It is a summary of methods of analysis and results that is unusually up to date because it draws heavily on material which was unpublished at the time the chapter was written and which has only recently appeared in print. In their paper "Seismicity and earthquake mechanism," John H. Hodgson and A. E. Stevens place most emphasis on the latter topic. The results of a fresh analysis of fault-plane data are presented; this has the advantage of treating all the data in a uniform manner. "Seismology and logics," by V. I. Keilis-Borok, is an examination of the logical structure of seismology. A strong appeal for uniformity and thoroughness in the interpretation of seismograms is made. Estimates of uncertainties in velocity-depth and amplitude-distance functions are shown. "Seismic studies of the earth's crust in Eurasia," by I. P. Kosminskaya and Y. V. Riznichenko, and "Explosion seismology in the western hemisphere," by L. C. Pakiser and J. S. Steinhart, summarize studies of crustal structure. It is interesting to note that the Russians conclude that "detailed observations have brought to light a velocity stratification in the earth's crust" whereas the Americans find that "it is certain only that the velocity-depth function can at any place be adequately represented by a continuous velocity variation." These differing conclusions presumably result from basically different philosophies of interpretation.

In "Longitude and latitude," W. Markowitz, N. Stoyko, and E. P. Fedorov discuss mainly IGY measurements of motions of the pole of rotation, continental drift, and variations in the length of the day. In "Earth tides" Paul Melchior describes advances in instrumentation for observing the bodily tides and improved numerical predictions of the Love numbers. G. P. Woolard, in a chapter entitled "Gravity," describes the international gravity net, compares pendulum and gravimeter data for a large number of stations, and discusses recent absolute determinations of gravity.

"Geophysics of the South Pacific," by R. W. Raitt, is a discussion of bottom topography, seismic crustal studies, heat flow, and the structure of the continental margin of the west coast of South America. This part of the oceans was virtually unstudied prior to 1951. In "Sea-level fluctuations and long waves," William L. Donn, June G. Patullo, and David M. Shaw discuss measurements of sea level in the Pacific, made principally during the IGY, and the detailed observations of sea level and water density made off Bermuda in the years 1954 to 1962. A briefer discussion of waves with periods up to several thousand seconds is included. John A. Knauss discusses subsurface ocean currents, with particular attention to the Cromwell current or Pacific equatorial countercurrent. He emphasizes the unexpected occurrence of high velocities at great depths in all the oceans. "Oceanic polar front survey in the North Atlantic," by G. Dietrich, covers the bottom topography of the North Atlantic and the southern limit of cold polar water. The influence of topography, especially the mid-Atlantic ridge, on the polar front is discussed. In "Antarctic oceanography" V. G. Kort discusses ice distribution, wave heights and periods, water and heat exchange, formation of bottom waters, and dynamics of water masses in the Southern Ocean. Russian work is emphasized.

The structure of Antarctica and its ice cover is discussed by Charles R. Bentley. Measurements of elevation, gravity, ice thickness, ice-cap structure, slope of the ice surface versus its thickness, crustal thickness, and snow accumulation are considered. A lengthy discussion of the reliability of the various measurements is included. "Glacial meteorology," by Herfried C. Hoinkes, is a discussion of the mass and heat budgets of glaciers, including methods of measurement, difficulties, and recent results. "Ice and its changes," by P. A. Shumskiy, A. N. Krenke, and I. A. Zotlikov, covers topics ranging from the terrestrial abundance of ice through theory of glacier flow and distribution of ice to changes in the volumes of glaciers. "Changes" in the title refers to the amount and distribution of ice rather than to its bulk physical properties. "Antarctic weather and climate," by M. J. Rubin, covers the chemical constituents of air and snow, climate controls, heat and water budget, circulation patterns, and climate. Bert Bolin, in "Gross-atmospheric circulation as deduced from radioactive tracers," covers both stable and radioactive tracers, emphasizing the latter. Natural and bomb-produced radioactivity are discussed. Circulation in the troposphere and lower stratosphere is examined, but little is said about the upper stratosphere and mesosphere. The latter topic is discussed by S. Teweles in the next chapter, "Stratospheric-mesospheric circulation." Teweles covers composition, annual cycle of circulation, winter breakdown of circulation, and the 26-month cycle in this part of the atmosphere. In "The heat balance of the earth," M. I. Budyko and K. Y. Kondratiev discuss the inflow and outflow of heat at different parts of the earth and different times of year.

The last two chapters of the book contain material presented at the general plenary session which launched the conference. V. V. Beloussov discusses "The Upper Mantle Project," and Roger Revelle considers "International Cooperation in Oceanography."

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Organic Chemistry

Les Mécanisme Réactionels en Chimie Organique. Blanca Tchoubar. Dunod, Paris, ed. 2, 1964. xvi + 231 pp. Illus. F.18.

According to the preface, the purpose of this book is to present the basic principles of molecular structure needed for an understanding of chemical reactivity, to indicate our present understanding of reaction mechanisms and the theoretical and experimental methods available for their study, and finally to show that a profound (approfondie) knowledge of chemical processes is needed to determine the laws relating structure to chemical properties. The book is divided into two parts. The first deals with the basic properties of orbital theory and molecular structure, with polarity and the inductive effect, with resonance and the mesomeric effect, and with acids and bases. In the second part a classification of reaction mechanisms and a survey of chemical kinetics precede chapters on aliphatic substitution, elimination reactions, addition reactions, prototropic reactions, carbonyl reactions, and aromatic substitution.

Reading this book fills me with a faint sense of nostalgia, for nearly the whole of it could have been written 30 years ago. The presentation is at a very elementary level, and little reference is made to modern developments in the field. Thus, the treatment of aliphatic substitution could well have been written in the 1930's, with the exception of a brief reference to nonclassical car-

bonium ions (which are mentioned in passing without any evidence for their existence or discussion of their role in chemistry). No mention is made of recent work on the relation between the S_N1 and S_N2 mechanisms, on ion pairs, on the S_N2' mechanism, or even on the relation between structure and reactivity. Similar criticisms could be made of the chapters that deal with other reactions. Even more surprising is the lack of any numerical data; the only reaction rates quoted in the book are some partial rate factors for nitration of substituted benzenes (p. 199)—and these are from the older literature and have been mostly superceded.

However, despite its shortcomings, this book does give a very clear outline of the subject, and, for this reason, it may prove useful to students.

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Microscopy and Biology

Electron Microscopic Anatomy. Stanley M. Kurtz, Ed. Academic Press, New York, 1964. xii + 425 pp. Illus. $14.

This volume consists of a collection of 15 articles by American and European specialists who describe the fine structure of many of the more investigated mammalian tissues. It includes little on blood vessels and leaves out both principal and accessory tissues of the genital and respiratory systems, the skin, the teeth, the eye, the ear, and several endocrine glands. Throughout there has been little attempt to integrate the information presented in the chapters, to develop particular concepts, or to trim away repetition. For example, about half of the 13 sections on materials and methods are fairly long; it might have been better to discuss methods once.

The chapters are independent and must be considered separately. Each begins with an introductory outline and ends with a list of references. The book has only an author index. The form of the articles is somewhere between that of a research report and that of a review. Most of the articles are new; a few were published earlier, in longer versions, but all have been competently written. The chapters are enlivened by the inclusion of controversial material, just as they are dulled by the repetition of such concepts as the packaging function of the Golgi apparatus, the protein-making function of the ribosomes, and the unit membrane. The descriptions of the central nervous system, the pancreas, and the cartilage are especially readable. A perfectionist might consider some 15 percent of the illustrating micrographs excellent and another 60 percent satisfactory and instructive; the remainder might recall the early days of electron microscopy. While substantial, the articles are not the definitive descriptions envisioned in the preface; nor do the illustrations set the standard of quality for beginners in electron microscopy, as the editor claims.

The book is printed on coated paper and is strongly bound. The reproduction of the plates is good; but that of the leading anatomical journals is better, owing to the use of higher resolution engravings or to more careful inking. As a supplement to histology textbooks this volume will have limited use, because it is not sufficiently comprehensive in its survey of the tissues. Moreover, as a result of recent revisions, the textbooks now include much on fine structure. Like a symposium volume, *Electron Microscopic Anatomy* will be consulted mostly for the sake of one or another of its articles. Those who read it through will appreciate the widespread contribution of electron microscopy to biological knowledge.

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Analytical Chemistry

Gas Analysis by Gas Chromatography. P. G. Jeffery and P. J. Kipping. Pergamon, London; Macmillan, New York, 1964. xii + 216 pp. Illus. $10.

Gas chromatography, an offspring of solution chromatography, is but 12 years old; the parent is 58. This precocious progeny has its own unique traits. In the parent, solution chromatography, the chromatogram is the sequential zones of the separated substances. In the offspring, gas chromatography, "the *chromatogram* is the plot of the detector response against either time or the volume of carrier gas." The sensitivity and the wide applicability of the detectors make gas chromatography more effective than solution chromatography, especially when applied with minute quantities of all kinds of substances. This characteristic, more than any other, facilitates the instrumentation and automation of the younger technique.

This book is another example of coordinated, basic studies produced in a laboratory devoted primarily to research. Both authors are "officers" of the Warren Spring Laboratory, a unit in Great Britain's Department of Scientific and Industrial Research.

The book was written for the analyst, as a guide to the analysis of gaseous mixtures. It consists of three parts: description of the apparatus (with chapters devoted to sample transfer or addition, columns and fillings, detectors, and the complete apparatus); methods for the determination of individual gases (with chapters on hydrogen, the noble gases, various common gases, the hydrocarbon gases, nitrogen compounds, sulfur compounds, halogen compounds, and miscellaneous compounds); and examples of separations (with chapters on complete analyses of gases, of gases in solids, of gases in liquids and vapors, and methods of sampling). The organization is a practical one that omits the common mechanistic or so-called theoretical considerations, which, at best, are inadequate, especially in explanation of separability or selectivity.

In the practical middle ground, the material in this publication should be most useful to those who are about to undertake analyses by gas chromatography for the first time. The book is a little too specialized for those with only a general interest in gas chromatography but not comprehensive enough for those now using gas chromatography. Many books and reviews on gas chromatography are not cited, nor is the *Journal of Gas Chromatography*. The extent of the commercial instrumentation of gas chromatography, an instrument business that now runs into many millions of dollars annually in the United States alone, is not indicated, although instrument makers issue a large number of publications, with pertinent data on sorbents, gas flow regulators, and special detectors.

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