

Book Reviews

and a two-month-old baby; other evidence comes from observations on adults. Perhaps his most important finding, from a modern point of view, is his demonstration (despite multiple difficulties) that in the hollows of teeth are blood vessels and nerves, helping to explain sensation in these hardened parts of the body. He preferred to confirm the observations of the ancients, such as Hippocrates' view that rudimentary teeth are already present in foetuses. Nevertheless, when the evidence required, Eustachius was prepared to contradict even the greatest of the ancients, although respectfully. He argued against Aristotle, for instance, that teeth do not have the ability to rebuild themselves; on the generation of teeth, he came to views at odds with Hippocrates and Aristotle, writing that "I reluctantly offer this conclusion to those great men, my distinguished teachers and predecessors" (p. 49).

Unfortunately, in their foreword the editors explain that Eustachius' respectful views of his learned predecessors were due to the compulsion of the Church: "Dissent from the teachings of Galen could lead to investigation by the Inquisition, with its implied threat of torture and execution" (p. vi). Not only is this terribly mistaken, it leads to the editors making misleading comparisons between Eustachius and people like Leonardo da Vinci, Gabriele Fallopio, and of course Vesalius, who were "bolder". Clearly Eustachius was not happy with fashionable put-downs of the ancients. "After all, everyone will realize that I have set myself the same goal, namely, to preserve the authority of the ancient writers, as long as it conforms to the truth, and to strengthen these writers' reputations" (unpaginated dedication). But as he explains further, he himself sometimes disagrees with other physicians and philosophers when they have erred, setting things right not to obtain personal glory but to stimulate others to make

additional investigations. Perhaps this volume will provide a similar inspiration, despite the errors of the editors.

H J Cook,

The Wellcome Trust Centre for the History of Medicine at UCL

Gayle Greene, *The woman who knew too much: Alice Stewart and the secrets of radiation*, Ann Arbor, University of Michigan Press, 1999, pp. x, 321, illus., £19.95 (hardback 0-472-11107-8).

This book is the story of Alice Stewart, the pioneer epidemiologist whose work on radiation hazards made her the bane of many radiologists, the nuclear industry, and its regulatory authorities. In 1956, at a time when doctors routinely X-rayed pregnant women, she published the first epidemiological study that suggested that a single prenatal diagnostic X-ray—far below what was regarded as safe at the time—doubled a child's risk of developing cancer. Yet her findings were dismissed for years by radiologists who continued to administer routine X-rays to pregnant women until at least the 1970s. Similarly, her finding that low doses of radiation in the US weapons industry were far more dangerous than official estimates suggested was dismissed by the nuclear industry and the international regulatory committees that set safety standards. As Gayle Greene notes, no one disputed that high doses of radiation were hazardous, but Stewart was one of a few scientists arguing for the dangers of low doses. Her work led her to suggest that the data on Japanese atomic bomb survivors, a key source of knowledge about radiation health effects, was not a good measure for predicting the health of nuclear workers, who were exposed in small increments, not in one major incident. Indeed, she claimed that studies of the bomb survivors—today managed by the joint US/Japanese

Radiation Effects Research Foundation (RERF)—were not representative of the population affected by the bomb. The RERF studies, she argued, focused on radiation effects among an atypically resilient group of survivors: they did not start until five years after the bombing, by which time many weaker survivors had died. Stewart concludes that these studies, therefore, provide a poor basis from which to derive radiation protection standards.

Alice Stewart was born in Sheffield in 1906, the daughter of medical parents. After education in Cambridge and London, she began a promising career as a hospital physician; she was the ninth woman fellow of the Royal College of Physicians, the first less than forty years of age. During the Second World War she became interested in occupational health, and in 1945 she joined John Ryle as his assistant at the new Institute of Social Medicine at Oxford—this move dismayed friends who feared that she was abandoning a successful medical career. It was under Ryle that she began the work—the Oxford Survey of Childhood Cancer—that eventually led to her landmark discovery of a cancer risk from irradiating pregnant women. In 1950 Ryle died and the Institute was downgraded to a Unit, Stewart becoming its director. But the Unit was ill-funded in Oxford, and closed after the arrival at the University of the epidemiologist Richard Doll, best known for his work establishing the link between smoking and cancer. Then in 1974, just as she was winding up the Oxford Survey and was moving to Birmingham University, Stewart received a call for help from Thomas F Mancuso who had been appointed by the US Atomic Energy Commission (AEC) to do a study of US nuclear workers at Hanford, a weapons complex in Washington State. When their joint research indicated a cancer danger at low doses Mancuso was removed from the Hanford study, and the AEC attempted to seize the data on which the study was based, so prompting Stewart and her

brilliant statistician George Kneale to flee to England with the information. When later studies by Mancuso's replacements appeared to indicate that the Hanford workforce had a lower rate of cancer than the expected rate for all US citizens of comparable age, the industry cited this as confirmation that cancer was not an occupational danger from radiation at the plant. Stewart's response was that the low cancer rate was because sickly people were excluded from employment at such facilities: the "healthy-worker effect" she called it, typical of well-paid industries.

Gayle Greene's biography is the first major study of Alice Stewart's life. It provides an admirable account of Stewart working in the field of radiation risks that was highly contentious; in the speciality of epidemiology that was struggling for recognition; and in a world often unfriendly to women. Yet it is also a frustrating read. The volume relies heavily on Stewart's own recollections of past events—a "collaborative memoir" (p. 15) Greene describes it—and makes relatively little use of contemporary archival or published material. The result is that the author's voice occasionally becomes almost indistinguishable from that of Stewart, and at times the Stewart of today rather than that of the past—even Stewart's own published work is sometimes sidelined in favour of her later memories of that work. There is, also, a progressivist and Whiggish tone to the book that vindicates Stewart's claims, and that deliberately (pp. 15–16) downplays the arguments of her opponents. For such reasons, the biography does not provide an adequate account of why the evidence of a correlation between low doses of radiation and cancer was persuasive to some scientists and not to others. How can it, when often it is Stewart who tells us why her opponents disagreed with her? The book is valuable for highlighting the ways in which radiation risks have been defined politically and socially, and how the bearers of bad tidings have been marginalized by

Book Reviews

powerful vested interests, their research frustrated and their findings discredited. But the account of the differences between Stewart and Doll is a missed opportunity to explain one of the great rivalries in post-war epidemiology and, more importantly, to explore the ways in which divisions *within* epidemiology played into disputes over the health hazards of low doses of radiation.

David Cantor,
National Institutes of Health

L S Jacyna, *Lost words: narratives of language and the brain, 1825–1926*, Princeton University Press, 2000, pp. x, 241, illus., £28.50, \$45.00 (hardback 0-691-00413-7).

Histories of aphasia are torn between telling simple stories of discovery about the brain and stories of seemingly endless complexity about language and human uniqueness. In this book, Stephen Jacyna goes beyond this with a different way of reading medical texts, to make “a new genre of writing dealing with the relations between language and the human brain” (p. 3) itself into the historical subject. This genre is the place where many varieties of aphasia come into existence, along with a distribution of power and influence between patient and doctor, between science and medicine, between doctor and doctor, and between the values associated with mind and with matter. Many of his texts will in part be familiar to historians of neurology or physiological psychology, but he interrogates them as forms of writing in a way that is entirely new. The result is a highly reflective, historically meticulous study at two levels: an account of key sources in the formation of aphasia studies, and a model of the “linguistic turn” for medical historiography. It is an excellent book, crafted with respect to language in both content and form, which should be a

standard reference point in the history of neurology and neuroscience.

The book is not a systematic history of aphasia; indeed, it rather severely dictates what it will and will not discuss. First and foremost, it provides what literary scholars call “a close reading” of “classic” texts, as well as some not so classic, to show how much more they contain than empirical representations of nature. Thus it examines narrative form, voice, metaphor, visual imagery and so on—providing a commentary on the technology of verbal and visual expression during the process of a speciality creating itself. Successive chapters examine Jean-Baptiste Bouillaud’s and Jacques Lordat’s creation of the aphasiological case history; the reshaping of this literature as a “physiological understanding of language” (p. 54)—the context of Paul Broca’s work; the consolidation of a materialist discourse—the period of the localizers and “diagram makers”; John Hughlings Jackson’s contrasted focus on the “psychological” speechless man; Henry Head’s renewal of Jackson’s programme and scathing dismissal of the diagram makers; and the dissonant voices of Pierre Marie, Sigmund Freud and Henri Bergson. The account of Head’s enrolment of his patients, educated officers, into his medical science, is especially rich. The penultimate chapter turns to what, before 1900, was a much smaller body of writing, the possibilities aphasics provided for therapy rather than science.

Another theme runs through the book. Alongside the examination of the particulars of language, it discusses the way in which the literature of aphasia articulates the nineteenth-century debate over naturalism—the explanation of existence in natural-scientific terms. Jacyna richly explores the representation of the speaking man as man and the speechless man as nature. Yet, quite where the argument will go, without drawing in such topics as the history of linguistic theory implicit in accounts of aphasia, or the theological