

that can be found with Mr. Galloway's book is that he has attempted to write the annals of the coal trade as apart from its twin industry of iron-making. The complexity, however, of the history of coal mining by itself may fairly be held to excuse, to some extent, this shortcoming.

The close of the eighteenth and the early years of the nineteenth century were prolific in great advances in the technique of coal mining, the invention of the safety lamp being, perhaps, one of those of most importance, although its value had not yet been fully recognised in 1835, the date at which the author closes these interesting annals. They stop short, therefore, at the dawn of the true age of steam, at the era of the railway and the steamship; it is on this ground to be regretted that the author has not extended his review yet another thirty years or so further, when he would have fittingly rounded off his picture. He has done his work so well, has brought so much industry and research, coupled evidently with a thorough knowledge of the subject, to bear upon his task, that he has succeeded in reproducing a most complete picture of the evolution of the coal-mining industry. It can only be hoped that at some future date he may continue these interesting records down to the present day.

H. LOUIS.

AN ATLAS OF BACTERIOLOGY.

An Atlas of Bacteriology. Containing 111 Original Photomicrographs with Explanatory Text. By Chas. Slater, M.A., M.B., M.R.C.S. Eng., F.C.S., and Edmund J. Spitta, L.R.C.P. Lond., M.R.C.S. Eng., F.R.A.S. Pp. xiv + 120. (London: The Scientific Press, Limited, 1898.)

IT might be said that the illustrative side of the science of bacteriology, whether by photographs, drawings, or coloured pictures, is, to some extent, overdone, and that the "Hand-Atlanten" of Lehmann and Neumann and the *Atlas der Bakterienkunde* by Fränkel and Pfeiffer already cover the whole field. Further, that the modern text-books of bacteriology are filled with numerous and useful illustrations, and have, of course, in addition the advantage of containing a complete and elaborate description of the morphological and biological characters of all the most important bacteria, besides all other information necessary to a correct knowledge of the science of bacteriology.

Yet, on careful study of this work, it is impossible to deny that it fills a blank in the life of the student of bacteriology. In the first place, most of the photographs are excellent, and the letterpress, linking together and explaining the teaching of the illustrations, is clear, concise and accurate. In the second place, the book is compactly bound, is printed on excellent paper in good type, and is of a very handy size. Thirdly, the authors can claim to have succeeded in giving in a limited number of illustrations a very complete series, so far as the wants and requirements of the average student of bacteriology are concerned. Lastly, its price is well within the limits of even a very slender purse.

For the purpose of this notice the book may be divided as follows:—

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(1) Photographic introduction (pp. 1 to 9). This introduction, although doubtless of value from the viewpoint of the micro-photographic expert, might reasonably be clothed in simpler language for the sake of the average reader.

(2) Bacteriological introduction (pp. 10 to 23). Although this is well written, the purpose it serves in a condensed atlas of bacteriology is not very clear. It detracts a little from the scope of the work, which presumably is to present to the student a condensed photographic record of the chief morphological and biological characters of those bacteria which he is most likely to have to investigate in the course of his bacteriological studies.

(3) Photographic records of the more important bacteria, with explanatory notes (pp. 24 to 108). Photographs are given of two micro-organisms recently discovered, and these of great importance, namely, *Bacillus pestis bubonicae* and *Micrococcus melitensis*. These same microbes are generally believed to be non-motile, and competent observers have failed to demonstrate the presence of flagella. Dr. M. H. Gordon, however, has succeeded in obtaining specimens in which the flagella, both of the bacillus of plague and the micrococcus of Malta fever, are clearly visible.

All the photographs are good and some are excellent. To the latter class belong, among others, the following:—Fig. 11.—*B. typhi murium*; Fig. 93.—Sp. *Obermeieri*; Fig. 111.—*Plasmodium malariae* (malignant Tertian); Fig. 78.—Sp. *cholera Asiatica*; Fig. 56.—*B. typhosus*; Fig. 49.—*Micrococcus gonorrhoea*; Figs. 25, 26, 27, 28.—*B. tuberculosis*; and Fig. 12.—*B. mycoides*. Much less satisfactory photographs are Figs. 50, 51, and 52.—*B. typhosus*.

A very large number of the illustrations depict coverglass specimens. It is a pity that more photographs are not given of cultures of the bacteria. No doubt these are frequently unsatisfactory, but the general excellence of Messrs. Slater's and Spitta's present work suggests the belief that their efforts in this direction would be crowned with success. For example, gelatine plate cultures of *B. mycoides* and *B. coli communis*, and agar cultures of *Streptococcus pyogenes* and *Diplococcus pneumoniae* under a low power of the microscope.

Of photographs of bacteria that might with advantage be added the following may be mentioned:—Anærobic milk cultures of *B. enteritidis sporogenes* (Klein); immersion preparation of the "swarming islands" of *Proteus vulgaris*; microscopic preparation of *B. coli communis* stained for flagella. This last is extremely important, as all students of bacteriology ought to be taught to regard the difference in the number of flagella of *B. coli* and *B. typhosus* as a valuable aid in the differential diagnosis of the two organisms. *B. typhosus* is multi-flagellated. Some varieties of *B. coli* are likewise multi-flagellated, but the true *B. coli communis* has only 1-3 flagella.

These criticisms are offered in no carping spirit, for we are struck with the general excellence of this Atlas of Bacteriology, and we can cordially recommend it not only to students but to all those who make this science their special study.

A. C. HOUSTON.