

12.2 listing elements determined in various matrices would be usefully complemented by another table listed in order of matrix instead of element, although this is available elsewhere, for example, NBS Technical Note 467.

These, however, are relatively minor criticisms of a book which is sure to find an important place in any laboratory engaged in the field. H. W. WILSON

Transport Kinetics

Elementary Kinetics of Membrane Carrier Transport. By K. D. Neame and T. G. Richards. Pp. xii+120. (Blackwell Scientific: Oxford, London, Edinburgh and Melbourne, 1972.) £3.

I SHOULD have liked to recommend this little book wholeheartedly. It is written in response to a definite need and the authors have successfully limited their treatment to the precise field of the title. There is, quite correctly, no discussion of the structure of membranes (although useful references are provided) and there is, again correctly, little on the properties of the "carriers". These entities are merely useful descriptions of experimental results and the book concerns itself only with the kinetic consequences of the carrier hypothesis.

The strength of the book lies in the really excellent sections dealing with the handling of kinetic data, and their analysis in terms of simple and complex carrier systems. The traps of too naive an analysis of the data and of too sophisticated an analysis of unreliable data are clearly pointed out. Most valuably, many of the examples used are wisely chosen and from a broad membrane literature, replacing the hypothetical examples that might have contented other writers. One necessarily anonymous provider of data and related "analysis" must be hiding his head in shame!

What a pity, then, that the sections dealing with fundamental theory do not match this high standard. Thus, for instance, the Michaelis-Menten equation is derived (in five laborious pages) in such a form that the concentration of binding sites appears in the Michaelis constant. The authors' terminology is often misleading, such as "association" and "dissociation" constants, where "on" and "off" constants would be more appropriate. Finally, the sections on exchange diffusion and counter-transport are completely misleading. An explicit experimental distinction between these processes has for a number of years been available. When William of Ockham (quoted by the authors in this context) wrote that "essences are not to be multiplied without necessity", he carefully included the latter words.

W. D. STEIN

Insect Natural History

Insects of the World. By Walter Linsenmaier. Translated from the German by Leigh E. Chadwick. Pp. 392. (McGraw-Hill: New York and London, November 1972.) £6.50.

In recent years there has been a spate of gaudy insect books richly illustrated with colour photographs; but in spite of the great technical improvements in colour film, in lenses, and in depth of focus, these books for some reason are apt to leave a feeling of dissatisfaction; and at the end of the day one turns with relief to the coloured copperplates of Maria Merian picturing the insects and other wonders of the tropics recorded during her journey to Surinam in 1699. Many of the same insects figure in Linsenmaier's book, depicted by hand in a different style but with something of the cornucopian extravagance that inspired Madame Merian's work. There is an abundant text, full of accurate information for those who care to seek it out. The text is illustrated by little monochrome vignettes, many of which bear a page and figure number where the same illustration can be found in full colour. The opening chapters provide simple outlines of anatomy and physiology, accounts of coloration, mimicry and camouflage, insect distribution and migration. But the main part is systematic. The insects are taken order by order, their description enlivened throughout by essays on every aspect of insect natural history. Finally, there are chapters on water insects and social insects—again systematically arranged and packed with information.

The book can therefore be read with interest, with the help of the thumb-nail illustrations, without reference to the plates. But the plates themselves are fantastic, all 150 of them; and many readers will find it difficult to leave them and get down to the text. The vast majority are superb drawings of insects in the living state in their native haunts; often crowded together in some amazonian forest or palaearctic woodland so that the child-like entomologist can pore over them again and again, and still discover something he had not noticed before. Then there are plates of massed colour photographs of cabinet specimens figuring hundreds of the more or less conspicuous insects from most parts of the world. These are so good that many can be used for identification, or approximate identification, and by looking up the pages of small print at the end of the book their generic and specific names and country of origin can be found. Among the Lepidoptera the subjects range from *Nepticula* with a wing span of 4 mm to *Attacus* with a wing span of 36 cm! A spectacular book by a splendid artist who is an enthusiastic insect lover, well

translated from the German by a distinguished American entomologist, L. E. Chadwick.

V. B. WIGGLESWORTH

EM *Vade-mecum*

Practical Methods in Electron Microscopy. Edited by Audrey M. Glauert. Volume I. Part 1. *Specimen Preparation in Materials Science.* By P. J. Goodhew. Part 2. *Electron Diffraction and Optical Diffraction Techniques.* By B. E. P. Beeston, Robert W. Horne and Roy Markham. Pp. viii+444. (North-Holland: Amsterdam and London, 1972.) Dfl. 110; \$34.50.

ELECTRON microscopy must be the interdisciplinary subject *par excellence*. The instrument itself is a relatively straightforward exercise in physics and electrical engineering, but its applications spread through practically all branches of pure and applied science, from concrete technology to macromolecular structure, from radiation damage in metals to the mechanism of muscular contraction. Further, having caught your rabbit, dissected, fixed, desiccated, stained and sectioned it into flakes thinner than one-tenth the wavelength of light, imaged it (in vacuum) in adequate illuminating conditions at a magnification up to $\times 300,000$ and enlarged the micrograph yet further, there remains the crucial task of interpreting your results, of deciding what is "real" and what artefact in the multifarious details made visible. The metallurgist has a like problem in preparing his specimens and analysing his images of dislocations or precipitates, though these are less liable to artefact.

Twenty years ago it was possible, within the compass of 300 pages, to produce a fair survey of the subject, from the principles and operation of the microscope through specimen preparation to electron photography. True, the author (if solo) needed to be something of a jack of all trades to provide a reasonably balanced view of every topic, but the early electron microscopists had to be just that, serving as they usually did customers from various departments of a university or research centre. Even 7 years ago one man could still cope adequately with the *Elektronenmikroskopische Untersuchungs und Präparationsmethoden* in 600 pages (Springer-Verlag; 1967), although Dr Reimer had to rely on help and advice from numerous colleagues as the preface acknowledges. The French a few years earlier required two volumes totalling nearly 1,300 pages and a team of seven authors (*Traité de Microscopie Électronique*, Hermann, Paris; 1961), but gave more space to the microscope itself.