regard and esteem of all true friends of Science; he belongs to the same metal that has already formed a wedge which will force open the secrets of inner Africa.

OUR BOOK SHELF

Adulterations of Food, with short Processes for their Detection. By Rowland J. Atcherly, Ph.D., F.C.S. (London: W. Isbister & Co., 56, Ludgate Hill, 1874.)

THE attempt to notice the adulterations of food in 100 pages of large type is a somewhat rash one, and it is not therefore surprising that the author of the treatise is frequently compelled to dismiss his subject in a very cursory manner.

For two of the classes of readers whom he addresses, the dealer and consumer, the work will no doubt be of use, and it is also likely to be useful to the chemist, as affording him a brief conspectus of the most likely adulterants in any particular article. Of what use, however, the last 12 pages of letterpress describing the making and use of volumetric solution are to the "trained chemist," to whom the author addresses them, we are at a loss to conceive.

The information given in the part upon adulterations is generally sound, though the statement on p. 34 that prussic acid is found when nitro-benzol has been used as a flavouring is absurd; so far is this from being the case, that it would be an indication of the use of a genuine but insufficiently purified oil of bitter almonds. The process for detecting alum in bread on p. 15 is also very unsatisfactory, and certainly not adapted for the use of either dealer or consumer. The book concludes with 21 neatly executed cuts of various starches, chicory, cocoa, tea-leaves and adulterating leaves found in tea, &c., as seen under the microscope. In conclusion, we would advise the author in a future edition to considerably expand the part on adulteration and to entirely omit the part intended for the "trained chemist," leaving that person to obtain his information on volumetric solutions from the proper sources. R. J. F.

An Easy Introduction to Chemistry. Edited by the Rev. Arthur Rigg, M.A., late Principal of the College, Chester. (Rivingtons: London, Oxford, and Cambridge, 1873.)

THE present work, founded, as the editor states, on a "First Book of Chemistry," by Dr. Worthington Hooker, published in America, is intended for the use of children. Mr. Rigg calls attention to the inquiries of "young persons" as generally suggested by their observations of things touched and handled, and states that his aim has been "To supply information in a form which it is hoped may be intelligible and interesting to all parties concerned in thus learning to read the ever open book of nature."

The intention is a worthy one, and we have no doubt that the work will serve its purpose in instructing some of its readers, though we doubt if it will prove very intelligible for "persons" so young as those to whom the style of its commencement would seem to prescribe its use. We do not say this with any desire to find fault, for it would indeed be difficult to place the information in a simpler form than has been done, but because of the great difficulty of convincing young minds of the alterability of matter. Either talking or reading alone is quite incompetent to do this. Without experimental illustration they are utterly meaningless except to well-advanced intellects, and even there cannot do much, as anyone can tell who has had the honour of meeting the chemist whose knowledge extends not beyond books. In fact, chemistry is not to be taught without the laboratory and its experiments, and Mr. Rigg has shown his sense of their importance by the insertion of 46 beautifully-executed woodcuts of experiments and a frontispiece of a laboratory with its apparatus and fittings.

Excepting in a school, however, the "young persons" of the preface are not likely to meet with the actual experiments of which illustrations are supplied, and those that are of sufficient age to go to such a school might surely have a rather more advanced book placed in their hands. The question, however, which a reviewer ought to ask himself is, Is the book such a one as would fairly carry out the author's intention? and to this we must, in this case, answer "Yes." Granting the possibility of teaching chemistry to young children, Mr. Rigg's book would certainly serve its purpose well. With regard to his facts, Mr. Rigg is, as a rule, sound; but we must demur to his statement on p. 134, that "If (silica) is to these (grasses and grain) and other plants very much what bones are to animals;" and again, on p. 167, "Every stalk of grain or grass is chiefly wood. In both cases fine particles of flint are scattered in the wood to make it firm enough to stand even in a gale of wind." The experiments of Sachs and others have long since disproved this theory. Such blemishes as these are, however, of but little moment when the main principles of the science are the object of teaching, and on these Mr. Rigg is perfectly orthodox. We must, in conclusion, compliment the publishers on the very elegant get-up of the book.

Die Rohstoffe des Pflanzenreiches: Versuch einer technischen Rohstofflehre des Pflanzenreiches. Von Dr. Julius Wiesner. (Leipzig: Engelmann, 1873. London: Williams and Norgate.)

THIS is one of those elaborate German works which seem as if they were intended completely to exhaust the subject of which they treat. Every substance of economical or technical importance which is obtained from the vegetable kingdom is treated of in detail from the point of view of its practical utility rather than its physiological history; its chemical, mechanical, and microscopical properties, the mode of its preparation or manufacture, and its utility in the arts or commerce, are described. The book is, in fact, a repertorium of technical botany.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

On a Proposed Statistical Scale

AT a lecture last Friday evening, at the Royal Institution, I spoke on a subject which happens to lie at the meeting-point of many special sciences, and therefore, as I am desirous of having it well discussed, and from many points of view, it seems to me best to state it afresh in your columns for that purpose. It refers to the *definition* of the estimated *degree of development* of any quality whatever, without reference to external standards of measurement. The scale I propose depends on two processes; the one is securely based on the law of statistical constancy, the other is doubtfully based on the law of frequency of error. (1) At present we are accustomed to deal with averages and the like, which can only be obtained by measuring *every* individual by a *detached standard scale*, and going through an arithmetical process afterwards. Now I want to deal with cases for which no external standard exists, and I propose to proceed in quite another way, on the principle that *intercomparison* suffices to define. We have only to range our group in a long series, beginning with the biggest and ending with the smallest; and then we know by the law of statistical constancy that the individual who occupies the half-way point, or any other fractional position of the entire length, will be of the same size as the individual who occupies a similar position in any other statistical group of similar objects. We state his size with statistical precision by saying that his place is so and so in a series. We appeal to a standard which lies dormant in every group, and which a statistician can evoke, for temporary purposes of comparison, whenever he will. (2) What places in the