SCIENTIFIC BOOKS

PLANT GEOGRAPHY

An Introduction to Historical Plant Geography. By E. V. WULFF. 1943. Authorized Translation by E. Brissenden. Waltham, Mass.: the Chronica Botanica Co.; New York, N. Y.: G. E. Stechert and Co., pp. xv + 223. $4.75.

IN the great period of DeCandolle, Forbes, Darwin, Hooker, Wallace and Gray, the importance of plant geography was widely recognized; but the developments of ecology in the present century have tended to divert attention from the wider aspects of plant distribution, even although ecology can make important contributions to the problems involved. An introduction to historical plant geography is, therefore, to be welcomed, and should find a place in every general botanical library. It is valuable not only for the data it presents, but because of their bearing on paleobotany, climatic and geological changes, as well as the problems of plant migration, selection, speciation and adaptations for dispersal.

The author is a Russian, who is thus able to introduce to English-speaking readers much Russian work in plant geography as well as an excellent summary of the whole field. It is to be hoped that a *History of the Floras of the World,* which he has also completed, can appear too in an English translation. In the present volume Dr. H. M. Raup has added a compact statement with references to the recent American work, necessitated by the isolations of the war.

The eleven chapters of this book are concerned with such topics as the scope and history of plant geography; areas—their origin, centers and types; the evidence from geographical distribution of hosts and parasites; wind, water and animals as factors in plant dispersal; the migration of species and floras; the historical causes for the present composition of floral areas; and the concept of floral elements.

The author has decided views, which he applies whole-heartedly to the solution of the many complicated problems and puzzles of plant distribution. He accepts the Age and Area conception as one of many factors at work in determining the present distribution of the earth's population of plant species. His discussion of the impact of the ice age on plant distribution in northern latitudes might have been more extended, but this is an introduction to the subject. A feature which he emphasizes is that not only cultivated plants but the weeds which infest them have, through man's partly unconscious action, lost their power of independent existence in competition with wild plants. He holds, with DeCandolle and Willis, that species generally advance very slowly into new areas, the process frequently necessitating a physiological process of acclimatization. This can hardly apply, however, to such species as *Argemone Mexicana,* which can be seen naturalized in India from the Himalayas to Cape Comorin.

In his discusion of methods of dispersal, the author places a minimum value on their efficiency. He points out, for example, that although the gigantic seeds of the double coconut (*Lodoicea*) have for centuries been thrown up on the coasts of the Indian Ocean, yet this palm remains endemic to the Seychelles alone. If ocean currents have not resulted in successful dispersal in this case, can they have done so with the coconut (*Cocos*) or with the seeds of many other plants? It is now generally conceded that man carried the coconut across the Pacific. Even the transport to distant islands of seeds from edible fruits by birds is made to appear very doubtful.

On the other hand, pollen is known to be carried hundreds of miles by winds, reaching over 10,000 feet in the air. Despite this disadvantage, the study of pollen in peat-bogs and other semi-fossilized conditions has acquired great importance in connection especially with post-glacial deposits and the conclusions which can be drawn from them regarding plant distribution. The recent book by Erdtman[1] in the same series is a timely review of the whole field.

Another interesting feature of Wulff's treatment of plant distribution is his acceptance of continental drift as a working hypothesis, made all the more necessary if the plant's "adaptations" for dispersal have such a limited success. Here the last word is likely to be with the geologists, and some of their recent pronouncements indicate that the controversy will be a lively one before it is settled. One geological difficulty appears to be that Pangaea only began to split apart towards the end of the Mesozoic period, although in earlier ages Eurasia (and perhaps also North America) was sundered by the shallow Tethys sea. What produced this belated instability of the previously single continent?

In his foreword, Dr. Merrill points out another difficulty: the genera of plants common to the two hemispheres are but 6.4 per cent. of the total. Whether this is a real difficulty, however, depends largely on the geographical nature of the process of speciation, regarding which, especially in the tropics, we at present know very little.

Wulff admits that Wegener's hypothesis requires modification, and that unsolved difficulties remain regarding the Pacific Ocean. But the facts of distribution clustering around the conceptions of Gondwanaland, Lemuria and Antarctica are so suggestive, and these conceptions solve so many difficulties that the hypothesis is bound to remain very attractive to botanists, especially as it appears to solve also the other-

[1] *An Introduction to Pollen Analysis.* By G. Erdtman.

wise insoluble problem of "shifting of the poles" and accompanying climatic changes.

Apart from all matters of controversy, this volume, with its accumulation of facts and literature, will be of great service to all who are interested in problems of distribution.

R. RUGGLES GATES

MARINE BIOLOGICAL LABORATORY,
WOODS HOLE, MASSACHUSETTS

ORGANIC CHEMISTRY OF SULFUR

The Organic Chemistry of Sulfur. Tetracovalent Sulfur Compounds. By CHESTER MERLE SUTER. 858 pp. 6 × 8½ in. Bound in dark green cloth. New York: John Wiley and Sons, Inc.; London: Chapman and Hall, Ltd. $10.00. 1944.

THE author states in the preface that this book is intended to serve as a reference work for those interested in the chemistry of those organic sulfur compounds which, broadly speaking, may be regarded as derivatives of sulfuric acid. The chapter headings are, therefore: I. Esters of Sulfuric Acid (94 pp.); II. Aliphatic Sulfonic Acids (101 pp.); III. The Preparation of Aromatic Sulfonic Acids (186 pp.); IV. The Properties and Reactions of Aromatic Sulfonic Acids (71 pp.); V. and VI. Derivatives of Aromatic Sulfonic Acids. 1. Sulfonyl Halides, Esters, and Anhydrides (121 pp.), 2. Sulfonamides and Related Compounds (85 pp.); and VII. Sulfones (117 pp.).

Encyclopedic in the field it covers, it is a veritable mine of information. References to all important literature on the subject, as recorded in *Chemical Abstracts* up to January 1, 1942, and totaling many thousands, are included. In recognition of the vast amount of time and labor which the author has expended in the preparation of a volume which makes all organic chemists his debtors, it is to be hoped that the welcome accorded it will be correspondingly cordial and that in due course of time we shall see from his pen other volumes treating with similar thoroughness and skill the remaining branches of the subject.

Each chapter opens with a detailed table of contents, showing the order in which the subject matter is classified and presented, and closes with a consolidated register of the references cited in the text. In addition to these references, there are innumerable tabular lists of compounds distributed throughout the text. Methods of preparation, general properties and reactions, derivatives of various kinds, industrial and medical applications, all are discussed in due course. A comprehensive index (83 pp.) is supplied.

In its chosen domain, the book is *facile princeps*, and is most heartily recommended. In paper, type, printing and binding, the book is fully up to the usual high Wiley standards.

MARSTON T. BOGERT

COLUMBIA UNIVERSITY

INDUSTRIAL CHEMISTRY

Industrial Chemistry. By WILLIAM THORNTON READ. 3rd edition. v + 631 pp. New York: John Wiley and Sons, Inc. 1943. $5.00.

THE third edition of Professor Read's well-known volume follows very closely the general plan and arrangement of previous editions.

A first section of six chapters discusses the approach to chemical engineering and serves as an excellent elementary introduction for readers who may be generally interested in the subject or who are approaching it for the first time.

The next four chapters discuss materials and equipment and are designed to give the general reader an introduction to the subjects of unit operations, materials of construction, power plant chemistry and related matter. The remaining seventeen chapters, 450 pages, are devoted to about twenty of the chemical industries of outstanding importance.

The volume represents a thorough revision of the previous editions and brings all the subjects treated up to date except for progress in the war interests. The author notes that the present world situation throws most statistical matter out of balance, and therefore, in general, bases economic data and so forth on the prewar figures.

About thirty pages of new matter have been added, including especially additions in the chapters on rubber, plastics and protective coatings; and, in fact, all the chapters represent much more than a revision of previous manuscript since in most cases the material is entirely rewritten.

The book is very readable, and the concise, entertaining style of the author is evident throughout, though the author has had the cooperation of recognized authorities in each field treated. The book should be welcomed by all those who have found the first and second editions useful and should reach a wide circle of new readers.

W. D. TURNER

COLUMBIA UNIVERSITY

PHYSICAL BIOCHEMISTRY

Physical Biochemistry. By HENRY B. BULL. New York: John Wiley and Sons. iv + 340 pp. $3.75. 1943.

THIS book is a short summary of many physicochemical principles and methods which have been applied in biochemical research. A noteworthy feature is the large number of references to the literature, particularly that of the last decade. More space is devoted to the presentation of principles than to the discussion of their application. While some of the equations are logically derived from fundamentals, many others must be accepted on faith. Particular