

of discovery, name of discoverer, and condition of occurrence in nature.

The volume under review is full of illustrations, and the fine plates in it are marvellous specimens of colour-printing. Among the full-page coloured plates is one of gems and precious stones, and another of birds. A third plate of special interest is a splendid monochrome in which a number of ancient coins are grouped. When the work is completed it will contain nearly five thousand illustrations, all especially drawn for it. Each picture has been drawn so as to help to define a word, and the object of the plates is to facilitate comparison.

Whether the dictionary will, in course of time, "be accepted as the standard by all who use the English language," may be doubted. Many years will pass before we spell honour without the *u*, and sulphur has evolved into sulfur. But, putting these differences of spelling aside, we have no hesitation in saying that, in point of accuracy, the dictionary will compare favourably with any similar compilation extant, while for comprehensiveness combined with handiness, it is as good a work as could be desired. Everything has been done to facilitate the finding of words and to make the definitions trustworthy when found. It passes the wit of man to suggest anything which ought to have been done that has not been done to make the dictionary a success.

#### OUR BOOK SHELF.

*An Introduction to the Study of Metallurgy.* By Prof. W. C. Roberts-Austen, C.B., F.R.S. Third edition. (London: Charles Griffin and Co., 1894.)

THE part metallurgy has played in the industrial progress and material prosperity of our country is so great, that we hail with pleasure the appearance of this enlarged edition of Prof. Roberts-Austen's book, in which all that is important for a sound knowledge of the principles on which metallurgy is based is set forth with remarkable lucidity and ability.

The issue of this edition marks, in fact, an epoch in metallurgical teaching.

Its especial value lies, not in mere descriptions of the processes and appliances of metallurgy, but in the admirable systematic course of study laid down for the student in the fundamental scientific principles on which the appliances used in metallurgy are constructed, its processes based, and the character of their products determined. Without a clear understanding of these principles, it is needless to say, no knowledge of mere practical details, however extensive, can be of any value in enabling the metallurgist to cope successfully with the difficult problems which often confront him both in furnace and laboratory operations.

The elaborate researches of the author in the "thermal treatment of metals" and "thermal measurements" is a sufficient guarantee that these subjects will be treated in a manner worthy of their importance. (Chaps. iv. and v.)

Chapter ix., a special feature of this edition of the book, is a masterly compendium of the facts, principles, theories and laws of thermo-chemistry, and the importance of a correct application of these to the practical work of metallurgy is wisely insisted on. In other textbooks and treatises the laws of stoichiometry have been chiefly relied on for the guidance of the metallurgist in interpreting and controlling the reactions which take

place under the complex conditions which present themselves in furnace operations, and it has long been felt that the results of many of these operations could only be imperfectly explained or predicted by these laws. In this chapter metallurgists are clearly shown that they "have no longer merely to deal with atoms and molecules, but with the influence of mass," and that if they are to advance their industrial practice "they must think in calorics, and not merely employ the ordinary atomic tools of thought." They will then be able to suggest what reactions can take place under given conditions, to indicate those which will be completed, and to avoid those which are impracticable.

Thus far we have mainly considered those chapters of the book which deal with the fundamental principles of scientific metallurgy, but the whole work is of the greatest interest, and deserves the careful and earnest study of all who are interested in the scientific advances which have been made in metallurgy during recent times. It is, in fact, indispensable not only to students, but to all metallurgists.

W. GOWLAND.

*Structural Botany (Flowering Plants).* By Dukinfield Henry Scott, M.A., Ph.D., F.L.S., F.G.S. With 113 Figures. (London: A. and C. Black, 1894.)

AN introduction to the study of structural botany has long been a desideratum in this country, where we have hitherto been compelled to refer the beginner either to works in foreign languages, or to such help as he may glean from lecture courses. Dr. Scott's little book supplies this need in a most admirable manner, and he has thoroughly earned the gratitude both of teacher and student alike for the freshness and clearness with which he has presented his subject. We notice with satisfaction that, amongst many other good points, there is an intelligible account given of the transition of the structure of the root to that of the stem, a matter concerning which there exists a great deal of needless ignorance and misapprehension in the minds of many students. Another excellent character of the work lies in the large number of new figures which it contains, an example which might with advantage be followed by other writers, for it is really not easy to see why the older illustrations should be regarded with such superstitious (or is it indolent?) veneration, especially when this practice leads to the exclusion of new figures, as is not unfrequently the case.

We can only hope that Dr. Scott will speedily fulfil the promise hinted at in his preface, and provide, before long, a second volume dealing with the cryptogams.

*The Lowell Lectures on the Ascent of Man.* By Henry Drummond. (London: Hodder and Stoughton, 1894.)

MR. DRUMMOND is well known as a brilliant and enthusiastic writer, and his latest book will be welcomed by a wide circle of admirers. He approaches the study of nature and evolution with the sympathetic eye of a moral teacher who is possessed by a praiseworthy desire to find wholesome and ennobling lessons therein. In this he is successful. He has, however, a further purpose, that of setting biologists right in matters of biology. In this he is scarcely so successful. "Evolution," he tells us in his preface, "was given to the modern world out of focus, was first seen by it out of focus, and has remained out of focus to the present hour." The focus is adjusted in "The Ascent of Man." We must, however, leave those of our readers who can spare an hour or two for the perusal of the well-printed volume, to see how far Mr. Drummond aids them in acquiring a more definite and accurate conception of evolution. They will, we feel sure, be impressed with his eloquence and earnestness.