

unknown to most students of building materials, it might be advisable to substitute the more familiar "mirror."

However, in spite of a few minor points like these, the book as a whole is well written, and admirably adapted to the class for whom it is intended. It deserves to take a permanent place among the textbooks upon the subject, and in future editions the points referred to will no doubt receive attention.

H. B.

ECONOMIC BACTERIOLOGY.

Bacteria in Relation to Country Life. By Dr. Jacob G. Lipmann. Pp. xx+486. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1908.) Price 6s. 6d. net.

WRITTEN in non-technical language, this book gives a good account of the activities of micro-organisms. It may therefore be recommended to all those who desire to obtain a general knowledge of the functions of bacteria and the important rôle they play in relation to daily life, while the intelligent agriculturist will find a large amount of information which should aid him in his work. After a brief survey of the form, structure, food requirements, and conditions of growth of bacteria, successive chapters deal with these organisms as met with in air, water, and sewage. The relation of water to health and disease is discussed, and the chief factors in connection with the contamination and purification of water are detailed. A readable account is given of the disposal of sewage and of bacterial systems of sewage disposal. Next follow the most important sections of the book, viz. the relation of bacteria to soil fertility and the influence of manures. We here find accounts of the sources of nitrogen in the soil, of nitrification and denitrification, of the action of leguminous crops in fixing nitrogen, and of soil inoculation with pure cultures of nitrogen-fixing organisms. The proper methods of storing farmyard manure are dealt with at some length, and it is shown that under different conditions of storage the losses of organic matter from the manure stack in three or four months may range from 15 to 20 per cent. to 40 to 50 per cent. of the initial quantity, and valuable suggestions are made on the best means of conservation of manurial constituents, both by proper methods of storage and by the use of chemical fixatives.

The chapters which follow on milk, its production and preservation, are also excellent. Details are given which show that careful hand-milking yields a better milk as regards bacterial contamination than any milking machine, unless extreme precautions are taken in the sterilisation of the latter. The subject of pasteurisation of milk is also critically discussed, and the following extract sums up the author's views on the advantages and disadvantages of the process, views with which we fully agree and which should be widely known:—

"Pasteurisation is effective for the destruction of disease bacteria in milk and for the improvement of its keeping quality. It is agreed that city children fed on pasteurised milk, properly heated and properly

cooled, are less subject to intestinal disturbances than children fed on raw milk. At the same time, it must be admitted that the pasteurisation of milk already filled with bacteria, and the products of their activities, will not remedy its defects. The undesirable substances formed by the bacteria are not entirely destroyed by the heating, and may still cause injury to the person consuming the milk.

"By resorting to pasteurisation, a dealer may be able to dispose of milk that would otherwise quickly become unsaleable. Similarly, the failure to cool the pasteurised milk quickly and to keep it at a temperature of 50°, or below that, may lead to the rapid multiplication in the milk of germs producing injurious or poisonous substances. Hence, pasteurised milk should be consumed within twelve hours, or should be immediately cooled down to between 45° and 50°."

The subject of tuberculosis in relation to milk is fully discussed. It is pointed out that large numbers of tubercle bacilli may pass into the excreta of tuberculous cows, a fact which was fully confirmed by the experiments of our Royal Commission on Tuberculosis as contained in the last report, and it is concluded that

"Whatever difference of opinion there may prevail as to the extent of human tuberculosis caused by the consumption of milk and milk products, it is conceded by sanitarians that persistent efforts should be made to eradicate bovine tuberculosis."

Subsequent chapters deal with milk beverages, butter and cheese, canning, ensilage and fermented liquors.

The book is adequately illustrated and clearly printed.

R. T. HEWLETT.

FORESTRY.

(1) *Our Forests and Woodlands.* By Dr. J. Nisbet. New and revised edition. Pp. xxiii+348. (London: J. M. Dent and Co., 1909.) Price 3s. 6d. net.

(2) *Trees: A Handbook of Forest-Botany for the Woodlands and the Laboratory.* By the late H. Marshall Ward. Vol. v., Form and Habit. Pp. xi+308. (Cambridge: University Press, 1909.) Price 4s. 6d. net.

(1) THE first edition of Dr. Nisbet's well-known book, "Our Forests and Woodlands," appeared in 1902. The second edition has now been issued, and will doubtless be welcomed by a large circle of readers, not only on account of the interesting and important information it contains, but the price is such as to bring it within the reach of many who cannot afford the more expensive, though excellent, works on forestry at present available to the English reader. A very important, and probably the most outstanding feature of the new edition is the preface, in which the author has given a résumé of the progress which has been made in forestry since the appearance of the first edition. The doings of the various Governmental committees and commissions which have sat of late years are clearly set forth. There is also given a very striking table in the form of an abstract from the "Annual Statement of the Timber Trade of the United Kingdom" for 1906 and 1907. Here it is shown that the gross total imports of wood and timber, wood-pulp, and manufactured wood-pulp come to about 37,500,000l. To supply these