techniques. A field of research reaches some limit as the available tools and techniques come to be fully exploited. The development of new tools and new techniques provides new ways to tackle old problems—they enable scientists to formulate new questions through expanding the range of soluble problems. Furthermore, I have always taken it as self-evident that scientists welcome new techniques because they always want to extend the limits of what they can do, and because they are afraid of being left behind. In molecular biology, for example, it was clear that anyone who did not take up the suite of tools and techniques that made up recombinant DNA was going to be at a severe disadvantage. However, Nicolas

Rasmussen's book demonstrates that this is a simplistic view, and that the introduction of new technology is an interesting and much more complex process.

In his introduction, Rasmussen claims that examples can be found showing that technical innovation leads to "conflict between the advocates of new questions, based in new concepts or new techniques, and advocates of the traditional ways" and that "conservative forces govern the acceptance of novel technique in scientific practice". Successful introduction of the electron microscope in biology required making the results of the new machine consonant with current knowledge while at the same time those results were moving beyond the limits of the current knowledge and instrumentation. In addition, the operation of the machine and the interpretation of its raw data had to be convenient so that the machine could move out of the few elite laboratories that had first access.

Rasmussen chooses five episodes in the early use of the electron microscope to illuminate—more or less successfully—how these problems were surmounted: 'RCA and the war years'; 'Stuart Mudd and his school of bacteriological electron microscopy'; 'The Rockefeller School and the rise of cell biology'; 'Muscle, nerve and the iron men of MIT', and 'Wendell Stanley, Robley Williams and the land of the virus'. It is a pity that Rasmussen does not include the applications of the electron microscope in studies of DNA and RNA molecules. In the 1960s, the electron microscope provided striking information on bacteriophage and bacterial chromosomes, and the replication of the latter, while the methods to visualize DNA-RNA hybrids were used to map viral genes and presented incontrovertible evidence for gene splicing.

The introduction and these five essays are by-and-large refreshingly free of jargon. It is unfortunate, then, that in his final chapter, Rasmussen lapses into a grandiloquent style characteristic, it seems, of much scholarly

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writing on the sociology and philosophy of science. "Thus when there are major advances in the methods of science (e.g. a Bachelardian epistemic break), these may arise from learning a novel way of deploying native intuitions in embodied inquiry that transcends shortcomings of prior ways, but not from a transcendence of the human body itself" is a fair example of the style. Suffice it to say that when, in another sentence, I read "individual masturbation", it seemed to make as much sense as the correct reading of "individual maturation". There are also far too many, far too long sentences—the longest I had the energy to count being 125 words.

But, overall, Rasmussen has written an interesting and enjoyable account of some fascinating episodes in modern biology. If the gulf between the theoretical analyses of the historians and philosophers of science, and the scientists who do the work is to be narrowed, more studies of this kind are needed.

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Samuel H Greenblatt (ed.), **T Forcht Dagi** and **Mel H Epstein** (contributing eds), *A history of neurosurgery in its scientific and professional contexts*, Park Ridge, Ill., American Association of Neurological Surgeons, 1997, pp. xiv, 623, illus., \$95.00 (1-879284-17-0).

As a specific discipline, modern neurosurgery dates from 25 November 1885 when a 25-year-old farmer with a tumour of the central cortex of the right hemisphere was operated on at the Hospital for Epilepsy and Paralysis at Regent's Park, London. The case was diagnosed by Alexander Hughes Bennett, and the tumour was removed by Rickman Godlee. But the

first full-time neurosurgeons appeared only in the 1900s (Harvey Cushing in the USA and Ludvig Pussep in Russia).

Samuel Greenblatt states that "the central purpose of this book is to construct a historical framework that will allow the reader to understand the development of modern neurosurgery in comprehensive terms" (p. 4). After an introduction, four sections deal with general themes: 'Surgery of the head and brain prior to the late nineteenth century', 'Gestation and birth of the specialty', 'The evolution of modern neurosurgical techniques and technology, and 'Organizational and philosophical issues'. Within the sections a varying number of chapters discuss specific issues. The book is well-structured and richly illustrated. Each chapter is fully referenced, and an appendix contains a full bibliography and biographical list of individuals with their dates. A comparison with A Earl Walker's work published in 1951 (*A history of neurosurgery*, London) shows a rapid development of the speciality as well as a fragmentation within it. It also demonstrates a shift towards methodological and philosophical issues. It is not a mere coincidence that several authors have also contributed to a recently published *Philosophy of neurological surgery* (American Association of Neurological Surgeons, 1995).

Given the structure of the book, some overlap between the 29 chapters is inevitable. For instance, the Edwin Smith Surgical Papyrus is discussed in the chapter on 'Neurosurgery in the ancient and medieval worlds' (p. 39), and in that on 'The management of head trauma' (p. 291). But duplication is most noticeable in the illustrations, for instance there are two portraits of Lister (pp. 17, 91), and figures of different methods of trepanation are almost identical (pp. 32, 194), as are the woodcuts of torculars for elevation of depressed skull fractures (pp. 68, 202). While it is indisputable that in the first decades of the twentieth century American