

## Biochemistry

*The Development of Biochemical Concepts from Ancient to Modern Times.* By Henry M. Leicester. Pp. 286. (Harvard University Press: Cambridge, Massachusetts, 1974.) \$15.00.

THIS is a book which was very much needed, and happily Professor Leicester has made a real success of it. Apart from a group of lectures at the Cambridge Biochemical Institute, recently published, the only thorough treatment of the history of biochemistry was the book by F. Lieben, *Geschichte der physiologische Chemie*, published 40 years ago. Lieben's book has been reprinted in recent times and will always have its value, but it is not satisfying nowadays for a number of reasons. For example, he disposed of the entire period down to the end of the 17th century in only 20 pages out of a total of 700; then he divided the main body of his text into physiological topics, which were followed by an account of discoveries in the present century grouped under proteins, carbohydrates and fats. The attitudes of the early thirties are very dominant, and as a whole the work lacks historical perspective.

This state of affairs is now vastly improved upon in Leicester's book. Eighty pages are devoted to the period from antiquity to the end of the Middle Ages, 45 to the 17th century and the time of iatrochemistry, and the remaining 105 to biochemistry, as the child of modern chemistry and modern biology. The book is well informed in classical and mediaeval history, yet comes down as far as the discoveries about the genetic code made by Watson and Crick in 1953, the latest references being to work in 1971.

The discussion of the ancient Western world draws from the pre-Socratic philosophers and the Aristotelians, with a paragraph or two on Alexandrian 'alchemy'. Far beyond the ken of Lieben, there is a good chapter on biochemical ideas in ancient China and India, now rightly regarded as necessary because of their great influence on Arabic culture, without a consideration of which the history of any science in post-mediaeval Europe can never properly be understood. Leicester has a clear appreciation of their macrobiotic drive, as opposed to the more metallurgical aurifactive and aurifactive approach of the Hellenistic papyri and the Corpus writers, respectively. The Arabic chapter is also well done, though perhaps the ideas in the Jabirian Corpus (p.56) are passed over a little too quickly. On the other hand, it is a good idea to emphasise the dawning of the ideal of the necessity of quantification, which occurred in the late Middle Ages with men such as Nicholas of Cusa.

It has been said that most of the early history of biochemistry can be followed by tracing all the peregrinations of certain fundamental ideas—such as *pneuma*, element, humour, *krasis*, quintessence, elixir, conjunction and ferment. Only four of these are actually in Leicester's index, but two more of them are fairly readily found within the text, and the reader can easily add the references to the index in his own copy. Although the Paracelsian chapter is so good, with its explanations of 'chaos', 'tartar', 'iliaster', and 'arcanum', one would like to have seen the concept of 'elixir' followed through somewhere; and again the ancient idea of the *conjunctio oppositorum* lying at the basis of all affinity theory, could also have been brought in with advantage. The great influence of the first distillers of strong alcohol is relevant here, since *aqua ardens* seemed indeed to be an instance of the "marriage of fire and water".

As an offering towards a second edition, I would express regret at the attribution of the discovery of gluten only to Grimaldi in 1665 (p.118), since *mien chin* had been systematically prepared on a nation-wide, if not indeed an industrial, scale in China for at least a millennium before. Indeed, the discovery may well go back to the second century BC if the traditional ascription to Liu An and his circle turns out to be justified. I would also like to see a rewording of the statement on p.49 that a characteristic feature of Chinese medicine was its reliance on herbal medicines. This is particularly misleading because the Chinese in their pharmaceutical natural histories from the second century BC onwards never shared the Galenic abhorrence of non-herbal remedies. From the beginning their physicians made much use of mineral drugs, and animal products were 'officinal' from the beginning. Thus, no Society of Chymical Physitians was ever necessary to awaken the Chinese from their Galenic slumbers; they had always been awake to the three kingdoms.

A great attack on Galenic orthodoxy took place when the specific virtues and specificity of drugs, as opposed to the unspecific adjustment of 'peccant humours', were recognised in the 16th and 17th centuries (pp. 86, 98). It might have been good to instance at this point the remarkable career of the Cambridge 'quack' physician, Talbot, who administered quinine widely and with great success in defiance of the reigning doctrine. Still later we get involved in the vitalism-mechanism polemics of the 19th and 20th centuries. Perhaps it is not quite enough to end the discussion (p.159) by saying that "with the accumulating mass of chemical and physiological information

vitalism gradually disappeared from biological thought". Would not a page or two of the current debates, centering round 'reductionism', have been in place here? They contain much of great interest for the philosophy of science, and the general position of organicism is so significant in the light of more than 2,000 years of past history, that this might well have been expanded. Lastly, I should like to offer to the author for a footnote in his second edition, the tradition that the invention of the term 'hormone' (p.228) actually occurred in the Hall of Caius College at Cambridge, when Bayliss and Starling were dining at High Table and had a conversation about a word they were looking for with the Greek and Latin scholars who were of the company.

Professor Leicester's book is well provided with exact references, the absence of which was one of the worst features of Lieben's book. The new book can be recommended without reservations to students and research workers alike, but of course it is not the last word on the subject. One can see a place which could be filled by something at one and the same time more philosophical and more industrially-oriented than either Lieben or Leicester; meanwhile let us be grateful for this book.

Joseph Needham

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