Molecular Biology: A Summary

Cell Biology. A current summary. John Paul. Stanford University Press, Stanford, Calif., 1964. 197 pp. Illus. $4.75.

This book clearly results from the determination of a competent scholar to provide for the needs of those whose knowledge is undeveloped in what has come to be called molecular biology.

According to the preface, the work is "primarily designed for post-graduate and senior undergraduate students in the biological sciences." But the author, John Paul, has also aimed at, and hit, a large number of their instructors who may be termed backward rather than undeveloped. These, in particular, should read *Cell Biology* with care and concentration.

Here is not really a summary but a tightly organized and integrated distillate from the ocean of data with which we are currently endowed. A considerable fraction of the author's effort was surely spent in orchestrating the material.

A number of promises are made in part 1 ("The Nature of Cells"), all of which are kept in later sections. The cell is very properly taken as the point of departure for a tripartate analysis of protoplasm as a system that transmits information, maintains itself by ordered catalyzed reactions, and reflects thermodynamic reality. Above all, Paul successfully conveys the essential biological message that everything depends on everything else (a difficult task if one is to do it in depth and with reasonable hope that the lesson will prove to be a base for an increasing degree of biological sophistication).

Molecular events are extremely well related to cellular architecture and biological activity. Particularly impressive are the treatments of photosynthesis, intracellular homeostasis, chromosomal ultrastructure, and the mitochondrion.

The diagrams are well chosen and very pertinent to the text, and tables are happily kept to a bare minimum. All the plates are confined to one section (a desirable arrangement because the reader faces the illuminating diagram before meeting the possibly confusing electron photomicrograph).

An excellent bibliography, properly correlated with the text, enables the advanced student or the established scholar to come to grips with the original literature to his maximal profit.

Cell Biology is not an easy book to read. It is not possible to skim through it, unless one is already thoroughly familiar with the material. It demands powers of concentration and retention, chiefly because of its highly sequential organization.

Paul is correct in believing that a layman with a trained mind would find reading his book a rewarding experience.

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Analytical Chemistry of Molybdenum (253 pp., $13.50) by A. I. Busev; **Analytical Chemistry of Ruthenium** (232 pp., $12.50) by T. D. Avtokratova; **Analytical Chemistry of Thorium** (256 pp., $11.25) by D. I. Ryabchikov and E. K. Gol'braikh; **Analytical Chemistry of Thallium** (144 pp., $6.75) by I. M. Korenman; and **Analytical Chemistry of Uranium** (382 pp., $15.75), edited by N. Kaner. Israel Program for Scientific Translations, Jerusalem, 1963; Davey, New York, 1964.

The five monographs reviewed here are part of a series which is being published by the Academy of Sciences of the U.S.S.R. and which will include approximately 50 monographs when complete. Academician A. P. Vinogradov serves as Chief Editor of this ambitious program, and a distinguished group of Russian chemists are on the Editorial Board. The monographs reviewed here were translated by the Israel Program for Scientific Translations.

The general plan of all the volumes is the same. A chapter giving a résumé of the chemistry of the element is followed by chapters on detection, separations, and determinations by gravimetric, volumetric, spectrophotometric, electrometric, and other methods, and by a chapter on analysis of materials. In some instances methods for determining trace elements in the element concerned are given. The analyst will be particularly interested in the large bibliography which cites work performed in the U.S.S.R. Previously many of these articles have not been available to those who do not read Russian. In fact, some of the Russian journals are not readily available in the United States. Therefore, the résumés of these articles given in the various volumes are quite useful.

Unfortunately there are quite a number of errors, and it is important that the reader be on his guard to note these. Incorrect references, even to the books themselves, errors in chemical formulas, and several other kinds of errors were noted. Some are definitely the result of the translation process, but it is difficult to assign all of them to this category.

The individual monographs are considered in the following paragraphs.

Analytical Chemistry of Molybdenum (Moscow, 1962), by A. I. Busev, is quite comprehensive, and the author's evaluation on the validity of the separations and the methods of determination show that he is an expert in the field. This excellent survey of the chemistry of molybdenum will be useful to the analyst, primarily because of the care with which the author indicates the shortcomings of many of the methods described. This volume has a more comprehensive index than other volumes reviewed here.

Analytical Chemistry of Ruthenium (Moscow, 1962), by T. D. Avtokratova, covers the literature quite thoroughly. There are several useful schematic diagrams that cover the analysis of platinum metals and solutions containing platinum metals as well as ores and concentrates. There is considerable repetition of work, such as the description of the preparation of RuO_4, which is found in several places throughout the book. In general, the coverage of the ruthenium methods in use is quite adequate, and the book will serve a useful purpose. The author has attempted to evaluate some of the methods described.

Analytical Chemistry of Thorium (Moscow, 1960), by D. I. Ryabchikov and E. K. Gol'braikh, gives a rather complete literature survey, but it appears that, unfortunately, a critical evaluation of methods was not considered. Many of the methods described are seldom used. The chapter on the determination of impurities in thorium metal is rather meager and of doubtful value. Of the many chemical

methods available for determining impurities, only those for aluminum, boron, and certain rare earths are considered, even though the necessity for methods was mentioned in chapter 5. Chapter 4, "Determination of thorium in natural materials and in industrial products," a quite comprehensive chapter, is the best one in the book. In general, this volume will be quite useful to the analyst.

Analytical Chemistry of Thallium (Moscow, 1960), by I. M. Korenman, is quite adequately documented. The published literature on thallium is relatively meager, and this volume is consequently considerably smaller than the other monographs. The author's evaluation of the methods given indicates that he is quite familiar with the subject. A considerable number of microscopic methods are given under qualitative reactions. The lack of a section on the analysis of commercial materials does detract in a small way, especially in view of the coverage given to this aspect of the topic in other volumes. The properties of thallium compounds in which the analyst may be interested are given in an appendix.

Analytical Chemistry of Uranium (Moscow, 1962), contains papers by various contributors, and the literature of the field is well covered. The work carried out in Russia is well documented and of considerable value. Chapter 4, on the determination of uranium, is the most important chapter in the book. As one would expect when several authors are responsible for a volume, the coverage is somewhat uneven. More space than appears warranted is given to polarography. In several instances the authors are noncritical. Certain rarely used procedures are given. Chapter 7, on the determination of impurities in uranium, is very spotty in its coverage and of somewhat questionable value. Considered as a whole, however, the monograph will be of considerable interest to the analytical chemist.

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British Ecological Society Monograph

Grazing in Terrestrial and Marine Environments. A symposium of the British Ecological Society, April 1962. D. J. Crisp, Ed. Blackwell, Oxford, England; Davis, Philadelphia, 1965. 338 pp. Illus. $12.50.

Like other symposia in the series, this one addresses itself mainly to fundamental aspects of practical problems. For future historians of science it thus provides a reflection of some of the concerns of the period and an assessment of the status of specific problems. For present-day readers the utility of different parts of the book will vary. Contributions range from one or two cursory progress reports, through detailed accounts of particular research efforts, to more general reviews. Coverage is broad, including such diverse phenomena as the effects of larger mammalian grazers on perennial plants and those of small invertebrate filter feeders on oceanic plankton. As must be expected, the variety of contributions results in something less than a satisfactory overview, and many aspects of grazing phenomena may have received less attention than they deserved. However, this is a natural consequence of this sort of effort. The comparisons and contrasts provided should, in any case, stimulate the many workers concerned with any of the aspects of grazing.

A short, unsigned introduction, which attempts to summarize the symposium as a whole, and the first paper, a review of the energetics of grazing (by Macfadyen), serve to integrate the other parts into which the volume is subdivided. Of these, the sections on grazing and range management and those on grazing by littoral and benthic organisms seem least successful in providing a coherent account of what is and what is not known. One feels that the efforts of various authors to be general have resulted in undesirable vagueness. But a group of four papers on grazing by sheep is particularly praiseworthy, for the individual contributions truly complement each other and document nicely a complex but reasonably well-understood set of interactions that may prove of considerable general interest.

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Electron-Stream Interaction with Plasmas. Richard J. Briggs. M.I.T. Press, Cambridge, Mass., 1964. xii + 187 pp. Illus. $7.50.

An extensive effort has been made in recent years to investigate the interaction between streams of charged-particle beams and a plasma. The motivation has been, on the one hand, to understand and catalog unwanted instabilities and, on the other, to investigate the possibilities of generating and of heating a plasma. Some attempt has also been made to use these interactions for microwave amplifiers. The most active research has been done by the Russians, who are concerned with fusion, and by a number of groups in this country, who are concerned with somewhat more diverse objectives. Concepts and ideas from the field of microwave tubes have influenced much of the work in the United States, and the research activity of the group at Massachusetts Institute of Technology is among those which have been largely influenced by such concepts. The book under review, which is derived from the author's Ph.D. thesis, represents the general set of ideas associated with this group, particularly with the work of Bers, Haus, and Smullin. It is definitely a book for the specialist, but for his purpose it is valuable.

The long preliminary chapter is concerned with the set of criteria for distinguishing various kinds of instabilities, the so-called convective and nonconvective instabilities. These categories originated from the work of Sturrock and of Landau and Lifshitz, but very useful generalizations and extensions of these concepts, which have been made by the author and some of the other MIT workers, are described in detail in this chapter. Because the entire approach involves "pololology" and the general exploration of the complex plane, the discussion is necessarily largely mathematical. A partially successful attempt is made to provide some feeling for the physical aspects of the various criteria, but there is room for another attempt to provide physical plausibility. However, the chapter is probably the most complete treatment of this valuable approach, and extensions not available elsewere are described.