merical analysis is already considerable and promises to intensify greatly.

The present book is a valuable contribution to the development and presentation of mathematical theory and methodology, designed to take advantage of the new and powerful computing machines. The main body of the text presents a systematic and thorough analysis of the most important finite difference approximations to ordinary differential equations. Discretization (or "truncation") error and round-off error are given equal attention. Both analytical and statistical methods are employed in the analysis of round-off error. Many computer experiments are included to illustrate and support the theory.

As a result of the systematic organization of the main results and the 170 problems to be solved, the volume will serve well as an advanced text. In fact, the problems contain many interesting special results and augment the main content of the book. The practising mathematicians will find over 200 references, mostly to literature written in the last decade. The references are made especially useful by bibliographical notes at the end of each chapter.

There is so much current activity in this field that the future will certainly see more publications and new results. In spite of this, the present work is and will remain a valuable addition to the library of any serious student of numerical analysis.

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## Plant, Animal, Soil Sciences

**Growth in Living Systems.** M. X. Zarrow, Ed. Basic Books, New York, 1961. xv + 759 pp. Illus. $15.

*Growth in Living Systems* represents the published proceedings of an international symposium on growth held at Purdue University in June 1960. The symposium, organized in conjunction with the dedication of Purdue's new Life Science Building, was intended to be interdisciplinary in approach, paralleling the concept which led to the construction of the Life Science Building as a huge, single structure aimed at uniting physically such diverse departments in plant, animal, and soil sciences as, for example, biophysics, soil conservation, nutrition, crop production, and microbiology.

The first two days were devoted to general sessions planned for the entire audience of several thousand people. The list of speakers was impressive indeed and included F. H. C. Crick, M. B. Hoagland, Daniel Mazia, T. T. Puck, Aron Moscona, M. Sussman, J. Brachet, C. W. Wardlaw, Armin Brau, M. Singer, and James Bonner. An equally distinguished group was invited to present papers at the several concurrent sessions comprising the third day of the symposium.

It is not possible to review here the merits of individual papers. Some are speculative, some are technical, some are reviews; some are directed at experts in the field, others assume total ignorance on the part of the reader; some attempt to attain depth in coverage and insight, others are clearly intended to be classed as superficial generalizations; some are superbly presented essays, others would fail to pass most editorial review boards.

Two unfortunate aspects of the volume need to be emphasized. First, most of those papers presenting new data have been preceded in the published record by scientific reports that appeared between the time the symposium was held and the present. By the same token, many of the review papers are almost direct duplications of reviews published elsewhere by the same authors.

The second aspect is perhaps more serious. The volume attempts to do too many things for too many people at the same time. It is difficult to visualize the same person appreciating a detailed, careful analysis of recombination in bacteria, and yet being satisfied with a suggestion that a hormone may prevent the genetic "count-down" of cells programmed to die. Similarly, a reader who has the sophistication required for understanding the kinetics of enzyme induction can hardly be the same reader for whose benefit the editor feels compelled to include a glossary of terms in which mutagenesis is defined as "the process of mutation," zygote is classified as "the cell resulting from the union of the male and female gametes," and DNA is equated with deoxyribonucleic acid.

It is difficult to argue with the goal of interdisciplinary understanding; one can only question whether the symposium achieved its goal. For those who attended the meetings, the answer is probably a qualified yes. For those who have to rely on the published proceedings, I suspect the majority will have to answer no.

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## Living Matter

**The Biosynthesis of Proteins.** H. Chantrenne. Pergamon, New York, 1961. ix + 220 pp. Illus. Plates. $6.50.

This volume represents a noteworthy integration of knowledge and theories in the highly important and rapidly developing field of protein biosynthesis. Chantrenne has published extensively in several of the areas concerned and has been able to bring together contributions represented by over a thousand publications in such fields as biochemistry, genetics, cytology, cellular physiology, immunology, and microbiology. He divided the subject into five chapters representing, respectively, genetic control, the sites of protein synthesis, the relative significance of ribonucleic and deoxyribonucleic acids (RNA and DNA), the chemical pathway and the chemistry of intermediates between amino acids and protein, and the mechanisms of regulation.

In the first chapter basic observations on hereditary abnormalities in man—for example, in alcaptonuria and congenital galactosemia—provide an introduction to the subject of genetic control of metabolic processes and to the formulation of the one-gene-one-enzyme hypothesis, which is elaborated with recent studies of microbial mutants and varieties of human hemoglobin. The second chapter reviews the ability of isolated cellular fractions like ribosomes, mitochondria, chloroplasts, and cell nuclei to synthesize proteins. The respective roles of DNA and RNA in protein synthesis are discussed in the third chapter, with emphasis on the heterogeneity of the latter and on the importance of its structural integrity for protein synthesis.

In the chapter on chemical pathways the energy requirement for protein biosynthesis is considered on thermodynamic grounds, and various experiments which describe the respective functions of adenosine triphosphate, amino acid

activation enzymes, transfer RNA's, guanosine triphosphate, and ribosomes are reviewed. The final chapter deals with those aspects of enzymic adaptation which throw light on the mechanisms and control of protein synthesis. The author considers successively induction and repression of enzyme synthesis in microorganisms, non-Mendelian hereditary factors, changes in protein synthesis during differentiation, and the synthesis of antibodies.

Although there are a number of typographical errors, this book, on the whole, is well written. The experimental basis for theories of protein biosynthesis is extensively recorded, and the book should be of value to research workers even after some of the current theories have become obsolete.

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## Concise, Clear, Utilitarian

**Minerals for the Chemical and Allied Industries**. Sydney J. Johnstone and Margery J. Johnstone. Wiley, New York, ed. 2, 1961. xi + 788 pp. $25.

Publication of this second edition of *Minerals for the Chemical and Allied Industries* again brings to our attention the valuable contribution that Sydney J. Johnstone and Margery J. Johnstone made in assembling a comprehensive volume based largely on the industrial applications and specifications of minerals and metals. The first edition, so well received in 1954, has been carefully brought up-to-date; six chapters have been added, and parts of the volume have been completely rewritten to make available descriptions of recent technological advances and data, previously classified. Although the book was prepared in Great Britain and draws heavily upon British publications for source material, its coverage is world-wide in scope, and many other sources have been utilized, including the principal U.S. agencies concerned with material specifications as well as numerous previously unpublished reports.

The format is nearly identical with that of the first edition. Each of the 77 chapters covers a commodity or group of commodities, arranged alphabetically. The typical chapter contains an introductory section, which briefly covers natural occurrences and includes general observations on the factors that control uses and marketing. Material on world production, extraction, and use is presented in the sections that follow. The bibliographies were selectively assembled, and they provide separate lists of publications exclusively devoted to standard specifications.

The emphasis placed upon utilization and specifications makes this book unique among the large, commodity-oriented volumes, such as *Industrial Minerals and Rocks* and *Mineral Facts and Problems*, and a valuable companion to them. Unlike some other commodity volumes the Johnstones' volume is industrially oriented, and includes both metallic and nonmetallic materials, thereby providing more complete coverage and ignoring the commonly arbitrary distinction between the two.

Because this book has only two authors rather than many contributors, its coverage is very well balanced and the ease of reference is at once obvious. Moreover, the text is refreshingly concise and readable, strongly suggesting that its preparation was a labor of love for the authors. Although both editions are primarily intended for use by mineral producers and consumers, the second edition especially should appeal to all persons concerned with mineral economics and economic geology.

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## New Books

### Biological and Medical Sciences

**Air Pollution**. vols. 1 and 2. Arthur C. Stern, Ed. Academic Press, New York, 1962. vol. 1, 673 pp., $20; vol. 2, 603 pp., $18.50.

**Algology**. Proceedings of the symposium held at New Delhi, India, in December 1959. D. Raghavan and P. Kachroo, Eds. Indian Council of Agricultural Research, New Delhi, 1960. 413 pp. Illus.

**Antibiotics and Sulphonamides in Paediatrics**. Joseph Ungar and Leonard Haas. Oxford Univ. Press, New York, 1962. 157 pp. 15s.

**Comparative Neuropathology**. J. R. M. Innes and L. Z. Saunders. Academic Press, New York, 1962. 839 pp. Illus. $32.50.

**Diagnostic Microbiology**. A textbook for the isolation and identification of pathogenic microorganisms. W. Robert Bailey and Evelyn G. Scott. Mosby, St. Louis, Mo., 1962. 327 pp. Illus. $6.50.

**Diagnostik und Therapie der Erkrankungen des Magen-Darm-Kanals**. Medizinischen Universitatsklinik Erlangen. Karger, Basel, Switzerland, 1962. 367 pp. Illus. Paper, $20.50. A collection of lectures presented at the postgraduate course in gastroenterology at the University of Erlangen, during late 1960, and dedicated to Norbert Henning.

**Fossils**. An introduction to prehistoric life. William H. Matthews III. Barnes and Noble, New York, 1962, 347 pp. Illus. $2.25.

**General Biology**. Gordon Alexander. Crowell, New York, ed. 2, 1962. 918 pp. Illus. $7.50.

**Introductory Zoology**. Lincoln Coles Petit. Mosby, St. Louis, Mo., 1962. 619 pp. Illus. $7.50.

**Methods of Biochemical Analysis**. vol. 9. David Glick, Ed. Interscience, New York, 1962. 461 pp. Illus. $14.50.

**Modern Dairy Cattle Management**. Richard F. Davis. Prentice-Hall, Englewood Cliffs, N.J., 1962. 270 pp. Illus. Trade ed., $6.65; text ed., $5.

**Otosclerosis**. Henry Ford Hospital International Symp. Harold F. Schuknecht, Ed. Little, Brown, Boston, Mass., 1962. 679 pp. Illus. $18.50.

**Progress in Drug Research**. vol. 3. Ernst Jucker, Ed. Interscience, New York, 1961. 563 pp. Illus. $23.50.

### Mathematics, Physical Sciences, and Engineering

**Ballistic Missile and Aerospace Technology**. Proceedings of the 6th symposium. vol. 1, *Design and Reliability, and the Invited Addresses* (414 pp., Illus., $8); vol. 2, *Ballistic Missile and Space Electronics* (463 pp., Illus., $9); vol. 3, *Propulsion, Space Science, and Space Exploration* (455 pp., Illus., $9); vol. 4, *Re-entry* (250 pp., Illus., $5). C. T. Morrow, L. D. Ely, and M. R. Smith, Eds. Academic Press, New York, 1961. The proceedings volumes contain the unclassified papers presented at the symposium sponsored by the Air Force and Aerospace Corporation and held in Los Angeles, 29–31 August 1961. Classified papers are published in the *Transactions*.

**Differential Equations**. Kaj L. Nielsen. Barnes and Noble, New York, 1962. 284 pp. Illus. Paper, $1.75.

**Experimental Thermochemistry**. vol. 2. H. A. Skinner, Ed. Interscience, New York, 1962. 476 pp. Illus. $14.50.

**Introductory Atomic Physics**. M. Russell Wehr and James A. Richards, Jr. Addison-Wesley, Reading, Mass., 1962. 431 pp. Illus. $8.75.

**Small and Medium Power Reactors**. vols. 1 and 2. Proceedings of the conference held at Vienna, 5–9 September 1960. International Atomic Energy Agency, Vienna, Austria, 1961. vol. 1, 617 pp. $9 (paper); vol. 2, 453 pp. $7 (paper).

**The Stars**. A new way to see them. H. A. Rey. Houghton Mifflin, Boston, Mass., ed. 2, 1962. 160 pp. Illus. $6.

**Worked Examples in Physics**. V. L. Zubov and V. P. Shal'nov. Translated by Erwin Marquit. D. L. Evans, Translation editor. Pergamon, New York, 1962. 353 pp. Illus. $17.50. Translated from *Zadachi po Fizike*, Moscow, ed. 5, 1959.