

description of the feet and legs of the horse, and the nature and causes of certain common ailments are indicated. The last two chapters, dealing with reproduction, are the best in the book. In addition to giving in a small compass and in an easily understood form all that is known of practical importance, they contain many suggestions that should be of great value to the breeder. A chapter on heredity would have added to the value of the book.

The other parts of the subject are dealt with more briefly, yet in sufficient detail to give the student of agriculture a working knowledge of the subject for all practical purposes.

In a few instances too little attention has been given to recent literature. The use of the term "amides" as covering the non-protein nitrogenous substance of feeding-stuffs is unfortunate. Although the term was used in this sense by certain of the older writers, it is no longer appropriate, since it is now known that the greater part of the non-protein nitrogenous substances consist of amino-acids, which, instead of being "of little importance as constituents of food," are as valuable as protein. The views put forward with regard to the metabolism of creatine and creatinine, which are largely those advanced by Mellanby some years ago, take no account of the work that has been done during the past ten or fifteen years. There is now no doubt that muscle, and not liver, is the chief seat of metabolism of both creatine and creatinine, and there is no experimental evidence in support of the view that creatine is formed from creatinine. The statement that creatine is found in the urine only in pathological conditions is scarcely correct, at least for farm animals. Creatine is found in the urine of the fowl, where it replaces creatinine, and it is a normal constituent of the urine of ruminants.

These, however, are points of minor importance so far as the student of agriculture is concerned. They are likely to be treated more fully in the second volume dealing with nutrition.

Chemical Text-books.

- (1) *Laboratory Manual of Elementary Colloid Chemistry.* By Emil Hatschek. Pp. 135. (London: J. and A. Churchill, 1920.) Price 6s. 6d.
- (2) *Chemistry for Public Health Students.* By E. Gabriel Jones. Pp. ix+244. (London: Methuen and Co., Ltd., 1920.) Price 6s. net.
- (3) *Elementary Practical Chemistry. For Medical and other Students.* By Dr. J. E. Myers and J. B. Firth. Second edition, revised. (Griffin's Scientific Text-books.) Pp. viii+194. (London: NO. 2649, VOL. 105]

Charles Griffin and Co., Ltd., 1920.) Price 4s. 6d.

- (4) *Qualitative Analysis in Theory and Practice.* By Prof. P. W. Robertson and D. H. Burleigh. Pp. 63. (London: Edward Arnold, 1920.) Price 4s. 6d. net.
- (5) *Practical Science for Girls: As Applied to Domestic Subjects.* By Evelyn E. Jardine. Pp. xiii+112. (London: Methuen and Co., Ltd., 1920.) Price 3s.
- (6) *Acids, Alkalis, and Salts.* By G. H. J. Adlam. (Pitman's Common Commodities and Industries.) Pp. ix+112. (London: Sir Isaac Pitman and Sons, Ltd., n.d.) Price 2s. 6d. net.

(1) **G**RAHAM'S pioneer work on colloids is bearing rich fruit to-day, and colloid chemistry is becoming more and more important in theory and in practice. There are, of course, several text-books dealing with the subject generally, and giving descriptions of methods used in preparing colloidal substances. Mr. Hatschek himself is known as the author of one of these, and as the annotator of another, besides being the writer of a notable series of articles on colloids. There is, however, no laboratory manual similar to the present work. To expound the theory of the matter, lectures are good things, and books necessary; but the laboratory remains always the "forecourt of the temple" of colloid philosophy; it is only there that the student gains real familiarity with the characteristic properties of colloidal substances. And in the laboratory a well-devised series of practical exercises is invaluable for economising the worker's time, sparing his temper, and leading him to good results. The author's aim has therefore been to give "accurate and very detailed" directions for carrying out the fundamental operations. He is qualified to write a manual based upon personal experience of the special difficulties met with in the practice of this branch of chemistry, and he has done it very well. Both students and teachers have reason to be grateful to him.

(2) This, also, is essentially a laboratory guide. It is intended for students reading for the diploma in public health, and is therefore concerned generally with foodstuffs, water, alcoholic beverages, sewage effluents, air, and disinfectants. After two introductory chapters explaining the principles of gravimetric and volumetric analysis, the important foodstuffs milk, butter, and margarine are dealt with. Facts as to the chemical composition of these are given, and the legal enactments relating to the sale of them, together with the usual methods of analysis adopted. Then follow chapters on the other articles mentioned. Naturally in a book of only 240 pages some of the subjects

cannot be treated very fully. The information given, however, is accurate, and, whilst the book is readable, it is by no means superficial. Indeed, for a work of its scope it is substantial, and the reviewer has formed a very favourable opinion of it. One of the best sections is the chapter on air, but all are good. A number of examination questions are included.

(3) Dr. Myers and Mr. Firth's little book has become favourably known as a convenient introductory work on practical chemistry. The ground covered is elementary qualitative and quantitative analysis, including an outline of simple gas analysis, with methods for making "preparations" and for identifying the commoner organic compounds. It gives the requisite information concisely, and can be recommended as a suitable initiatory book for medical and pharmaceutical students.

(4) Messrs. Robertson and Burleigh's book is of a more advanced type than the foregoing. It treats of qualitative analysis only, but aims at giving the student a thorough grounding in this subject. The authors rightly hold that qualitative chemical analysis, intelligently taught, is of great value in laying a good foundation for a knowledge of the general chemistry of the metals and in illustrating the more important types of chemical reactions. Their method is to familiarise the student with these types (replacement, decomposition, oxidation, and reduction), and thus to enable him to see how they are applied to the problems of systematic analysis. They discard "dry" tests (apart from flame reactions) as being "tedious, often ambiguous, and misleading." They look with disfavour upon the practice of describing, in detail, with equations, the individual reactions of the metals. The practice, they contend, is "pernicious and demoralising"; and the student, in the end, "simply copies into his notes what he sees in his text-book." It is by no means clear why this should be so. Surely it is the part of a capable teacher to find out, by a few suitable questions, whether a student really understands what the equations signify? If this is done there appears to be no particular objection to describing the individual reactions, and such a course simplifies the work of explanation. But be that as it may, there is no doubt that the student who works intelligently through the book under notice should obtain a good grasp of the matter. The questions propounded at the end of the sections will search out his weak points.

(5) This little book contains instructions for performing a series of simple exercises in physics, chemistry, and bacteriology. As occasion offers, the principles under discussion are applied to, or

exemplified by, domestic subjects. Thus, having learned various methods of determining specific gravity, the student uses some of them to find the density of milk. In connection with thermometry she learns how to use a clinical thermometer. In the chemistry exercises she is taught how to make soap, how to remove stains from calico, and so on.

The exercises are carefully graduated, and, on the whole, are well calculated to stimulate the pupil's interest. Here and there the text needs a little revision. Thus the experiment (3) on p. 45 is meaningless as it stands. A weighed quantity of household "blue" is mixed with water, the mixture evaporated to dryness, and weighed. The student is then asked to state the percentage of "blue" dissolved! Again (p. 59), permanently "hard" water is directed to be made by dissolving *common salt* in distilled water. Then, after the naïve remark that "we have used salt because it is convenient," the pupil is taught how to "soften" (such) permanently hard water by means of washing-soda. These exercises should be revised; they do not bring out the essential fact that it is the soluble salts of calcium and magnesium, not those of sodium, that cause permanent hardness. "Of the nitrogenous foods there are protein, water, and salts" (p. 70) is a cryptic saying; and it is not the only one. The impression given is that the author occasionally gets a little out of her depth; but the book as a whole will be found quite useful and convenient.

(6) At first sight the title "Acids, Alkalis, and Salts" appears rather unattractive—except perhaps to the chemist, who knows these products already. Mr. Adlam, however, manages to make quite a readable little volume on the subject. Many valuable works will, alas! always and necessarily be classed with the "books that are no books," since they must give the dry bones of facts, and no space is available for investing these facts with even a bare minimum of literary covering. This book, however, aims at being not only instructive, but also interesting. Though starting with little or no knowledge of chemistry, the general reader will have no difficulty in understanding the text, and will find in it a store of information concerning the acids and alkalis which is none the less trustworthy because it is easily and pleasantly acquired. The book may, in fact, be looked upon as a simple introduction to the subject of industrial chemistry. Incidentally, it may help to prevent other people following the example of the man mentioned by the author, who took his son to the Royal School of Mines to "learn copper," and not to waste his time over other parts of chemistry, because "they would be of no use to him."

C. S.