

to some of the most highly complex structures found in organic Nature, the constitution of which has been elucidated in a masterly fashion by Willstätter and his associates.

One of the most interesting chapters in the book is that dealing with theories relating to the synthesis of vital products, the greater part of which, according to the author, has been elaborated by Prof. Collie. Here we enter the realm of speculation; indeed, so little is known of the laboratory methods of the living cell that free rein may be given to the chemical imagination. Enzyme action, of which, however, little of value is said, will probably furnish the key to organic synthesis and cleavage within the living organism, and, until that action has been more fully explained, there is no harm in manufacturing equations and mechanical devices to represent these changes.

One point, however, must be borne in mind—namely, that these changes must take place with comparatively small energy changes, so that the equilibrium may be easily induced to shift, and the balance of a reversible reaction thrown, to one or other side of the normal point; in short, vital reactions, if the expression may be used, must occur within a small range of temperature. In this respect such reactions as the synthesis of pyridine derivatives from malic and citric acids, which were studied many years ago by v. Pechmann and others, and the more recent work on the synthesis of tropinone by Robinson, have an unequivocal significance.

J. B. C.

OUR BOOKSHELF.

The Science and Practice of Manuring. For the Use of Amateur, Market, and Professional Growers, Orchardists, etc. By W. Dyke. With introduction by J. Wright. Revised and enlarged edition. Pp. 157. (London: The Lockwood Press (Harvey H. Mason), n.d.) Price 2s. net.

MR. DYKE is well known to horticulturists as a man with a strong scientific bent, and by those men of science who are interested in large-scale crop production he is recognised as possessing a considerable stock of problems still requiring solution. The scientific worker will, therefore, take up this book in the hope of finding a record of some of these observations. He will not be altogether disappointed, yet he will not find so much as he might hope; for Mr. Dyke, having written for the practical man and not for the plant physiologist, sets out some of the elementary scientific facts which he considers the grower needs, but he has not always recorded the growers' observations, which the scientific reader would like to have had, and which no doubt Mr. Dyke considered the practical grower did not need to be told.

Mr. Dyke knows his *clientèle* so well that he may safely be trusted to furnish a syllabus of the things they wish to know. To the horticultural lecturer this will be one of the most interesting features of the book.

The information given to the growers is largely sound and likely to be helpful. Some of the data might well be modernised, and a certain number of the figures need correction. In particular some of the statistics in the first chapter are inaccurate; some of the experimental data given in later chapters are old, and more modern figures are available. It is incorrect also to say, on p. 20, that agricultural chemists have "entirely overlooked" the possibility of the presence of ammonium nitrate in the soil. Large numbers of determinations have been made, but in no case is more than a trace of ammonia present either in cropped or uncropped soils. The amount of nitrate, however, may rise considerably. It is very doubtful whether the recommendation of ground leather is sound, and it is certain that a well-made superphosphate does not become wet and sticky, or lose soluble phosphate on keeping, at any rate so long as it is kept in a weather-proof shed.

The Life and Discoveries of Michael Faraday. By Dr. J. A. Crowther. ("Pioneers of Progress," Men of Science Series.) Pp. 72+portrait. (London: Society for Promoting Christian Knowledge, 1918.) Price 2s. net.

IN these days, when, by the loom of science, strange and terrible patterns have been woven on our national life, and novel and improved designs are demanded on every side, it is refreshing to turn again to the history of one of the greatest pioneers in scientific discovery and renew our spiritual friendship with that "Just and Faithful Knight of God," Michael Faraday. The author of this little volume has done his work well, and given us a realistic picture both of the scientific enthusiast and of the humble and devout Christian. "Not half his greatness was incorporate in his science, for science could not reveal the bravery and delicacy of his heart." We could wish this book to be read by our legislators, by our manufacturers, and even by our educational authorities, in order to impress upon them "that research must be free to be powerful and that there is little to be gained from a servile science." Gradually but surely the ideas of Faraday have permeated physical science, and at no time since their publication have they met with such general acceptance as they do to-day. "It may fairly be claimed that modern English physics is the school of Faraday, applying his methods, led by his vision, inspired by his faith."

H. S. A.

Cotton. By George Bigwood. ("Staple Trades and Industries," vol. ii.) Pp. viii+204. (London: Constable and Co., Ltd., 1918.) Price 6s. 6d. net.

THIS volume gives a readable, popular account of the whole field which the cotton industry includes, beginning with the historical records, and passing successively through the cotton fields, the mills, and the markets. The book is well printed and illustrated, but, especially on the technical side, it would be improved by a number of corrections when it reaches the second edition.

L. B.