

both university students and lecturers. The new edition has been well produced with most legible printing on good quality paper and the spatial and conventional organic chemistry formulations are reproduced with considerable clarity.

The historical approach employed throughout the text is thought-stimulating and interesting, the earlier chapters dealing with the general theories of valency bonding, inter-atomic force theories, etc. Electrostatic, covalent, semipolar double bond systems, etc., are clearly described, together with valuable excursions into the fields of dipole-dipole interactions, solvated chains, polarization and orientation phenomena. The first chapter, on valency and configuration, forms a natural precursor to discussions on the determination of structure by various physical methods, and general comment is made on the application of nuclear magnetic resonance, rotatory dispersion and parachor applications.

Other chapters deal with the Lowry-Bronsted theory of acids and bases, and the allied Lewis concept; a survey is made of clathrate inclusion compounds, of nucleophilic displacements,  $S_N$  and their relation to  $S_{N-1}$  kinetics and to  $S_{N-2}$  reactions of the Walden inversion type.

A most extensive chapter deals with the stereochemistry of carbon, which is well illustrated with numerous examples illustrating resolution, solvent effects, configuration studies, optical phenomena, etc. This is supplemented by a further chapter on stereochemistry of elements other than carbon, notably those of nitrogen and sulphur. Free radical chemistry also receives the most detailed treatment.

The Baeyer strain theory, steric hindrance and conformational analysis receive much attention. A memorandum by Prof. F. W. Westheimer on electrostatic affects in organic chemistry forms the basis of Chapter 11, which concludes with a rather abbreviated discussion of the Hammett rho-sigma relations. References are, however, given to H. H. Jaffe's excellent review of this quantitative empirical relation between the rate or equilibrium constants of reactions involving organic compounds. The value of kinetic data is frequently stressed throughout the book, and in all chapters the mathematical treatment is of reasonably simple character and will not prove over-burdensome to those who find the more abstruse mathematical concepts somewhat difficult to follow.

This book is an able successor to its authoritative predecessors, and will do much to stimulate original thought and constructive discussion in the ever-extending and complex field of theoretical organic chemistry.

D. T. LEWIS

## TEXT-BOOK OF INORGANIC CHEMICAL ANALYSIS

### Quantitative Inorganic Analysis

By Prof. R. Belcher and Dr. A. J. Nutten. Second edition. Pp. x+390. (London: Butterworths Scientific Publications, 1960.) 35s.

IT is highly commendable that the authors have so thoroughly revised a text-book that is only six years old. Among the novel features introduced are choice of appropriate redox indicators for particular systems, and criticism of uncertainties involved in the dichromate-ferrous reaction. It is a pleasure to see classical gravimetric analysis treated with due respect

and yet a pity to miss a reference, presumably due to shortage of space, to the solvent extraction technique.

The reviewer disagrees with the condemnation of the swinging-point balance. In its simplicity and versatility, especially as regards control of sensitivity, it ought to remain for a long time a basic instrument in the hands of a chemist. Some minor criticisms may be mentioned briefly. Cleaning of pipettes by immersing overnight in a dichromate-sulphuric acid mixture is in the long run detrimental to the pipette inscription. On p. 150, it is pointed out categorically that laboratory glassware should on no account be warmed which, without defining temperature limits or stating reasons, sounds very dogmatic. On the other hand, the temperature control in a drying oven to within  $\pm 1^\circ$  C. (p. 10) seems exceptionally good for an average student drying oven. In the volumetric section, the conventional ferric alum is recommended as indicator in Volhard's method, while in the colorimetric section the authors state that sulphate ions tend to form complexes with iron(III). Why not propose ferric nitrate as indicator in the first instance?

The book has been edited with great care and the occurrence of misprints such as that in the legend to Fig. 40 is exceptional.

This clear, concise, and up-to-date text-book can be whole-heartedly recommended for use by students and practising chemists.

G. KAKABADSE

## THE POLYNUCLEOTIDE FIELD

### Polynucleotides

Natural and Synthetic Nucleic Acids. By Robert F. Steiner and Roland F. Beers, Jr. Pp. viii+404. (Amsterdam: Elsevier Publishing Company; London: D. Van Nostrand Company, Ltd., 1961.) 85s.

IN the introductory chapter of this monograph, the authors point out that the nucleic acid and associated fields have expanded at such a remarkable rate in the post-war years that it is no longer possible to attempt a complete coverage of them in a single text. They go on to list a few of the main subdivisions such as chemical genetics, virus biochemistry, protein synthesis, polynucleotide synthesis and the physical chemistry of polynucleotides. The extensive developments in the last two subdivisions in the five-year period ending 1960 have prompted Dr. Steiner and Dr. Beers to write this book. In the final chapter they touch on some of the other main subdivisions by discussing the biological roles of nucleic acids.

The introduction, which indicates the scope of the book, is followed by a chapter on the organic chemistry of nucleotides. Then the chemical and enzymatic evidence for the nature of the inter-nucleotide linkages in ribonucleic acid, deoxyribonucleic acid and synthetic polynucleotides is discussed. This is followed by two chapters on nucleotide-polymerizing enzymes. In the first, a description of the procedures for isolating and assaying these enzymes is given, and in the second, the properties of the different enzymes are discussed. The next three chapters deal with some physical methods such as ultra-violet spectroscopy, optical rotation and X-ray diffraction, and their application to the determination of the macro-molecular configuration of natural and synthetic polynucleotides. The final chapter, mentioned above, is preceded by a discussion of the helix-coil