

### Theory of Elasticity

By V. V. Novozhilov. Translated from the Russian by J. K. Lusher. Pp. xii + 448. (London and New York: Pergamon Press, 1961.) 80s. net.

IN the first part of the book the author develops the theory of elasticity proceeding from the general concept of finite deformation and specializing to cases where (a) the strains are small and (b) the strains and rotations are small. In this way he examines the geometry of deformation, the conditions of equilibrium, and the strain energy and related concept of virtual work. The classical theory is then examined in detail. Topics considered include the Papkovitch solution of the general equations, thermoelasticity, dynamic problems, and existence, uniqueness, minimum, and super-position theorems.

The theory is developed in rectangular Cartesian co-ordinates, but the field equations are also transformed to orthogonal curvilinear co-ordinates. This makes the initial development rather lengthy, but has the effect that many topics in non-linear elasticity become available to the newcomer without resort to tensor notation. The theory of finite deformation is referred to co-ordinates both in the deformed and in the un-deformed body. The careful transition by stages from the non-linear to the classical theory brings out a number of points that are sometimes overlooked in more sophisticated treatments. The book includes a brief mention of tensor notation.

The last two chapters are concerned with problems in classical elasticity. St. Venant's theory of torsion is developed and applied to the twisting of rods of circular, elliptical, triangular, square and other cross-sections. Bending theory is treated similarly. The theory of classical plane strain and stress is formulated in curvilinear co-ordinates and in complex forms. A number of problems is treated using the method of complex power series expansions, aided where necessary by conformal transformations. These include the plane deformation of an infinite plate containing circular, elliptical and (approximately) square holes. The half plane problem is also considered. The book does not deal in any detail with anisotropic bodies or with three-dimensional problems. The careful treatment of the basis of finite elasticity and the transition to the classical case, however, make this a useful book. J. E. ADKINS

### Proceedings of the International Conference on Nuclidic Masses

McMaster University, Hamilton, September 12-16, 1960. Edited by H. E. Duckworth. Pp. xi + 540. (Toronto: University of Toronto Press; London: Oxford University Press, 1960.) 80s. net.

THE complexities of nuclear structure having as yet defied all efforts at an overall interpretation, it is becoming increasingly recognized that more and more precise data on nuclear properties should be sought to provide clues which may lead us to the fundamental laws. An outstanding contribution to this cause is the present table of nuclidic masses published in 1960; it forms the hub about which revolve the discussions of the conference reported in this volume. For the mass compilation a vast array of data was drawn from mass-spectroscopic experiments as well as from all kinds of nuclear reaction measurements, and from  $\beta$ -decay studies. To users of these mass tables the papers in the first session of the conference afford an interesting opportunity of gaining some insight into the magnitude of

the task which the compilers have undertaken. The second session directs attention to some of the physical properties of nuclei which can be derived from mass data, dealing particularly with the nuclear surface, total binding energies, and a shell-model interpretation. The experimentalists then take over with a series of lively discussions covering present-day problems and progress in energy standards and calibrations, the measurement of  $Q$ -values for nuclear reactions, including charged-particle, photonuclear, threshold and capture reactions, beta-decay energies and systematics, and finally mass-spectroscopic determinations of atomic masses, together with accounts of recently developed instruments, including a new type of radiofrequency mass spectrometer.

Considerable progress has been made in achieving consistency in the mass data, particularly between the reaction and mass-spectroscopic measurements. There remain, however, a number of discrepancies and gaps, which the contributors discuss, pointing the way to further desirable investigations. Another mass compilation and a similar conference are not anticipated for several years. Meantime this volume is likely to be of considerable use to low-energy nuclear physicists and mass spectroscopists.

J. M. FREEMAN

### Organic Chemistry Today

By F. W. Gibbs. (Pelican Book No. A461.) Pp. x + 294. (Harmondsworth, Mddx.: Penguin Books, Ltd., 1961.) 7s. 6d.

SINCE Woehler's synthesis of urea in 1828, staggering advances have been made in theoretical and applied organic chemistry. To-day chemical industries founded on oil, petroleum and other organic raw materials are still springing up in Britain. In his book *Organic Chemistry Today*, Dr. Gibbs attempts to describe some of the more important advances and underline their practical implications and significance.

He begins with a clear outline of the scope of organic chemistry and an introduction to molecular structure which should be familiar to every sixth-form chemistry student. Then, in the remaining eleven chapters, he deals with such topics as: oil and petroleum hydrocarbons, coal and coal chemicals, sugars and polysaccharides, proteins and living matter, food, drugs, dyes and pigments. Wherever possible, each topic is developed against a historical background of key-dates and the names of people most responsible for major advances. Schematic diagrams and charts, and structural formulæ even of the rather complex carotenes, porphyrins and vitamins, are most clearly and simply presented. The comprehensive subject index and the short bibliography with a comment on each book are most helpful.

The introductory chapters and the chapter on coal and coal chemicals should appeal to the layman, but the book as a whole is more likely to appeal to the reader who is able easily to interpret structural formulæ and is familiar with the technical terms of organic chemistry: the synonyms isobutene and isobutylene appear indiscriminately in the text without comment. This book is of considerable value to all students of chemistry at sixth-form level and beyond, and is cheap at the price. It also has something to offer those interested in the influence of chemistry on politics and economics, and vice versa.

MICHAEL C. CON