

Generalised Electrodynamics and the Structure of Matter

By [the late] Prof. S. R. Milner. Edited by Dr. C. W. Kilmister. Pp. ii+290. (Sheffield: The University Library, 1963.) 42s.

S. R. MILNER'S posthumous papers contained a rich collection of results of his investigations in three closely allied fields. There was, first, an algebraical technique which arose, for Milner, in his attempts to elucidate Eddington's later work, though it has no necessary connexion with it. This technique made it possible for Milner to operate conveniently with Clifford algebras (for example, quaternions, Dirac matrices) and to seek different criteria for what constitutes a simple system. This was then useful to him in the second kind of investigation—that into the generalized electromagnetic theory. Here Milner used his algebraic tools to suggest an extremely natural and straightforward generalization of Maxwell's equations, which leaves electromagnetic theory exactly the same, away from charge, but modifies the equations in charge in such a way that the classical electron model becomes a possible stable configuration, without additional forces to hold it together. The more detailed investigations of this kind led him on to considering general relativity, and in this field he sought to re-express the existing theory of gravitation in a way that was more directly connected with ideas of mass, energy and force.

These papers have now been collected together and edited by Dr. C. W. Kilmister, King's College, University of London, who has added a number of notes relating the new notations of Milner to more commonly used ones.

Mass and Abundance Tables for Use in Mass Spectroscopy

By Dr. J. H. Beynon and A. E. Williams. Pp. xxi+570. (Amsterdam and London: Elsevier Publishing Company, 1963.) 80s.

THERE is little one can say in a review of this set of tables except that it is a must for all workers interested in the determination of molecular weights and molecular structure of organic compounds. This is especially true of those who are working in the field of high-resolution mass spectrometry, in which area a molecular weight determination leads directly to the molecular formula. After an introduction in English, German, French and Russian, the book lists under the appropriate mass numbers (a) the atomic composition; (b) the molecular mass ($^{12}\text{C} = 12.000000$); (c) $100 P_{m+1}/P_m$; (d) $1,000 P_{m+2}/P_m$; (e) P_{m+1}/P_{m+2} , where P_{m+i} is the height of the (parent + i) isotopic peak. On the carbon-12 scale, some of the molecular weights fall below the mass number, and this must be remembered when using the tables. Thus under mass 319, there is the entry for $\text{C}_{14}\text{HN}_5\text{O}_5$, 0.997764. This refers to 318.997764.

As has been said before, this book will be invaluable, especially for workers in the relatively new field of the high-resolution mass spectrometry of organic compounds.

A. MACCOLL

Flows in Networks

By L. R. Ford, jun., and D. R. Fulkerson. Pp. xii+194. (Princeton, N.J.: Princeton University Press; London: Oxford University Press, 1963.) 48s. net.

THE most familiar example of a network flow problem is that defined by Kirchoff's laws for the flow of an electric current in a network of resistors. In this problem a certain quadratic function of the current representing the heat dissipated has to be minimized subject to linear constraints. This is an example of the kind of problem more complicated than that considered in *Flows in Networks*, where the attention is limited to corresponding problems in which linear functions are minimized, and

the further restriction is adopted that the assumption of integral data provides the existence of an integral solution. It is, then, an introduction to the wide and rapidly developing field loosely classified under the name of linear programming, which has come to the fore in recent times.

It should not be thought, however, that the application of the ideas of the book is in some narrowly restricted field concerned primarily with the transport of petrol across deserts. The subjects discussed by the authors range from such practical ones as the way across deserts, to the extremely theoretical questions in graph theory, the theory of partially ordered sets, and the theory defined by matrices, the elements of which are 0 and 1. In all cases a great deal of attention is directed to finding effective procedure which will enable the actual calculation of a solution to be carried out. The book is divided into four chapters, in which the first forms a necessary introduction to each of the others. These last three discuss, respectively, combinatorial applications, minimal cost flow problems, and multiterminal maximal flows.

There is a great deal in the book which is not available elsewhere except in the original papers, and much of the work is in fact due to the authors themselves in the past few years. The book is well produced, and should provide a means of linking workers in the (at present) separated fields of operations research, communications engineering, and combinatorial mathematics.

C. W. KILMISTER

Recent Advances in Allergy Research

Edited by F. Hahn, P. Kallós and G. B. West. (Transactions of the Collegium Internationale Allergologicum, Fifth Symposium in Freiburg i. Br., October 1962.) Published simultaneously as Vol. 22, Nos. 2, 3, 4, 5 and 6 (1963), *International Archives of Allergy and Applied Immunology*. Pp. iv+355. (Basle and New York: S. Karger, 1963.) 55 Sw. francs; 55 D.M.

THIS book contains 34 of the 39 scientific papers given at the fifth symposium of the Collegium Internationale Allergologicum in Freiburg. Because of the wide range of topics covered and the fact that the papers were given by many different groups of research workers, such as physiologists, pharmacologists, biochemists, allergists and clinicians, the reader is given a very good insight into the present trends of research into allergy. As we still do not understand the underlying causes of the symptoms seen in allergic reactions many papers are devoted to the compounds which may produce those symptoms. At one time the symptoms of allergy were thought to be due to histamine, but recently many other substances have become associated with allergy. This aspect of research is reflected in the many papers dealing with the origin, storage, metabolism and role of histamine, together with papers on some of the other substances believed to be involved including the kinins and a much newer set of substances, the neuraminyl glycosides.

Several papers deal with the diagnostic aspects of the causes of allergy. It is interesting to read that the skin-sensitivity test can give erroneous results and that a bronchial test for asthmatic allergy is more informative. Another group of papers deals with the relationships of collagen diseases and allergy. There is a good review of the dermatological aspect of the collagen diseases and also a paper on the similarity between collagen diseases and the effects of experimentally implanted fibrin in connective tissues. There is a good historical review of the changes which have occurred in the medical concepts of allergy, and this includes an excellent bibliography. Among the many other subjects discussed are anaphylotoxin, penicillin allergy, precipitins to moulds in asthmatic sera and allergic reactions in blood.

A few papers tend to be rather brief, but on the whole this book keeps the reader who is interested in a better understanding of the causes of allergy abreast of the latest trends in allergy research.

N. G. WATON