

adulteration had already done. He says: 'Those who mix maize in the chocolate do very ill, because these grains do beget a very melancholy humour, and those which mix it in this confection, do it only for their profit.'

The book is illustrated by numerous full-page and smaller illustrations, and is well printed on thick, glazed paper.

THE CHEMISTRY OF ENGINEERING.

Chemistry for Engineers and Manufacturers. A Practical Text-book. By Bertram Blount, F.I.C., F.C.S., and A. G. Bloxam, F.I.C., F.C.S. Volume I. *Chemistry of Engineering, Building, and Metallurgy.* Pp. x + 244. 35 illustrations. (London: Charles Griffin and Co., Limited, 1896.)

THIS book gives a general view of chemical technology, and is intended for the use of engineers, managers of works, and students. It is meant to be read, and not to be treated as a book of reference, and therein differs from the larger works which have already covered the same ground. The authors have confined themselves to explaining the general chemical principles underlying each process, working details and exact descriptions of plant being omitted. Thus the manager of works engaged on a particular process can probably, by perusing this book, find out as much as he desires about any other typical process, although it is perhaps unlikely that he will learn from it much regarding his own business. It is to be regretted that in pursuance of their plan of avoiding all semblance of a book of reference, the authors have in no case indicated where further information can be obtained to supplement their own accounts. The volume is divided into two parts, the first part dealing with the chemistry of engineering and building, and the second with metallurgy. These two parts are very unequal in merit, the first being what it claims to be, a practical treatise, which will doubtless be much appreciated by manufacturers. In this part the accounts given of fuels, and particularly that of gaseous fuel, are useful summaries, and the chapters on steam-raising and on lubricants contain a considerable amount of practical information. These sections will be of value in enabling an owner of machinery or user of power to detect causes of waste, and to realise when saving may be effected by calling in expert assistance.

The part devoted to metallurgy is much less satisfactory. It is evident that, as the attempt has been made to compress an account of the whole art into 104 pages, only the barest outlines of the various processes could be given. Among the unfortunate results of this are that the Patio process for extracting silver from its ores, and the cyanide process for extracting gold, are each dismissed in half a page, though in these cases the chemical actions are complicated and the mechanical arrangements of secondary importance. Such paragraphs serve no useful purpose. There are more mistakes in this part than should have been allowed to creep in, this constituting another point of difference between the two parts. For example, in describing the wet process of copper extraction, the reason for preventing the temperature from rising much above 38° C. is incorrectly stated, the true

reason being that the production of ferric salts is favoured by higher temperatures; moreover, a little-used method of keeping down the percentage of ferric salts in the solution is given, while no allusion is made to the ordinary one, viz. the passage of the liquid through a layer of cupriforous pyrites, rich in copper. Again, on p. 214, sulphurous acid is given as one of the agents used to precipitate gold from the solutions obtained in the chlorination process, the fact being that it is only employed to prepare solutions for the passage of sulphuretted hydrogen, which is not mentioned. It may be a hard saying, but there is little doubt that the whole book would have been improved if the part on metallurgy had been left out. Space could then have been found to expand here and there the first part, which, excellent as it is, might thus have been made still more useful.

OUR BOOK SHELF.

Elementary Practical Physics. By William Watson, B.Sc. (London: Longmans, Green, and Co., 1896.)

Elementary Practical Chemistry. By G. S. Newth, F.I.C. (London: Longmans, Green, and Co., 1896.)

WE have long deplored the unfortunate division between theoretical and practical chemistry in many schools and classes, and have been convinced that, alike for educational and utilitarian purposes, physics was a neglected instrument; therefore, very heartily do we welcome the new movement of which these books are a manifestation.

Each volume is described on its title-page as a "laboratory manual for use in organised science schools." Each is written to the new syllabus of the South Kensington Science and Art Department, and each gives excellent directions for setting up (and often for constructing) apparatus, and for taking observations to demonstrate the chief phenomena, and to verify the fundamental laws, of chemistry and physics respectively. In the physics we are glad to see that nearly all the experiments are of a quantitative character; in the chemistry this is far less often the case, partly owing, doubtless, to the nature of the subject. In both works the experiments are judiciously chosen, carefully described, and well illustrated, and in many cases strikingly original.

One criticism of principle may be made. Mr. Newth says: "In a text-book it is almost inevitable that in giving such directions as will lead a student on to the discovery of a fact, the fact itself shall be stated." He may be right in this; but if so, it appears to afford an argument against the use of such text-books in the laboratory at all, for, speaking generally, the most valuable exercise of all for the student is the study of his recorded observations, and the endeavour to deduce therefrom the property or law they demonstrate. Is not the getting up of a proposition of Euclid a smaller intellectual feat than the solution of a "rider"?

Especially does this principle of research appear to be applicable to the laws of elementary physics; but Mr. Watson apparently endorses Mr. Newth's view.

With this reservation, we cordially recommend both these volumes to the notice of teachers of elementary science. From the point of view taken, the work has been well done in both cases, and the books reflect credit alike on authors and publishers.

C. H. D.

A Text-Book of the Science and Art of Bread-Making. By William Jago, F.I.C., F.C.S. Pp. 618. (London: Simpkin, Marshall, Hamilton, Kent, and Co., 1895.)

THE practical application of science to the arts and trades has been one of the most notable features of the present century, with the almost universal result of