

Book Reviews

Arthur M Silverstein, *Paul Ehrlich's receptor immunology: the magnificent obsession*, San Diego and London, Academic Press, 2002, pp. xix, 202, illus., US\$75.00 (hardback 0-12-643765-3).

Although history of medicine is no longer devoted exclusively to great men and their research, they are still worth studying under certain circumstances, above all if they represent important scientific research strands and movements of their times. This is certainly true for the immunologist and bacteriologist Paul Ehrlich (1854–1915), whose work had an impact on several areas within twentieth-century biomedicine.

Arthur Silverstein's book deals with one of the most important aspects of Ehrlich's work, namely his research in immunology, and describes and analyses the development of Ehrlich's "side-chain" or "receptor theory". Ehrlich promoted the application of chemistry in medicine and used tissue staining to analyse the chemical binding of substances to morphological structures, especially cells. He applied this work to the investigation of immunological problems. Antigens (or toxins) bind with specific "side-chains" of cells to unfold their effects. As many side-chains are bound by antigens, the cell "overcompensates" when releasing a large quantity of side-chains into the bloodstream. These side-chains function as antibodies able to bind antigens and to avoid further infection. In 1900, the side-chains were renamed "receptors". Ehrlich applied his theory to research on both cancer and chemotherapy, leading to his development of the famous substance Salvarsan for the treatment of syphilis in 1910.

The strength of Silverstein's work lies in the medical detail of this important story. He offers interesting insights into the receptor theory's development and defence. For example, he explains Ehrlich's experiments in the field of paediatric immunology, and gives an interesting account of the debate between Ehrlich and

Jules Bordet (1870–1961) of the Pasteur Institute in Paris. In discussing the views of Ehrlich's critics, Silverstein also analyses his explanation of the side-chain or receptor theory and looks at how immunologists received it.

Although this is without doubt one of the book's merits, it also carries a basic methodological problem. Silverstein writes mainly from the perspective of the immunologist. He describes the path from staining to side-chains as a success story rooted in the genius of the "imaginative Paul Ehrlich" (p. 12). It is a history of ideas, describing the receptor concept as the logical outcome of Ehrlich's productive genius. Of course, logical sequence can be detected in Ehrlich's immunological investigations but it is important to consider that the realization of a new scientific concept depends not least on the specific circumstances of the scientist's social and academic life. Silverstein mentions the breaks and troubles in Ehrlich's life only randomly, although the end of Ehrlich's clinical career as well as his need as a Jew to get a safe position in the German university system were seemingly influential in changing his research interests and enabling him to make his intricate investigations on the side-chain and receptor theory. These shortcomings are surprising since Silverstein himself hints at such socio-historical perspectives, for example: "It was only the direct request of Behring . . . that would allow Ehrlich to venture into an area to which his institute colleague had full priority claim" (immunological research on diphtheria, p. 42). Moreover, Silverstein's contribution is presentist. Even in the early stage of Ehrlich's career, he searches for "receptors" using the term when dealing with papers written before 1900.

The book presents no new general interpretative approach to Ehrlich's immunology, and it does not reach beyond the splendid article on Ehrlich written by Claude Dolman in the *Dictionary of*

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Scientific Biography in 1989. Nevertheless, it is an important contribution. As the time is not yet ripe for a detailed biography, we need books on single aspects of Ehrlich's life. His papers, held at the Rockefeller Archive Center in New York, contain a lot of material that needs to be considered. Thus, in spite of its shortcomings, Silverstein's book is important as it gives a rich and detailed overview of the intellectual development of Ehrlich's immunology.

Cay-Rüdiger Prüll,
Wolfson Research Institute,
University of Durham,
Stockton

Judith Robinson, *Noble conspirator: Florence S Mahoney and the rise of the National Institutes of Health*, Washington, DC, Francis Press, 2001, pp. xiv, 342, illus., \$28.00 (hardback 0-96665051-4-X).

Florence S Mahoney, a wealthy private citizen, assisted the growth of the biomedical research enterprise in the United States federal government during the last six decades of the twentieth century. Mahoney exuded intelligence and charm; and she had access to leaders in politics (especially in the Democratic Party) and newspaper publishing.

Mahoney and Mary Lasker, her principal ally, began to lobby for public investment in biomedical research during the 1940s. In that decade, an ever-growing number of opinion leaders believed that increased public spending for research, professional education, and facilities would quickly translate into longer and more pleasant lives for Americans.

Two new federal policies financed what became a supply side spending spree on behalf of the health sector that continues today. Robinson relegates one of these policy innovations, establishing the extramural research programme of the

National Institutes of Health, to a footnote and does not mention the other, massive federal subsidies to build and equip hospitals.

Congress routinely re-authorized the US Public Health Service (PHS), which includes the NIH, while the Second World War was the highest national priority. As a result, few people except agency and Congressional staff noticed that the PHS now had authority to make grants for research to non-federal investigators and institutions. In the final months of the war, PHS leaders quietly secured White House approval to transfer the most promising research contracts, as well as funding to continue them, from the temporary federal agency that managed wartime science to the new NIH extramural grants programme. Within a few weeks these contracts became the first NIH grants.

Meanwhile, a highly visible effort to establish, through legislation, a national agency to fund research in all scientific fields stalled because of conflicts about policy within Congress and between Congress and the White House. These conflicts were not resolved for almost five years, during which NIH leaders and their allies, who included leaders in research, advocacy and philanthropic groups, and the media, as well as Mahoney and Lasker, took advantage of the absence of competition. When the National Science Foundation began to operate in 1950, biomedical research remained the responsibility of the NIH.

Robinson relegates this well-documented history to a footnote (p. 284). Perhaps she did so to reinforce her claim that "Mahoney and Lasker [were] skeptical that existing agencies like the PHS were up to the job that the women had in mind" (p. 71) and her implication that, eventually, PHS did her heroines' bidding. But with the exception of the creation of a new National Institute for Mental Health, when Mahoney and Lasker led a coalition, PHS leaders and