

hopelessly into totally unnecessary integration, in order to get back to the professorial logarithm.

The nomenclature of photometrical quantities is dismissed in a few lines with the very true remark that "the tendency toward particular nomenclature of physical quantities has been carried to a burdensome excess in many cases, until it has assumed the nature of scientific fetichism." "The attempts" of Hospitalier are alluded to, but the author has paid so little attention to the matter that he falls into sad confusion in the use of the expression "illumination." The word is used in half a dozen senses—as a sensation, as a flux, as a quantity of light, and so on. It is true that the "lux" of Preece or Hospitalier are no guide, but the "carcel-metre" or the unscientific "candle-foot," when once understood, leave not the slightest ambiguity about the meaning of "illumination."

The chapter on standards of light is excellent, but the table of comparisons of standards, taken from Laporte, does not include the British candle. Only two items out of a dozen appear to agree with the more complete table of Palaz. The British candle, with all the refinements of the gas referees, is not a unit which does credit to physical science, but it is at least as definitely known, reproducible and measurable as any other standard of light.

The arrangement, illustrations and index are good; the spelling is English.

A. P. T.

#### OUR BOOK SHELF.

*The Nature and Work of Plants: an Introduction to the Study of Botany.* By D. T. MacDougal, Ph.D., Director of the Laboratories, New York Botanic Garden. Pp. xvii + 218. (New York: The Macmillan Co. London: Macmillan and Co., Ltd., 1900.)

THIS is a bright and readable little volume, in which plants are treated of mainly from a natural history and physiological point of view. It deserves to be successful, if only as showing that it is possible to gain a fairly considerable, and certainly intelligent, insight into the ways of plants, and that without first mastering the mass of technical detail which too often renders elementary books on botany so repulsive to beginners.

The author commences with a general account of the materials of which plants are composed, and of the structures of which they are built up, the student being led to investigate for himself the different facts and principles enunciated. The phenomena of reproduction, irritability and the like are introduced as objects of observation, and in such a way as to arouse, rather than by satiating to quench, curiosity. The seed and fruit are more fully dealt with, as they afford examples in which adaptations to special purposes can be made out with some degree of clearness, and their individual peculiarities are well explained. If one feels some doubt as to the wisdom of selecting the coconut as an introductory example of a fruit, one cannot complain of the mode in which its structure is treated. The very interesting case of *Xanthium*, in which two fruits are contained in a common sheath, one seed of which germinates in one year whilst its fellow remains dormant till the following season, will probably be new to some readers on this side the Atlantic.

A short chapter on plant societies closes the volume, which may be warmly commended as one likely to excite an interest in many people who fancy that the acquirement of a more or less complicated vocabulary is an essential preliminary to a scientific study of plants.

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Naturally, the book is not without its faults. Some of these seem to be those of carelessness, of which there is an example on p. 11 in the implication that a dried plant consists of charcoal (!) and ash. But these defects are not numerous, and do not seriously affect the general excellence of the book.

*Practical Coal Mining.* By George L. Kerr. Pp. x + 462. (London: Charles Griffin and Company, Ltd., 1900.)

IN the vigorous outburst of technical literature that the last few years have witnessed, the subject of mining has not been forgotten, and the student of this subject has his choice of a fair number of works of a high degree of merit, amongst which those published by Messrs. Griffin and Co. take foremost rank. It was therefore to be expected that a new book on coal mining, issued by these same publishers, ought to surpass anything previously written on this subject, or at any rate to present features of especial importance. It is to be regretted that these anticipations have been very far from being realised, and, indeed, that it is difficult to discover anything in the work now under review that justifies its publication. It is very largely made up of extracts from the works already referred to, as well as from others, nor are these extracts by any means the worst part of the book. The author's style is far from clear, and many passages might be quoted that would be quite unintelligible to any one who was not acquainted beforehand with the subject-matter; this obscurity of languages often merges into inaccuracy and want of precision—the latter fault being one of the most dangerous that could well be found in a book intended to be placed in the hands of a student. A couple of examples of this fault may be cited: on p. 3 the author writes that "the line at right angles to the direction of 'dip' is called the 'strike,'" a definition that is not true unless qualified by the statement that the line referred to is a line within the bed; it is obvious that there may be an infinite number of lines at right angles to the direction of dip, but only one of these is the strike. Again, on p. 326, we find the following: "When two shafts are sunk and connected by a passage, and the density (weight) of air in the two shafts is equal, no current of air will circulate, no matter what their respective sizes may be." This, again, is only true if it be postulated that both shafts are of precisely the same depth, otherwise an air current may circulate.

The author is weak whenever he touches upon scientific ground; he uses mechanical formulas without apparently appreciating their limitations, as, for instance, when he applies formulas for the bending of columns, ignoring the fact that these are only applicable within the elastic limit. Similarly, his mechanical conceptions of the work done by the winding engine (p. 221) are incorrect. That his chemistry is not much more satisfactory may be judged from the occurrence of such phrases as "glycerine nitrate" for nitro-glycerine, &c.

The best chapter in the book is that on "Modes of Working," the methods of coal-getting in use in Scotland being well described. Indeed, had Mr. Kerr confined himself to a small book describing merely those points in which Scotch practice differs from the English, notably in shaft-sinking, coal-getting and haulage, he would have produced a contribution of distinct value to the literature of coal mining, a phrase that can, unfortunately, not be applied to his present more ambitious attempt.

H. LOUIS.

*Bookkeeping for Business Men.* By J. Thornton and S. W. Thornton. Pp. vi + 185. (London: Macmillan and Co., Ltd., 1900.) Price 3s. 6d.

BOOKKEEPING is only the application of common-sense principles to the classification and systemisation of accounts. Its purpose is to show how the financial facts of a business may be expressed in the clearest and shortest