

Even worse is the harrowing story of the survivors of Kut. "The scene at Baghaila was one of anguish and misery. The march itself (from Kut) was a nightmare. The Arab soldiery used sticks and whips to flog the stragglers on. Some have been thrashed to death, some killed . . . some left to be tortured by the Arab. . . . Every now and then we stopped to bury our dead." 2592 British rank and file left Kut; 1700 died in captivity. Such was 'the gentlemanly' Turk; but "The General Staff in Mesopotamia . . . discredited every report of brutality or cruelty till the bitter truth could no longer be hidden". The reviewer has purposely quoted these terrible details of the grimmer aspects of the War to direct attention to a chapter which is written with a restraint and a latent fire that render it one of the most effective exposures of a foolish tradition ever put forward.

It remains finally to congratulate the author on the achievement of a living history. It would be supererogatory to direct attention to the easy flow of its style, to the wealth of knowledge and sympathy enshrined in it, to the reticence of a man who feels deeply, and felt deeply, in telling and recalling its moving story. It is a book that no Briton should fail to read, and in reading, to anticipate with no less interest the sequel that will deal with the later history of the War and the notable and fruitful scientific services in connexion with agricultural and mineral development, aviation, and preventive hygiene.

A. E. D.

Biological Catalysts.

Enzymes. By Prof. J. B. S. Haldane. (Monographs on Biochemistry.) Pp. vii + 235. (London, New York and Toronto: Longmans, Green and Co., Ltd., 1930.) 14s. net.

THIS book marks a new departure in the series of Monographs on Biochemistry, additions to which have appeared at intervals since its happy inauguration in 1908, for the subject has already been treated in an earlier volume of the series, Bayliss's "Nature of Enzyme Action" (1908), the last edition of which from its author's hand appeared in 1925. As the present author points out, Bayliss's book was strongly individual, and it was rightly thought that an entirely new work would be better than an attempt by an alien hand to bring Bayliss up-to-date. Bayliss's main thesis was that enzymes act as colloidal catalysts and combine with their substrates and other substances by adsorption,

"so that the action of enzymes in general must be regarded as exerted by their surface", and a large part of his book was devoted to the support of this view. In the present work this position is assumed almost without discussion, though it is carefully pointed out that "the assumption that an enzyme molecule activates only one substrate molecule at a time has worked remarkably well".

In the new book, the influence on enzyme action of such factors as enzyme concentration, hydrogen ion concentration, temperature, radiation, and the union of the enzyme with its substrate and other compounds is first considered. Then follows a chapter on the course of enzymatic reactions and its mathematical theory, treated with a profusion of mathematics which implies a high, and we hope well deserved, compliment to the attainments of the readers of the book. Interesting chapters follow on specificity, coenzymes and other adjuncts, the 'poisoning' of enzymes, and the purification of enzymes; and the work is concluded by a chapter on the theory of enzyme action and classification.

Throughout the book a wealth of examples is brought forward, which fully justifies the author's reputation for an encyclopaedic knowledge of the literature, but sometimes leaves the reader a little breathless. A number of tables are included, in which a great mass of information is usefully summarised.

The author, perhaps wisely, avoids generalisations, but it can be gleaned from his pages that he regards enzymes, defined as soluble, colloidal, organic catalysts produced by living organisms, as capable of combining with their substrates, owing to the chemical structure of the latter, and also with at least one of the products of the reaction catalysed. In this combination the substrate molecules do not, in general, cover the whole surface of the enzyme. The substrate in this situation requires the addition of less than the usual amount of energy increment to enable it to undergo the chemical change in question. The reason for this is not definitely known, but the author makes an interesting suggestion, and Quastel's theory of active centres provides another. The fundamental question as to the exact structure which renders an enzyme capable of exerting its specific effects has not yet been answered.

Biochemists have every reason to be grateful to the author for the abundance of material which he has put before them, and for the careful and logical way in which he has treated it.

ARTHUR HARDEN.