

not possess much knowledge of the theory of electricity. There is no attempt to give purely electrical explanations of the principles involved; instead, the author has made free use of a few well-chosen mechanical analogies, which are worked out in considerable detail.

The discussion of these mechanical vibration problems, with the help of torque-time and velocity-time curves, is a most attractive feature, of the greatest interest to students of physics and engineering.

Part ii. deals mainly with transmitting apparatus and develops the theories of the dynamo, transformer, coupled circuits, spark transmitters, and oscillation valves.

The treatment of these, though necessarily brief, is on the whole remarkably clear and accurate, and is illustrated by a large number of diagrams.

The section, about fifty pages, devoted to oscillation valves is very good indeed. These sensitive contrivances have almost revolutionised the art of wireless telegraphy during the past few years. Unfortunately, there is very little quantitative information given about them; a few more numbers would have been most welcome.

Scarcity of numerical illustrations is perhaps the chief defect of the book; the size of a piece of apparatus and the numerical values of its constants are rarely given. But this is not very serious, and we can warmly recommend the work as a trustworthy and stimulating introduction to the more elaborate treatises on radiotelegraphy.

*Field and Laboratory Studies of Crops: An Elementary Manual for Students of Agriculture.* By Prof. A. G. McCall. Pp. viii+133. (New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1916.) Price 3s. 6d. net.

THE object of this little book is to provide students of school age with practical exercises in the study of plant life. It is, as it were, a twentieth-century edition of the book of "Common Things" which bored the children of earlier generations. Unlike those forbidding compendiums, it seeks to lead children to a study of Nature through the avenue of experiment, and hence possesses a marked superiority over its early prototypes. Nevertheless, it has the fundamental defect of all those books which seek to evade the disciplinary grind which is the only passport into the world of science. Thus the student is supposed to learn how plants grow by marking corn roots with thread or waterproof ink, and he is advised to draw an entirely erroneous conclusion, namely, that sunlight is necessary for plant growth from an experiment in growing plants in the dark. Having performed the experiment, he is *told* about carbohydrates and is *told* about photosynthesis, on which things and phenomena the experiment throws but little and faint light.

If "agronomists" think that a knowledge of

the elements of plant physiology is useful to the budding agriculturist, it would be best to let him follow a simple but systematic course in that subject, and not to restrict him to a few odds and ends of experiments which serve for little else than occasions for providing "morals"—conclusions which may or may not follow from the experiments and statistics which, though valuable enough in themselves, have no legitimate relation with the experiment to which they purport to refer. For example (Exercise 9), the child digs up 5 lb. of clover or corn, and, having determined that, when exposed to the sun, it loses a considerable part of its weight, is informed that a field of oats uses 522 lb. of water for each pound of dry matter produced.

We fear that this attempt to get the child "rich quick" is doomed to failure, and we do not believe that even the American child will make much of a success of his garden by studying Exercise 50, on "Planning the Home Garden," pp. 122-24, or even by purchasing the apparatus required for the exercise—to wit, a 50-ft. tape and some plain drawing-paper. F. K.

*Dairy Farming.* By Prof. C. H. Eckles and Prof. G. F. Warren. Pp. xv+309. (New York: The Macmillan Co.; London: Macmillan and Co., Ltd., 1916.) Price 5s. net.

As was to be expected, the chapters dealing with the breeds of cattle, their selection, improvement, management, feeding, etc., have been written by Prof. Eckles, and follow the lines of his own book on that subject. He has also contributed a chapter on the common ailments of cattle, and one on milk and its products. Prof. Warren's contribution deals with the why and wherefore of dairying and dairy farming, and a great deal of information is given on matters which are not, as a rule, gone into very exhaustively by the average teacher in this country. Nevertheless, such information is of the greatest possible benefit in developing the mind of the future farmer and giving him an outlook which will carry him above rule-of-thumb methods.

This book is intended for teaching purposes, and there are questions and problems at the end of each chapter, also a list of books in some cases which may be read with advantage.

The modern farmer will find much that will interest him in this book, particularly in view of the changing conditions in our country at the present time, and there seems to be every reason why the value of the dairy cow as an economical producer of human food should be strongly pointed out to those already engaged in farming, as well as to those who are prospective farmers.

It is, however, chiefly as an aid to the teacher that this book is to be strongly recommended, and whilst the examples refer to American conditions, it ought to be possible to get similar data for British farms and utilise the information to the same ends.