

**ORGANIC CHEMISTRY FOR AGRICULTURAL STUDENTS.**

*Organic Agricultural Chemistry (The Chemistry of Plants and Animals)*. By Prof. J. S. Chamberlain. Pp. xvii+319. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1916.) Price 7s. net.

**T**HIS volume is intended to solve the difficult problem of providing a course in chemistry for students at agricultural colleges. By common consent the ideal plan is for the would-be agricultural chemist to go through the pure chemical course and take an honours degree. But many cannot do this; their training has to be carried out at the agricultural college, where chemistry as such is strictly subordinated to the matter in hand.

Prof. Chamberlain deals with the problems by picking out those substances that the student will come across in his agricultural studies, and then connecting them together by building up the course round them. Necessarily this prevents discussion of many problems of chemical interest; constitutions have to be taken on trust without even an indication of the way in which they have been established. The course, too, is necessarily altered, and many old friends disappear: the ketones are not mentioned; even acetone is not described.

But the book has to be judged by its suitability for the people for whom it was written, and from this point of view it is satisfactory. The ordinary simple substances are dealt with in sufficient detail, and the experiments are numerous enough to ensure that the student shall familiarise himself with them. Fats, sugars, starches, and proteins are discussed in a simple manner, and various interesting illustrations are given that show the bearing of chemistry on the problems of everyday experience.

The first section of the book having dealt with organic substances, the second is devoted to physiology, both of plants and of animals. It is unfortunate that the lecturer in agricultural chemistry is almost always called upon to teach these subjects, for it is obvious that no man can do justice to physiology when he has to bring it in simply as an "extra." Prof. Chamberlain has courageously introduced the chapters, and no doubt they will supply the teacher's needs. But throughout one has the feeling that agricultural chemistry ought not to be extended to include physiology.

The third section treats of crops, which undoubtedly belong to the subject. An account is given of the proximate and ultimate constituents of the ordinary crops, and of their value to both man and animals. The author classifies them on p. 150 as volatile and non-volatile, using "volatile" to include starch, cellulose, protein, etc., and "non-volatile" for the ash constituents. It would have been better to retain the old terms "organic" and "mineral," or something that does not involve calling cellulose a "volatile" substance.

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Several omissions call for remedy. In a book of this kind the student may reasonably expect to find the answers to the questions that arise in everyday practice. What, for instance, is the constituent in cotton-seed cake that has such a "binding" effect on cattle? or the substance in young grass that makes them scour? Why is May grass better than October grass? Why have mangolds to be stored some months before they can safely be used? These are the kind of questions about crops that are perpetually before the agricultural instructor in this country, and a similar variety of questions must be put by inquisitive farmers in the States; they represent the kind of problem that the text-book writer ought to face.

The book has several new features which seem decidedly useful. No space is lost in giving details of analytical methods which, as the author truly observes, can be got out of the analytical text-books. The detailed study of animal nutrition is taken before that of plants—a course which, in the author's experience, gives the student a clearer conception of the biochemical changes involved, and at the same time emphasises both the differences between plants and animals and their fundamental similarity.

No references to original papers are given, but there are references to larger text-books, so that the student seeking further information will know where to find it.

The book is, we believe, the only one of its kind. The well-known volume by Haas and Hill was written from the general biochemical point of view. Prof. Chamberlain is, so far as we know, the only recent chemist who has written organic chemistry for agricultural students. E. J. R.

**COLOUR.**

*Color and its Applications*. By M. Luckiesh. Pp. xii+357. (London: Constable and Co., Ltd., 1915.) Price 16s. net.

**I**T is always difficult, if not impossible, to separate the principles of a science from the applications of them, and the author has, perhaps wisely, not attempted to do so. On the other hand, while a student may be able to master the principles so far as they have been made clear, he can never hope to become practically acquainted with the innumerable applications of such a subject as colour. Therefore, we have here a very good account of the fundamentals, and a similarly good account of some of the applications, while other of the latter are treated in so limited a manner that it can scarcely be claimed that they are fairly presented. With these few exceptions, which indeed the author from his preface evidently appreciates, we have a very useful general treatise on colour which includes 130 well-selected diagrams, curves, and tables, so that for very many purposes the book will be found sufficient in itself. But at the end of every section references are given to other text-books and to original papers to facilitate a more extended study.

About three-fifths of the volume is devoted to