repertoire of the hospital's surgical staff, beginning with Salmon as "pile doctor" and extending into the era of an increasingly elaborate and invasive surgery. This is, in short, an extremely well-balanced and generously detailed study that constitutes a significant contribution to social and institutional history as well as to the history of medicine construed more narrowly. Her concluding chapter is titled 'A Study in Specialism', but this careful and unpretentious book is more than that. It would be unfortunate if a seemingly technical and circumscribed subject matter should obscure its more general relevance.

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SAUL BENISON, A. CLIFFORD BARGER, and ELIN L. WOLFE, *Walter B. Cannon. The life and times of a young scientist*, Cambridge, Mass., Belknap Press of Harvard University Press, 1987, 8vo, pp. xiv, 520, illus., £23.95.

Anyone beginning to read, or particularly to write, a scientist's biography must now do so with Sir Peter Medawar's warning reveberating in their ears: "The lives of academics, considered as Lives almost always make dull reading". Fortunately, the authors of this enthralling biography of the American physiologist, Walter B. Cannon, prove that an academic "Life" need not be the barren literary exercise that Medawar so feared, and this is in spite of following the precise schedule that he castigated, of "promise later to be fulfilled . . . a manly grappling with administration . . . and grateful letters from high places". The result is an attractive, well-researched account of the scientific and personal development of one of the most influential physiologists of this century, with a laudable absence of "dullness".

Cannon was born in Wisconsin in 1871, at a time when American medicine, as in Britain, was beginning to settle slowly into professional structures and opportunities. These would provide Cannon with purpose and possibilities throughout his career, which was to encompass a wide range of first-class research, distinguished service to the Harvard Medical School, and considerable efforts on behalf of the larger community of science at both national and international levels. These three major strands, with several minor ornaments, are detailed with impressive and highly readable authority by the three authors. Their individual expertises, as Medical Historian, as Professor of Physiology, and as Archivist to the Cannon papers, bring important complementary skills to bear on what must have been an absorbing project. It would be fascinating to know more of the mechanics of producing a work of this nature: how did the collaborators divide up the monumental amount of research required for the study? How did they collate their findings and assessments? And how did they co-operate in the writing, for there is a pleasing continuity in style and in content that is frequently lacking in other co-authored efforts. In analysing Cannon's work and influence, the authors have the benefit of not only his original research papers but also the several books he wrote, re-synthesizing and re-presenting his earlier experimental work. Additionally, they have his own account of his scientific beliefs *(The way of an investigator, 1945)*, and several published assessments and reminiscences by his colleagues and pupils. Such works can, of course, be a mixed blessing to the later historian and Benison, Barger, and Wolfe have meticulously verified, with extensive archival detail, their sources.

Walter Bradford Cannon was born on the site of the original Fort Crawford, where forty years earlier, William Beaumont had made his important observations of the stomach of the unfortunate Alexis St Martin, who suffered from a gastric fistula. Cannon himself was always pleased to tell of this coincidence, because of the close links it provided with his own work in gastro-intestinal physiology, which, in turn, was associated with the European traditions of Bernard and Ludwig through Cannon's first Professor at Harvard, Henry Bowditch. It was Bowditch who suggested to Cannon and Moser, both young medical students at the beginning of their studies, that the newly-discovered Roentgen rays might be a useful technique for the investigation of deglutition. From that initial idea developed much of Cannon's future research, on gastro-intestinal motility, autonomic reflexes, the role of emotions in visceral function,

endocrine control mechanisms, and, linking them all, his concepts of functional integration. His total fascination with integrative physiology was apparent from his earliest writings. This biography re-emphasizes and extends that interest in a particularly satisfactory way: the medical student who advocated the "Case method" for clinical study; the teacher who, while agonizing over his lecture style, provided a wide practical interpretation of his subject's strengths and applications; and the administrator who promoted medical education as an integral part of the university, and animal experimentation as an essential component of medical research. All these aspects of Cannon's life are convincingly drawn. Less sure are the sections on Cannon's domestic life and his conflicts with personalities such as Porter and Bowditch, although even here, details such as the Cannons' difficulties in starting a family are skilfully woven into the main story of the development of his research and the hazards of prolonged X-ray exposure.

Unfortunately, this volume finishes in 1917, when Cannon, the father of a young family, is about to set off for Europe and war. More, much more, of his creative life remained, including his entrance into the debate about the possibility of chemical neurotransmission and the publication of his most influential book, *The wisdom of the body,* in 1939. There is no indication in this volume that the Cannon story is to be continued, but one can hope that this fruitful and rewarding biography will move into a second volume.

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ELIZABETH FEE, *Disease and discovery: a history of the Johns Hopkins School of Hygiene and Public Health, 1916-1939,* Baltimore, Md., and London, Johns Hopkins University Press, 1987, 8vo, pp. xii, 286, illus., £21.30.

This history of the Johns Hopkins School of Public Health, up to 1939, recounts the fascinating story of its foundation set in its context of the previous and concurrent development of public health concepts, services, and training in the United States.

By the late nineteenth century, there were public health departments at state and major city level; but no professional requirements for public health practice had been set, and no specialist training existed. It was largely "the province of amateurs and gentlemen", supported and harrassed by voluntary pressure groups. The attention focused on communicable diseases and the need for improved sanitation by high mortality in the Civil War was enhanced by the similar communicable disease problems of the Spanish American War and early attempts to dig the Panama Canal. By the early 1900s, industrialists were investing heavily in the southern states—railways, cotton mills—and keen to extend their interests overseas. John D. Rockefeller had created the General Education Board to promote economic, social and educational development in rural areas. G. W. Stiles convinced the Board that hookworm ("the germ of laziness") was the real cause of "misery and lack of productivity" in the South, and a Sanitary Commission under Wickliffe Rose was set up (1909) to eradicate it. Although it failed to do so, the Commission's activities led to a great expansion in public health services; and in 1912, the federal government responded by expanding the responsibilities of the public health service.

In 1914, Rose reported to the General Education Board that careers in public health now existed and recommended the setting up of a school of public health: a science-based school, well endowed for research, with an independent identity within a university. The main contenders—Boston, New York, Baltimore, Chicago—met and agreed that Rose and William Henry Welch should prepare a plan. With much jockeying for position among the contenders, Rose and Welch produced different versions of the expected joint report. In 1915, Welch's version—emphasizing scientific research—was accepted by the Board. After site visits to Boston, New York, Philadelphia, Baltimore, Washington DC, Chicago, and St Louis, Baltimore was chosen because, while "the general resource of the University and of the community are inferior—in some respects much inferior—to those found in New York, Boston and Philadelphia, the Medical School fulfills the requisite conditions in the highest degree anywhere obtainable". Welch thus achieved his dream, with assured funding for five years and a virtual promise of