Plant Organelles

The Plastids. Their Chemistry, Structure, Growth and Inheritance. JOHN T. O. KIRK and RICHARD A. E. TILNEY-BASSETT. Freeman, San Francisco, 1967. 624 pp., illus. $17.50.

Because of the great achievements of biochemists in the laboratory as well as in publicity, most readers will equate *plastids* with *chloroplasts*, and the latter they will probably characterize as the containers for the enzymes and pigments of photosynthesis. However, the last few years have witnessed an increased interest in and emphasis on the many other aspects of the life and functions of these cellular organelles. The photosynthetic chloroplasts are only one of the types of plastids which are found in plant cells. Other plastids develop into structures with different biochemical properties. The biochemical riches of the plant kingdom in food substances and pigments are probably due to the specialization and evolution of the synthetic potentials of the plastids.

The authors of this book have undertaken to present an appraisal of the entire field of the biology of the plastids. We can gain an insight into the breadth of this field from the fact that of the close to 600 text pages of the book, only about one dozen are devoted to the process of photosynthesis as such.

The authors have done an admirable job of assembling data and of summarizing the present state of this exciting field of cell biology. The areas of active research which are extensively covered include studies on the reproduction, development, and differentiation of the organelles. The phenotypic and genotypic controls over the plastids are of special interest at present, and they are given extensive and detailed discussion ranging all the way from classical genetics studies to molecular details of the genetic-apparatus of the organelles. Implications of these studies are most relevant to studies of differentiation of all multicellular organisms, both plants and animals.

One of the most important contributions of this book is that it brings together, in a rather clear account, the German literature on the genetics of plastids of higher plants. This part of the book will be greatly appreciated by English-speaking graduate students.

I found the extensive subdivision and subtitling throughout the book somewhat distracting. Also, the division of the subjects covered by the two authors makes for a rather uneven and somewhat arbitrary organization. For example, the part of the book devoted to inheritance and genetics of plastids includes studies of higher plants only. Studies on the inheritance of mutations which affect the chloroplasts of *Chlamydomonas* are treated in the section concerned with the specific biochemical consequences of these mutations.

But these are minor defects in a generally well-presented and timely contribution. This book with its wealth of assembled information can, in addition to being a handy reference for the specialist, admirably serve to introduce advanced students to the field. In summarizing our present knowledge in this field, the authors do not fail to call our attention to the extent of our ignorance. The book will stimulate many new investigations and thus will undoubtedly contribute to its own obsolescence.

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Problems in Embryology

The Biochemistry of Animal Development. Vol. 2, Biochemical Control Mechanisms and Adaptations in Development. RUDOLF WEBER, Ed. Academic Press, New York, 1967. 495 pp., illus. $21.

The goal of biochemical embryology has been to elucidate the chemistry of developing systems and to determine the role that biochemical reactions play in developmental processes. A wide variety of approaches and rationales have been applied to the study of developmental problems. The success of these endeavors and the state of knowledge are well illustrated in the present volume.

Rather than undertaking the mammoth task of compiling a comprehensive review of the vast literature of developmental biology, the contributors deal with selected problems that are currently receiving much attention.

The material is presented in nine review articles. The first part of the book is concerned with biochemical control mechanisms in development processes and contains articles on primary induction and determination, metabolic control of growth and differentiation, nucleo-cytoplasmic interactions, sex differentiation, amphibian metamorphosis, and regeneration. The second part deals with adaptations in embryonic development and discusses yolk utilization, mammalian placenta, and nitrogen metabolism and excretion.

For the most part the articles are well organized, are easy to read, and adequately referenced. The material is cross-indexed according to author, animal species, and subject matter. In general, the topics treated are representative of the problems in the selected areas. As in most works of this kind, there are some disappointing disparities of coverage and critical comment. Even so, the diligent reader will find ready entrance to the original literature through the list of references included at the end of each article. The present volume, along with volume 1 of the work, will therefore serve as a useful reference source and an adequate introduction to the kinds of biochemical studies that have been made on developing systems.

These articles are essentially progress reports; they give no definitive answers to the basic questions of the biochemistry of development. As the editor writes in his preface, "Although the amount of information available on biochemical events of development is impressive indeed, it remains for future experimentation to help translate the classic concepts derived from experimental embryology into adequate molecular terms." As I see it, the primary value of *The Biochemistry of Animal Development* is that it points up, as no other recent work of my acquaintance has, the primitive and fragmentary state of fundamental biochemical knowledge in developmental biology.

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Mathematical Procedure

Numerical Inversion of the Laplace Transform. Applications to Biology, Economics, Engineering, and Physics. RICHARD BELLMAN, ROBERT E. KALABA, and JO ANN LOCKETT. Elsevier, New York, 1966. 259 pp., illus. $8.50.

The authors' stated purpose in writing this book is to advance the point of view that many problems which take the form of equations can be solved numerically by means of the intermediary use of the Laplace trans-