

REVIEWS

Optical Workshop Principles. By Col. Dève
Translated by T. L. Tippell. (Adam Hilger
Ltd.), 1943. Pp. 306 + xiv. 20s.

Le Travail Des Verres D'Optique De Precision by Col. Dève was originally published in Paris in 1936. The book under review is an English translation brought out last year by Adam Hilger Ltd. It is in two parts, the first dealing with the elementary aspects and the second dealing with the more difficult and precise operations of optical technology. Under the elementary aspects, the properties of glasses, their faults and the principles that should guide one in choosing raw material are dealt with. There is a very useful account of different kinds of abrasives and cements. Hints which are of great practical value are given as to their utility under different conditions. In the same part, methods of surfacing are also dealt with. In the second part, definitely intended for those interested in work of high precision, the subject of surfacing is dealt with in greater detail and the use of test plates of different types is described. The processes of cutting, grinding and polishing varieties of crystals are described. Various other processes such as centring, edging, cementing, etching, silvering, etc., a knowledge of which is essential for a person working in Applied Optics are also dealt with.

The book contains a large amount of interesting and valuable information. It is eminently practical in its outlook and is accordingly indispensable to people engaged in optical work. The technique of producing either flat or curved surface to a state of perfection demanded by modern requirements is a highly specialised one and there are very few books in the English language which deal with this aspect of optics. The present publication is very welcome from this point of view.

S. B.

Experiment and Theory in Physics. By Max Born. (Cambridge University Press), 1943. Pp. 44. 2sh.

This pamphlet contains the substance of an address given by the author to the Durham Philosophical Society and the Pure Science Society in King's College at Newcastle-upon-Tyne. Basing himself on the details of some outstanding events in the development of modern physics, the author discusses the methods employed by the two extreme schools of investigators comprising on the one hand of men who declare experiment to be the only genuine method of science and on the other of men who claim that all universal laws of nature could be derived from pure epistemological principles and without any appeal to experiment. According to the author the history of modern physics shows that theoretical conceptions and experimental discoveries were alternatively taking the front place as time went on and we owe the present position neither to

pure reason alone nor to pure experiment alone but to a process of mutual interaction giving rise to a long chain of empirical research and synthesis. The author concludes by stating that scientific prophecy is better based on the facts of experience than on abstract reasoning. The pamphlet forms an interesting reading.

S. B.

An Introduction to the Modern Theory of Valency. By Dr. J. C. Speakman. Second Edition. (Edward Arnold and Co., London), 1943. Pp. 159. Price 5sh. 6d.

This book amply justifies its claim to be an introduction to the modern theory of valency. It is written in an easy flowing and convincing style, and takes the reader right from the basic principles of electrovalency and covalency described in the first five chapters, to a lucid and non-mathematical survey of the essential features of modern valency theory based on the methods of quantum and wave mechanics. Chapter VI deals briefly with the mechanism of covalency bond formation through coupling by the exchange resonance of valency electrons belonging to different nuclei. This concept of electrons in resonance, leads to the possibility of different electronic arrangements for the same molecule being coupled to each other by exchange resonance, forming thereby a "resonance hybrid" of greater stability. Chapter VII describes some of the important quantitative studies on valency bonds. In the reviewer's opinion, an adequate reference to the vibration frequencies for these bonds as evaluated by the very elegant method of Raman spectra would make the picture more complete. Chapter VIII describes very clearly the concept of intermolecular linking by hydrogen bonding, and also makes an adequate reference to other types of intermolecular coupling through uni-dipole, dipole-dipole, and Van der Waals or "dispersion force". The succeeding chapters deal with polar and non-polar compounds, relationship between electrovalency and covalency, and the varying valencies exhibited by the elements in the long periods. Chapter XII on Co-ordination and Hydration gives a clear account of Werner's Co-ordination Theory. In Chapter XIII are considered the stereochemical aspects of valency, and it is shown how the wavenumbers treatment of valency angles has justified the pure chemist's sound instincts, as witness the phenomenon of d^2sp^3 -hybridisation leading to Werner's hypothesis regarding the stereochemistry of hexavalent complexes. The last chapter, XIV, is a short discussion of the electronic theory of acids and bases.

This little book of only 159 pages is neatly printed and got up, and except for an obvious error in the structural formula for the sodium derivative of benzoyl acetone on page 135, is free from mistakes. It is moderately priced and should provide a very good supplementary

reading to undergraduates as well as to others who desire to become acquainted with the recent advances in this field.

M. A. G.

The Rayon Industry, Possibilities of its Establishment in India. (All-India Manufacturers' Organisation Monograph No. 4, Bombay), 1944. Pp. 25.

This pamphlet advocates the early establishment of a factory for the production of Artificial Silk by the viscose process, in India. The statistics given show that this country imports or was importing in 1937-39, 50,000,000 lbs. rayon per year, a considerable portion of which, in the form of rayon and staple fibre, was used up by our great textile industries. This dependence of a key industry for an important product on foreign supplies, is to say the least, not healthy. The pamphlet indicates very briefly the prospects for the establishment of such a factory in terms of availability of raw materials, such as wood and bamboo pulp, cotton linters, and short-staple cotton, plant location, chemicals required, technology of production, labour and management, daily capacity (10 tons), investment required (one crore rupees) and profits (a safe minimum of 20 per cent.).

M. A. G.

Soil and Plant Analysis. By C. S. Piper. (The University of Adelaide, South Australia), 1942. Pp. x+368, Illustrated. Price 15s.

This book is a monograph from the Waite Agricultural Research Institute. It brings together in one volume, the more important and the more widely used analytical methods for soils and plants.

About the beginning of the present century H. W. Wiley published his *Principles and Methods of Agricultural Analysis* in three volumes. Later Klein in his four volumes of *Pflanzenanalyse* has brought together and dealt with in considerable detail the methods and techniques scattered over a large number and variety of periodical publications. The Asso-

ciation of official Agricultural Chemists in U.S.A. has been rendering yeoman service to their fellow-workers in America and elsewhere by publishing a journal and by issuing from time to time revised editions of their well-known publication *Official and Tentative Methods* which is in use in the laboratory of every agricultural chemist.

With the development of soil and plant research in geographical extension, the need has been felt to modify methods of analysis to suit special requirements of particular localities, materials and laboratories. To this end workers in India, Australia and Africa published from time to time several modifications of well-known methods. As far back as 1928 Dr. J. A. Prescott of the Waite Agricultural Research Institute published a bulletin in the series of publications, issued by the Commonwealth Council of Scientific and Industrial Research, Australia, dealing with soils. Dr. Piper who has been long associated with Dr. Prescott has, in the publication under review, reproduced the methods of soil analysis previously described in the aforesaid bulletin and has also added a good deal of other selected data in the first part. In the second part he has furnished valuable information in regard to the inorganic constituents of plants and their methods of determination.

Information on the subject of trace or minor elements and their bearing on soil and plant nutrition is widely scattered among a number of publications. Dr. Piper has collected the relevant information and presented it in a readily accessible form. Dr. Piper has not included (and in the reviewer's opinion rightly) a chapter on rapid methods of analysis and on foliar and other diagnostics of plant and soil deficiencies, presumably because their usefulness in soil fertility investigations is not yet established for inclusion in a book of the kind meant as a laboratory companion for agricultural workers.

The book is attractively got up and is free from mistakes. It should prove a useful addition to the library of an agricultural chemist.

B. V. N.

STARCH AND ITS DERIVATIVES*

THE second edition of the monograph on starch will be warmly welcomed, if only because the revision has vastly improved the intrinsic value of a work of acknowledged merit. Owing to the dislocation of normal trade channels due to the present emergency, the requirements of essential industrial products have to be met by stimulating indigenous production. This is particularly true in India with a gigantic textile industry consuming large quantities of starch and a series of its derivatives. The position is particularly critical as the accepted sources of starch, viz., cereals and tubers, constitute valuable items of food which

have to be conserved for human consumption. The position demands careful and informed consideration at the hands of technologists. The appearance of a monograph summarizing the latest developments in an important branch of chemical industry and presenting a very balanced account of the scientific and technological researches should be considered very opportune.

The beginnings of the starch industry date back to the earliest periods of recorded history. The discovery of dextrin, reminiscent of Lamb's account of the roast pig, extended the field of industrial application of starch. The more recent studies on the derivatives of starch, notably on the ethers and esters, have opened up new industrial possibilities. On the vexed question of the structure of starch itself, the

* "Starch and Its Derivatives", by J. A. Radley. (Chapman & Hall Ltd., London.) Second Edition (revised). 1943. Pages xii + 558; Price 30/-