

remarks which are often found to explain away or totally alter the meaning of the text.

As it is, we would emphasise the prefatory remark of the Editor, that "the Appendix has come to be an important feature" of the book, and is to be especially recommended to the notice of the reader. The student who will judiciously introduce the new material in this appendix into the older structure in the text will be afforded a tolerably clear insight into the present standpoint of vegetable morphology.

Book II. forms the largest third of the volume, and from a purely critical point of view, was the least satisfactory portion of the original. No doubt it was by far the most difficult portion to condense into any reasonable compass, and it bristled with unknown quantities and controverted points, and indeed it may well be doubted if the immense subject of "General Morphology and Outlines of Classification" could be fairly well mastered by any one botanist. That the editor has added a great deal of new material—no doubt assisted by some whose criticisms and suggestions he gratefully acknowledges—is, on the face of this second book, abundantly clear. That a good deal might have been still added is also, on a little examination, made apparent. Detailed criticism on this portion of the volume would be here to a large extent out of place, and serve no good end, but as a justification of these remarks we would observe that among the very first forms alluded to—the Protophyta arranged under the Cyanophyceæ—of which the Nostocaceæ form a highly interesting group—the description of the formation of the Nostæ filament, though amended, as noted within brackets, is, despite the warning of Bornet, founded on a misconception of Thuret's account. In a footnote, too, we read that Archer has described the occurrence of spores in *Nostoc paludosum*, as if this were something novel, but their appearance in many species has not only been known to but made even a factor in their classification by Bornet. It seems inexplicable to us why this distinguished author's works should be so little known to English writers, but so it is, and on turning over page 247 to see what would be said about the Rivulariaceæ—the Scytonemaceæ—we felt disappointed at not finding even a reference to show the student how much has been done by Bornet in recent years to add to our knowledge of these groups. To these remarks we will only add that the large and important groups of Palmellaceæ are dismissed in a paragraph of ten lines. In order that these remarks may not be mistaken, we may observe that we did not expect to find more than a sketch of the natural history of the forms to be found in these groups lying at the base of chlorophyllaceous life, but we did expect that what was narrated of these would be exact, and that a reference to the latest literature of the subject would be given. It would be easy, at least among the Thallophytes, to extend these criticisms. Such an excessively interesting algal form as Pithophora is nowhere alluded to, though its first birth-place seems to have been our Royal Gardens at Kew. Wittrock's paper on this form was fully as important as his on Mesocarpeæ. Nor is the student referred under Fucoidæ to the splendidly illustrated work on the group by Thuret and Bornet; but criticism is not our object, and we gladly pass from the notice of

Book II. to notice Book III., from which, knowing the excellent work done by the Editor in vegetable physiology, we expected great things, nor have we been disappointed. It seems to us an excellent account of vegetable physiology, with all or most of all the modern discoveries alluded to, and we know of no compendium on the subject at all approaching to it.

Should in another four years this second English edition be sold out, let us hope that Mr. Vines will, like its author, cease trying to mend the old garment, but will of his own energy and knowledge give us an Introduction to the Study of Botany, which we doubt not would be worthy of appearing as one of the Clarendon Press Series, and which will wipe away the reproach, true to this of physiological botany as of the drama, that we are forced to fly with all too borrowed plumes.

E. P. WRIGHT

#### RECENT ELECTRICAL PUBLICATIONS

*Electricity.* By Robert M. Ferguson, Ph.D., F.R.S.E., of the Edinburgh Institute. New Edition, revised and extended by James Blyth, M.A., F.R.S.E., Professor of Math. and Nat. Phil. in Anderson's College, Glasgow. (London and Edinburgh: W. and R. Chambers, 1882.)

*Electric Illumination.* By Conrad Cooke, James Dredge, M. F. O'Reilly, S. P. Thompson, and H. Vivarez. Edited by James Dredge. Chiefly compiled from *Engineering*. With Abstracts of Specifications, prepared by W. Lloyd Wise. Vol. I. (London: Office of *Engineering*, 1882.)

PROFESSOR BLYTH has done good service by the judicious additions which have to a great extent revived Dr. Ferguson's well-known little manual, and brought it up to the level of the times.

The actual progress in electrical science since the original book appeared has not been anything extraordinary, but the amount of it which the public are willing to learn has undergone a prodigious increase, and the modern text-book is therefore expected to enter into details about a number of matters which a few years ago would have been scouted as altogether too difficult. It is these semi-advanced portions which Prof. Blyth has incorporated with the old stock of the work, the stock remaining about the same. There was very little to which one could object in the original; if it erred, it erred as a rule only by omission. In the new edition, however, we have information, and though concise it is mostly good and reliable information very intelligibly expressed, concerning Sir Wm. Thomson's electrometers, mariner's compass, and thermo-electric discoveries, also concerning electrostatic and electromagnetic induction, and other matters which had been but very lightly glanced at in the original edition. It also refers to Mr. Crooke's experiments, Mr. Spottiswoode's coil, Prof. Tait's thermo-electric diagram, and Dr. Kerr's discoveries. The operation of making a text-book may be compared to the operation of skimming, and the depth to which this operation may be safely carried depends, we suppose, mainly on the taste of the public at the time. Prof. Blyth has added to Dr. Ferguson's original skim a slightly deeper and more substantial layer; and fortunately neither of the authors have

forgotten the very important preliminary operation of blowing aside the froth and scum which accumulates on long standing, and which an injudicious skimmer is very apt to obtain and exhibit as his sole result.

The book appears almost contemporaneously with Prof. S. P. Thompson's little work on the same subject, which we noticed some months back, and may be taken as complementary to it. Although both are of the same scope, yet the area open to them was so wide that it seldom happens that they both contain equally full information on precisely the same subjects.

The second volume which we here notice, viz. the compilation entitled "Electric Illumination," is of very different appearance and scope. It is a handsome large octavo, well printed, and with admirable illustrations. It is not addressed to students, but to engineers and practical men, and it is a most useful summary of notices which have appeared in the pages of *Engineering*, concerning dynamo machines, electric lamps, and the other paraphernalia connected with the practical applications of electricity. It aims, of course, more at completeness than at judicious selection; and it therefore naturally includes a number of contrivances which are hardly likely to come into any notorious existence.

While it is very useful as a book of reference, therefore it is scarcely calculated for ordinary reading, the style of the descriptions being not seldom tiresome, and giving one the usual dismal feeling of "letterpress" written up to a picture. Some of the sections are very full, as for instance that relating to the manufacture of Jablochkoff candles, where the account is so complete that the usual form of the Wheatstone bridge is depicted and carefully explained as if it were a specialty of the Jablochkoff system: while some other sections are distinctly meagre. At the same time it is only natural that some kinds of information should be easier of access than others, and that all that came to hand should be utilised. At the beginning of the book we have a sketch of the early history of dynamo machines, several admirable sketches of lines of force, and a very clear elementary exposition of the principles of magnetic induction. There are also very excellent and instructive skeleton figures of the Gramme and Siemens armatures, as designed by the late Antoine Breguet, though the writer of the article rather absurdly seems to take them as embodying researches which throw a new light on the action of the machines, instead of as useful and interesting illustrations of what was perfectly clear to every physicist.

Throughout the book, in fact, one comes across various curious statements, which, if read hypercritically and pressed, would be either annoying or misleading; but still more frequently one is in the presence of a cautious vagueness which conceals the want of exact knowledge by the turning of a phrase, and one notices a laudable desire to avoid the ascription of either praise or blame and to take the odiousness out of all comparisons.

But to say that some of the writers are often only half acquainted with their subject, and that they accordingly take precautions to avoid mistakes, is only to say that the book belongs to modern periodical literature; to that kind of literature, namely, which is written and read with the tacit understanding on both sides that in a few years at most it is sure to be out of date and forgotten, and that

accordingly any serious labour expended on either its production or its assimilation would be labour misspent.

Taken for what it is, however, it is difficult to imagine a more complete and handy publication of information for which at the present time there is a great demand, and the book will be welcomed by all who take an interest, professional or otherwise, in those applications of electricity which are now so evidently imminent, and which must ultimately assume such vast proportions.

O. J. L.

### OUR BOOK SHELF

*Introductory Treatise on Rigid Dynamics.* By W. Steadman Aldis, M.A. (London: G. Bell and Sons, 1882.)

THIS little work is truly characterised by its above title. The portions of the subject selected by the author will be best indicated by the headings of the several chapters. An introductory chapter on kinematics is followed by one on D'Alembert's principle: general equations of motion of a rigid body; impulsive forces. Chapter iii. treats of moments and products of inertia; Chapter iv. of motion round a fixed axis (centres of suspension, oscillation, and of percussion); Chapter v. of motion of a body with one point fixed; and Chapter vi. of the motion of a free body. Chapter vii. discusses certain general principles, as conservation of linear momentum, of moment of momentum, and of energy. In Chapter viii. miscellaneous problems are investigated, as of moving axes, initial motions, small oscillations, and "tendency to break." As might have been expected from so accomplished a teacher, the exposition of the general principles is most clear, and these principles are fully illustrated by a capital selection of exercises, many of which are solved, and for the solution of many others hints are given at the end. We know of no better introduction to this difficult branch of study. The text is most carefully printed.

*Encyklopädie der Naturwissenschaften.* Herausgegeben von Prof. Dr. G. Jäger (and seven other gentlemen). Erste Abtheilung (Parts 16, 19, 20, 22, 24, 26, 27). (Breslau: E. Trewendt, 1880, 1881.)

THESE seven numbers form parts 6 to 12, *i.e.* the second volume of a "Handbuch der Mathematik," edited by Dr. Schlömilch, the several treatises being written by Dr. R. Heger, Professor at Dresden. The pagination is continuous (1-963 pp.), and there are 235 woodcuts.

The first treatise is on "Analytical Plane Geometry" (pp. 1-194). The first 164 pages are devoted to the conic sections: the mode of treatment, or rather the order of arrangement of propositions, is different from that of any English text-book with which we are acquainted, but approximates most closely to that of Dr. Salmon's classical work. It is a full, able, and interesting presentment of the properties of these curves. The remaining thirty pages are devoted to a rapid sketch of the principal known properties of curves of the third order, in which are embodied most, if not all, of the results of modern research.

The second treatise is on "Analytical Geometry of Three Dimensions" (pp. 195-380); the third is on the "Differential Calculus" (pp. 381-568); and the last is on the "Integral Calculus" (pp. 569-902).

This last work is broken up into three parts, of which the second treats of elliptic functions, the theta functions, and of elliptic integrals; the third is devoted to differential equations.

There are two smaller works, one (pp. 903-928) on the method of least squares (Ausgleichungs-rechnung), and the other (pp. 929-957) on insurances (Renten-, Lebens-, und Aussteuer Versicherung). A list of works on the different subjects treated of in the "Handbook" is given