of information), where also are tables of atomic and molecular weights, analytical factors, and amounts of various substances equivalent to 1 c.c. of certain "volumetric solutions." A considerable amount of labour has gone to the compilation of the book, which seems to have been carefully edited, and, as a volume, is very well produced; but, though it may be adapted to American conditions, it is hardly likely that English chemists as a body will find it very useful.

J. T. DUNN.

FUNDAMENTAL PRINCIPLES OF ORGANIC CHEMISTRY.
By CHARLES MOUREU. *Authorised translation from the sixth French edition by W. T. K. BRAUNHOLTZ.* Pp. 399. (London: G. Bell and Sons, Ltd. 1921.) Price 12s. 6d. net.

The text-books of organic chemistry, apart from those of a purely elementary character, may be divided into two classes, namely, those which hope to cater for the student who is passing through a course such as that required for an ordinary science degree, and those which are intended to fill up the gaps in a course of lectures given in a chemistry honours school in one or other of our universities or university institutions. Those falling within the first category have hitherto been written on stereotyped lines; the examples chosen to illustrate fundamental principles have been those which have stood the test of time and any spirit of heterodoxy has been carefully suppressed. With books of the second type the difficulty has always been to cover the ground in an adequate and interesting manner; in fact, to make a text-book and not a dictionary. Every teacher of advanced organic chemistry will agree that some text-book is necessary. The subject is so large and the time for instruction so short that it is quite impossible to cover the whole field in the hundred or so lectures which the time devoted to organic chemistry in the usual honours course permits. The lecturer is not, moreover, a free agent. Above his head, and above the heads of his students, looms the inevitable examination, at which he knows, and they know, that the questions set will be on certain definite lines. Indeed, our examination system sees to it that no lecturer shall deal with matter not in the examination syllabus. He must, above all things, be orthodox, and must not depart from the dozen or so subjects which he knows will form the basis of the forthcoming examination. These are the difficulties under which, not only our lecturers, but also our text-book writers suffer, and which handicap them when they try to introduce original methods into their lectures or books. It is therefore very welcome to see a text-book, emanating from a country not afflicted as we are, which starts off by breaking one of the fetishes which has dominated organic chemistry since its inception. Wöhler killed the theory of the vital origin of organic matter by his synthesis of urea, but no one, until Professor Moureu wrote this book, has had the courage to point out that the purely artificial division of organic chemistry into an aliphatic and an aromatic series has no real foundation, and that, for example, the difference between ethyl alcohol and phenol is only one of degree. Such a division is not only wrong in principle, but it has been harmful in practice, because it has often prevented the science from being taught in the only way which renders it intelligible and interesting to the student, namely, by contrasting the effect of difference of structure on chemical character. In the book under review the principles underlying the science are illustrated as they ought to be, by reference both to aromatic and aliphatic compounds.

Perhaps the most striking feature of the book is its complete up-to-dateness, the examples chosen being mostly those of recent discovery. The

chapter on Stereochemistry is in every way excellent, and is one of the clearest and best descriptions of this important subject that has been published. The sections on Triphenylmethyl, Ethylene Hydrocarbons, Alcohols, Phenols, Aldehydes, Ketones, Ketenes, and Acids are written in such a manner as will render them of the greatest value to the advanced student who may wish to supplement his lecture notes. Indeed, one would hardly have thought it possible to produce a text-book which so nearly supplies the requirements of the two classes mentioned at the commencement of this review. Professor Moureu and his translator are to be congratulated on the achievement.

For the rest, one would like to have seen a fuller description of the nitrogen compounds, this important subject having been compressed within fifty pages. The translation is clear and concise and closely follows the French text. One notices the use of the word potash when potassium hydroxide is meant, but these are minor faults in a work which should appeal to all teachers of organic chemistry.

JOCELYN THORPE.

TANNING MATERIALS, WITH NOTES ON TANNING-EXTRACT MANUFACTURE. By A. HARVEY. Pp. 182. (London: Crosby Lockwood and Son. 1921.) Price 15s. net.

Since the publication of Procter's "Principles of Leather Manufacture" (Spon, 1908) there has been no new English work containing a complete account of the available vegetable tanning materials. Many fresh materials have been discovered, and great progress has been made in the manufacture of extracts from tanning materials other than quebracho, but the information is very widely scattered, and the chemist is frequently unable to obtain access to the journals he requires. The present book should be very useful to him as a work of reference to the published literature.

The vegetable tanning materials are arranged in alphabetical order, and notes are provided on the varieties and tannin content of each one. In many instances both the tannin and non-tannin contents of the materials are given, but the composition of the poorer materials is dismissed merely with a reference to the approximate tannin content. The author expresses the hope that the volume will prove useful to the average tanner or manufacturer, but this hope is not likely to be realised, since the tanner and manufacturer are just as interested in the tanning properties as in the tannin content. In a few instances only is any attempt made to describe the characteristics of the various materials and their practical application. This section is open to very serious criticism in this respect, and also on account of the very cursory treatment of the extracts prepared from vegetable tanning materials. Liquid and solid extracts of myrobolans and oak-bark extract are worthy of much more attention than the author has devoted to them. The German leather industry owed its salvation largely to the oak-bark extracts manufactured in that country during the war. On p. 71 the statement that "an endeavour has been made in Germany to manufacture a tanning extract from pine twigs and pine refuse" is open to misconstruction, since this is the only reference to pine bark or pine-bark extract in the section on tanning materials. Yet pine bark is a most valuable tanning agent largely used on the Continent, and is included by authorities like Paessler and Ganswindt in their treatises on tanning materials.

The third section of the book forms a treatise on the general manufacture of tanning extracts. In contrast to the second edition, this is well written and freely illustrated with prints and diagrams of machinery, and includes all the pro-

cesses in general use and many of those recently patented. This section will prove a useful introduction to the study of the manufacture of tanning extracts and of great interest to the general reader. The official methods of tannin analysis as formulated by the Society of Leather Trades Chemists and the American Leather Chemists' Association are outlined in the fourth section; and the last chapter is a miscellany, including remarks on the use of spent bark. The author has omitted to mention the patents of Blanc and Blockey for utilising spent tan, etc. as a reducing agent in the manufacture of one-bath chrome-tanning liquors. There is an error on p. 69, where osage orange is termed *Bois d'arc*; the true botanical name is *Maclura aurantiaca*.

D. WOODROFFE.

SOIL CONDITIONS AND PLANT GROWTH. By E. J. RUSSELL. *The Rothamsted Monographs on Agricultural Science.* Pp. xii+406. (London: Longmans, Green and Co. 1921.) Price 16s. net.

This volume, which is really the fourth edition of Dr. Russell's monograph in Messrs. Longmans' series of Monographs on Biochemistry, is announced as the first volume of a new series of "Rothamsted Monographs of Agricultural Science." Its aim is to give a general account of all aspects of the relationship between plants and the soil in which they grow. Subsequent volumes of the series by the heads of the various departments in which the extensive work of the Rothamsted Station is now organised, will appear in due course. Each volume will deal in detail with the literature of one special branch of the subject. If Dr. Russell's colleagues can maintain the high standard which he has set, the series will mark a new epoch in agricultural literature.

The success of Dr. Russell's volume and its usefulness to everyone interested in soil science can best be judged by the fact that it has gone through three editions and one new impression in nine years. Further comment on its excellence is almost unnecessary. The present edition has been largely rewritten and far exceeds the third edition in length and in scope. The historical introductory chapter which now covers 30 pages is specially interesting, and serves to give a sense of perspective to the whole subject. Other writers on technical subjects might well follow Dr. Russell's example in treating their introduction historically. Unfortunately, however, few writers possess his historical sense, and fewer still such a library as now adorns the Rothamsted Laboratories. The second chapter on conditions affecting plant growth, which contains much new matter, is also of wide general interest. Subsequent chapters are perhaps rather more specialised, but throughout the volume the author has treated every branch of his subject in a broad-minded and general manner which makes it eminently readable, and adds greatly to its value. Such a book spreads among agricultural teachers and students a mass of accurate and ordered knowledge of all branches of soil science. Dr. Russell's description of the evolution of each branch of the subject points the way for further research and provides an invaluable stimulus to those of his readers who have the opportunity to add to our stock of information about the soil.

The volume ends with three appendices on the methods of soil analysis, the amounts of various substances absorbed from the soil by the common agricultural crops, and a selected bibliography giving over 300 references. There are also excellent indexes arranged under authors and subjects.

To the agricultural chemist Dr. Russell's book requires no recommendation. The reviewer trusts

he may be excused for recommending it to the botanist in the hope that its perusal may remind him that plants grow in the soil, and that there is now a literature dealing with the connexion between plant and soil which he can no longer afford to ignore.

T. B. WOOD.

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THE OIL INDUSTRY IN INDIA. By R. M. VAKIL. Pp. 45. (Bombay: D. B. Taraporevala, Sons and Co. 1921.) Price 1 rupee 4 annas.

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