

Book Reviews

never flagged and this brief book, comprising thirteen lectures that he gave during his career, indicates the depth and commitment with which he continued to study this ubiquitous and extraordinary micro-organism, adding to the gift of medical knowledge that has come from detailed study of this pathogen. Yet, we must conclude with the paradox that despite the intensity and depth of our knowledge concerning the pneumococcus, we still do not know how it produces illness and death.

The thirteen essays were written at different times, during the period 1959–84, and they indicate how Austrian came to the realization that despite specific antimicrobial therapy, and despite the sensitivity of the micro-organism to these drugs, pneumococcal pneumonia remained an important cause of morbidity and mortality, particularly at the two extremes of the span of life. Necessarily, there is a certain amount of redundancy. Austrian's careful scholarship recalls to the reader the notable early contributions that led to the identification of the pneumococcus, its separation from other microbes of the respiratory tract, and the painstaking process by which the large number of serotypes of the pneumococcus became identified to become the basis for the vaccine that Austrian developed and that is now commercially available.

The story that unfolds can be interpreted in many ways. Lewis Thomas in his foreword interprets these papers as a lesson in how the study of biological mechanisms at a fundamental level leads to discoveries that can be applied to human disease. This is a theme that has dominated much of Thomas's writing over the past several decades. Alternatively, it could be argued, and Austrian makes the point effectively, that a clinical investigator who becomes intrigued with an important medical problem, and who decides to explore that problem wherever it may go, must ultimately become adept at sorting out epidemiological and biostatistical information, may need to learn about the chemical structure of bacteria, and of the immunological response to these structures, and should grasp completely the various clinical manifestations of infection due to an organism with extraordinary capacity to invade and to do so in different ways in different hosts. It matters little which interpretation one chooses to adopt as an article of faith, and perhaps matters little if there is an article of faith underlying these observations. What does come through is that the depth of the chase has uncovered knowledge and has saved lives. Whether as many lives have been saved as was originally projected, and whether the inevitable controversies over exactly how effective the vaccine is will be stilled by any body of accumulating knowledge, is irrelevant to the fundamental message.

Equally important is the precise and measured prose with which the complex thoughts and experiments are made lucid and proceed to the discoveries that will follow. Those of us who have attempted to edit Austrian's writings know only too well the precision with which his thoughts are presented, the meticulousness with which he will argue about the placement of a semicolon or a comma, and know equally well that this fluid and seemingly effortless prose comes only from those who have taken great pains to fashion it. All who are engaged in writing scientific articles will gain from a careful study of these essays, quite apart from their scientific content.

This is a book to be read in many brief excursions, rather than read through at one time. In this way, the development over almost thirty years of research can be fully appreciated and the purposeful repetitions disregarded. The book will be rewarding for its content, presentation, and for its most important message, which is one of optimism, and the sheer pleasure and satisfaction that comes from looking back at a life of discovery and achievement.

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GLADYS L. HOBBY, *Penicillin: meeting the challenge*, New Haven, Conn., and London, Yale University Press, 1985, 8vo, pp. xxii, 319, illus., £30.00.

Dr Hobby has written an excellent, broad-ranging book which contributes new information as well as providing a fresh insight into the penicillin story, from the discovery by Fleming through to its large-scale production. The part played by the American pharmaceutical industry in the development of penicillin is covered in detail. There are also chapters on the development

of the antibiotic in various parts of the world, new derivatives, and penicillin's impact on science and medicine. The book is well illustrated with numerous black-and-white photographs and two colour plates, while a good deal of statistical information is given in the form of tables. There is also a very useful section of references and notes containing some interesting information which is additional to the book's main narrative.

Most of the works which have appeared on the penicillin story have either concentrated on its discovery and early history, or have been biographies of the key figures involved. Dr Hobby's book, on the other hand, covers the whole story, although the part played by American scientists in penicillin's development is emphasized. Dr Hobby was involved early on in some of this work so she is able to provide an authoritative description of this period. This part of the book is required reading for those on this side of the Atlantic who still feel that penicillin was in some way stolen from us by the Americans.

The book provides many fascinating snippets of information, particularly in the opening chapters on the early history of penicillin. Unfortunately, Dr Hobby falls into the increasingly popular trap of regarding some late-nineteenth-century observations on microbial antagonism as examples of the discovery of penicillin which pre-date Fleming's observations. Such suggestions should be firmly dismissed, especially since the majority of the pre-Fleming work involved the use of *Penicillium glaucum*. Until relatively recently, the term *Penicillium glaucum* was used loosely, but it is probably a synonym for *P. expansum*, a fungus which, although it produces a number of antibacterial agents, does not produce penicillin. Workers such as Duchesne were therefore observing the effects of antibacterial agents from fungi, but this does not mean that they discovered penicillin. This fact is unwittingly emphasized when Dr Hobby states that Duchesne's antibacterial agent was effective against *E. coli*, a bacterium which she later points out is not susceptible to penicillin.

Dr Hobby was fortunate to have Lady Fleming's permission to use her husband's original notebooks, which are deposited in the British Library. Dr Hobby's initial observations differ from that arrived at by Ronald Hare when he attempted to reconstruct what happened in Fleming's laboratory in September 1928, and she avoids the current fashion for criticizing Fleming. As she points out, "short of injecting penicillin . . . he had done all that was necessary to establish its potential as a chemotherapeutic agent".

It is generally assumed that Fleming was being unscientifically untidy when he left his Staph.-inoculated plates on the bench of his laboratory. Dr Hobby points out, however, that bacteriologists of that period thought that incubation at room temperature encouraged the formation of the staphylococcal variants which were of particular interest to Fleming. She thereby destroys one of the long-established myths concerning Fleming's discovery.

The chapters dealing with the large-scale production of penicillin by both the British and American pharmaceutical industries are again illuminating. Of particular interest is the observation that the methods used in penicillin production, including the use of corn steep liquor, had been worked out for the production of gluconic acid by strains of penicillia as early as 1931. It was apparently these studies which made possible the almost immediate success of penicillin production by fermentation. This information also suggests that the methods for large-scale production would have been available had penicillin been purified in the 1930s.

This excellent book is well produced and largely free of typographical errors. Dr Hobby is to be congratulated for providing so much new information on a topic generally considered to have been thoroughly researched. Although expensive, her monograph is a necessary addition to all academic libraries, and should also prove of interest to the general reader.

Dr Hobby concludes with the following statement: "Had Fleming not made the observation and preserved the culture, had he not demonstrated the presence of penicillin in his culture fluids and recorded its properties, there would have been no starting point for Chain and Florey's studies ten years later." By placing the discovery and development of penicillin into its proper perspective, Dr Hobby's book should help Fleming's critics to assimilate these simple facts.

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