be said that they are all classics, and we ask the student to decide in favour of reading them in preference to some brief text-book summary. He will find no great mathematical difficulty in any of them which would make it impossible for him to understand them thoroughly without being otherwise helped.

PURE AND APPLIED BACTERIOLOGY.

Traité de Bactériologie pure et appliquée à la Médecine et à l'Hygiène. Par MM. P. Miquel et R. Cambier. Pp. xv + 1059. (Paris: C. Naud, 1902.) Price fr. 45.

THIS work, comprising more than one thousand pages and a comprehensive index, is a valuable addition to the already extensive literature of the subject of bacteriology. As the title of the work indicates, it deals with bacteriology, not only from the purely scientific point of view, but also from the technical and applied, inasmuch as its application to industry and to sanitation forms an important part of the work. The book is divided into four principal divisions. The first division treats of the morphology, the chemical, physical and other conditions concerning the composition, growth and reproduction of bacteria, and capable of affecting them favourably or unfavourably. It deals, further, with the methods used in cultivation, the culture media, their preparation and their physiological action in the human and animal body. In the same division is found an account of the methods of staining bacteria, their spores and cilia, both from cultures and from animal tissues. And lastly, the optical instruments used in the study of bacteria (microscopes, photomicrographs, magnifying glasses, &c.) are treated in chapter ix.

All these subjects are treated in a clear and comprehensive manner, very useful and sufficient for the student of bacteriology, and in many instances brought up to the most recent times, so that both student and original worker have the advantage of the most recent improvements in the methods of the study of bacteria. While, therefore, the reader has in the 236 pages constituting this first part all that it is of real importance to know concerning the most modern methods in bacteriology, he misses a good deal concerning some modern views of the morphology and classification (Migula, Meyer).

The second part, comprising in five chapters about 325 pages, is the one which for the student of medicine and hygiene is the most important, since it describes the different species of pathogenic bacteria of diseases of man and animals.

This part of the book will be found less satisfactory than the first, because in our opinion it is in several respects somewhat imperfect; the descriptions of the different species, their characters and actions might be more detailed; it is deficient in the theories of immunity, and notably in regard to suitable and representative illustrations. The absence of proper and accurate illustrations, not only in this, but in other portions of the book, seems inexplicable. The authors devote time and trouble to teaching photomicrography, yet there is not in the whole book a single photomicrograph to illustrate a single species of the many hundreds described. We have no fault to find with the use of schematic drawings, such as occur

in this book, when it is a question merely to illustrate general characters as to the aspect and morphology of the bacteria, but we fail to understand the value of such illustrations as occur in this second portion of the work ("Pathogenic Bacteria"), where, in total disregard of all natural conditions, a few tinted dots or a few tinted lines are here produced to represent cocci or bacilli. Another subject in this section seems to us deserving of explanation. It is this. All text-books, all writers and all those who have contributed to their discovery have recognised and described as "bacilli" the various species that cause "hæmorrhagic septicæmia" in different animals, yet here in this book we are suddenly brought to a full stop, and for no adequate reason, by having all these different bacilli (fowl cholera, swine plague, swine fever, wildseuche, duck cholera, grouse disease, &c.) grouped amongst "Microcoques Pathogènes."

The third and fourth portions of the work (pp. 568-888 and 888-1038 respectively) in our opinion are excellent, both as regards treatment and arrangement, and denote the hand of the master, and considering the known works and reputation of M. Miquel, this is quite what was to be expected. The third part deals with the important processes of fermentations caused by bacteria, as lactic, acetic, butyric, pectic, &c.; with the production of pigment; with the bacteria of air, water and soil; with putrefaction; with the bacteria occurring in the different parts of human and animal bodies, and with phosphorescent bacteria.

The fourth and last part deals with the principal methods of analysis of air, water and soil as practised and applied by the authors and others in their own systematic work; further, with the purification of potable waters; and last, but not least, with the most efficient means of disinfection.

As stated already, these two sections of the book form, by their clear and concise descriptions and by their complete treatment, an advance over all existing books, and we venture to say that the book on this account alone deserves to be, and will doubtless become, of universal use.

There is one further merit in this book not to be taken lightly, and that is the copious references to the original works of other authors, notably French and German. There are references also to English and American workers, but, as is usual with most German and French writers, to which we in England have become by this time well accustomed, references to English and American literature occur rather sparingly and are treated in a somewhat stepmotherly fashion.

E. KLEIN.

OUR BOOK SHELF.

General Investigations of Curved Surfaces of 1827 and 1825. By Karl Friedrich Gauss. Translated with Notes and a Bibliography by James Caddall Morehead, A.M., M.S., and Adam Miller Hildebeitel, A.M. Pp. viii + 127. (Princeton, N.J., U.S.A.: The Princeton Library Publishing Association, 1902.) Price 175 dollars.

THIS is an English translation of the classic memoirs of Gauss on the theory of surfaces. The first paper is that which was presented to the Royal Society of Göttingen in