

beans grown: curiously enough the gourd seems to have been of Old World origin. Tobacco culture was widespread in America even among tribes that did not grow food. It is unknown whence or how maize came into cultivation, but its arrival was a turning point in American history, for it made possible the magnificent cultural evolution in the Andes and in Central America, Mexico and the south-west area. Wherever it came from, Colombia appears to be its oldest centre of cultivation. Colombia also appears as the centre of origin of a number of other cultivated plants.

The book contains a large amount of information that will be new to many readers and which, moreover, is not generally accessible. It can be commended to all who are interested in the origins and early history of our domesticated animals and field crops, and in the tools men used for dealing with them.

E. JOHN RUSSELL

THE SOILS OF EUROPE

The Soils of Europe

Illustrated Diagnosis and Systematics. By Prof. Dr. Walter L. Kubiëna. Pp. 318+26 plates. (Madrid: Consejo Superior de Investigaciones Cientificas; London: Thomas Murby and Co., 1953.) n.p.

UNTIL the identity of a creature can be established and communicated, correlation and the transfer of experience are impossible and knowledge remains chaotic. The recognition and precise description of kinds of plants and animals by such men as Turner and Gesner in the sixteenth century provided the essential foundation for modern biological science; and as a pedologist Dr. Kubiëna is surely right in asserting the urgency of his aim in this book, which "is an attempt to make it possible to identify and to give suitable names to soils for all who need it". Descriptions of 173 different "formations of soils" are illustrated by more than fifty excellent reproductions of beautifully executed paintings chosen in preference to photographs to emphasize the features regarded as most significant. Keys are provided to facilitate rapid identifications which may then be checked by the more-or-less detailed profile descriptions. Many synonyms are carefully equated in the explanation of more than four hundred soil names and some two hundred pedological terms. Dr. Kubiëna claims to have studied personally most of the soils described, and it may well be doubted if any other person could provide such an extensive background of personal experience. It is a pity that in this translation from the German such a valuable book should be marred by English so often ambiguous that the reader is left doubting those subtleties which may well have been intended; and from the number of typographic errors it seems doubtful whether the proofs could ever have been read at all.

The development of a precise terminology, a clear and concise nomenclature, and an orderly and serviceable classification are probably the three most urgent requirements in the study of the soil. In the field of profile description Dr. Kubiëna is particularly helpful in those features of the profile which reveal themselves best under the microscope. His account of both the morphology and genesis of the various forms of organic matter establishes without question the value of his techniques, while the features upon

which he bases his important distinction between *Lehm* and *Erde* could scarcely be fully discerned by the unaided senses. Many of the profile descriptions, however, are quite inadequate for precise diagnosis, and some of the more obvious features, such as major profile structures, for example, are often not described at all.

In nomenclature, Dr. Kubiëna adopts a Linnaean approach, and perhaps assumes too readily that the success of a system for plants and animals is a guarantee of its value in soils. Indeed, in his assumption that soils may be "as exactly and unambiguously characterized and named as breeds of cereals, market garden crops, and domestic animals" Dr. Kubiëna is assuming an analogy which is misleading. Plants and animals are discrete and transferable units with their essential characters determined by an internal mechanism, whereas soils, as Dockuchaiev insisted, "are a mere function of the soil-forming factors". As in petrology, the essential problem is the significant division of a gradually varying continuum, and it may be that a premature enthusiasm for "pigeon-holing" may divert energies from the more vital study of soil and landscape relationships. That Dr. Kubiëna is himself aware of the merging of soil boundaries is clear from his emphasis on the strongly dynamic nature of soil profiles; and his evolutionary division between raw soils, ranker soils, and more mature soils recognizes, at a high level in his classification, profile development sequences similar to those which have been shown to be of such practical value in New Zealand. To arrange soils in order from the simplest to the most complex, after consideration of "all essential characteristics", is a logical aim, but its adequate fulfilment will require much more knowledge of profile dynamics than we now possess.

The book is stimulating and of lasting value, and cannot be neglected by any serious student of the soil.

E. CROMPTON

ELECTRONIC THEORY OF VALENCY IN ORGANIC CHEMISTRY

Electron Structures of Organic Molecules

By Prof. Lloyd N. Ferguson. Pp. xi+335. (London: Constable and Co., Ltd., 1952.) 48s. net.

THE scope of this book is correctly described in its title. As is explained in the introductory chapter, it gives an up-to-date account of that part of physical organic chemistry which is concerned with molecules in their normal (non-reacting) states. Successive chapters carry the following headings: the types of chemical bonds, the polar nature of covalent bonds, covalent bond distances and bond angles, intramolecular forces, induction and electric dipole moments, magnetic susceptibility, resonance and its applications in organic chemistry, absorption spectroscopy (this chapter and the preceding one occupy almost half the book), aromatic substitution, and molecular and electron structures by physical methods.

The treatment is clear and the expositions generally full, so that the book is interesting to read and should be easily followed by the honours degree student for whom it seems to have been designed. Yet a conscientious teacher might hesitate before recommending the book without qualification—especially as it is so expensive.