Book Reviews


The importance of this book from the point of view of oncology is best expressed by the Foreword of the Series Editor, who points out that ‘exaggerated emphasis is placed in today’s government research policy planning upon work that deals directly with man and his diseases ...’ while ‘there remain numerous problems in clinical medicine that no amount of clinical study can solve’. Indeed, the six essays which constitute this volume, although written by eminent plant biologists contain a wealth of information for clinical and experimental cancer research, a fact which, incidentally, is a further justification of having in this journal a section for studies which deal with the basic biological background of cancer. One of the essays (H. N. Wood) actually starts by quoting Sir Julian Huxley: ‘Cancer is not merely a medical problem; it is a biological phenomenon, whose elucidation is bound up with advances in a number of key fields in present-day biology’. This is the same view which the illustrious biologist reiterated in this journal when introducing the general biological section a few years ago [Huxley, J. S.: Introduction remarks on the new section of the journal Oncology. Oncology 22: 3-5, 1968].

In the volume under review, by far the longest of the contributions is the first one, The Inception Phase in the Crown Gall Disease by R. E. Beardsley (Laboratory of Plant Morphogenesis, Manhattan College) which deals with the central mystery of all tumor research, the problem of tumor induction, i. e., the conversion of normal cells to the tumorous state. The author concludes that in the case of the characteristic plant tumors, crown galls, the most reasonable view is that they are virus-induced. The agent seems to be a bacterial virus (bacteriophage), carried by Agrobacterium tumefaciens. There is impressive evidence for this view both from modern analysis of DNA base sequences and experimental tumor inductions with bacterial and phage DNA. However, there is still much doubt whether this DNA is itself the tumor-inducing principle (TIP) or just triggers a more complex mechanism in which two or more further substances are involved. There are good indications that crown galls are induced in two stages, one of which is thermolabile.

Two more essays, The Development of a Capacity for Autonomous Growth of the Crown Gall Tumor Cell by H. N. Wood (Rockefeller University) and Plant Tumors of Viral Origin by L. M. Black (University of Illinois) deal essentially with the same problems as Beardsley’s paper and contribute further valuable data to the subject, while two others, Stability of the Tumor Phenotype in Crown Gall Tumors of Tobacco by F. Meins (Princeton University) and Plant Genetic Tumors by H. H. Smith (Brookhaven National Laboratory) emphasize mainly the genetic aspects pf plant tumor research.

The last essay of the volume, The Relevance of Plant Tumor Systems to an Understanding of the Basic Cellular Mechanisms Underlying Tumorigenesis is by the Editor of the volume, Armin C. Braun (Rockefeller University), undoubtedly the greatest authority on plant tumors and a distinguished contributor to the theory of cancer in general [see review of his book The Cancer Problem in Oncology 25: 363, 1971]. It is a
summing-up of the contents of the book and a fine presentation of the author’s well-known views about cancer, especially the view which he developed in the course of his pioneering work with crown gall tumors, that cancer cells, in certain cases, may return to normal conditions. It cannot be emphasized strongly enough that this is the type of book which oncologists, involved in clinical or experimental research, should consult when searching for basic information – and inspiration.

A. Wolsky, New York, N. Y.


The title for this new book by H. J. Rapp and T. Borsos is very optimistic considering its rather meager contents. The volume is ‘dedicated to the “one-hit” theory of immune hemolysis, which holds that the interaction of hemolytic antibody, corresponding cell surface antigen, and complement at a single site on the red cell surface is necessary and sufficient to lyse the cell’. The one-hit hypothesis was advanced by M. M. Mayer (in ‘Imunochemical Approaches to Problems in Microbiology’, M. Heidelberger and O. Plescia, eds. New Brunswick, Rutgers University Press, 1961), as an alternative to the multiple hit theories which then dominated complement research. Kinetics of single-hit systems are surely much easier to study and analyze, but one must be cautious not to espouse the single-hit theory simply because it is more amenable to mathematical treatment.

The book begins with a brief historical review of some of the major advances in complement research. This portion is well written and would be of interest to someone seeking a general knowledge of the field. Chapter 2, ‘Physicochemical Basis of Complement Action’ is a very basic introduction to probability theory and chemical kinetics. The chapters dealing with molecular events in immune hemolysis (chapter 3) and the biochemistry of complement components (chapter 4) give an overwhelming impression of chaos. The systems studied have so many variables which are difficult to control that it makes interpretation of the results difficult. Amazingly little is known about the biochemistry of the complement components beyond their protein nature and in some cases their molecular size. The continuity of these chapters suffers by having much relevant material in later chapters of the book.

Chapter 6, ‘Complement Fixation’, seems rather pointless. Complement fixation does indeed occur and is of biological importance and diagnostic value. Fixation of complement is required for its biological activity. And yet, the molecular mechanism of fixation, which one would expect to find discussed in a book of this title, remains unknown.

Chapter 7, ‘Reagents Commonly Used in Complement Research’ seems totally unnecessary. The material contained therein is found in numerous other references and handbooks. An individual with sufficient background to appreciate the contents of chapters 3 through 6 certainly would already be familiar with it or know where to find it.

Chapter 8, entitled ‘Mathematical Analysis of Complement Action’ comprises about one sixth of the book. It deals with very elementary calculus and probability theory which should be known to anyone interested in the remainder of the book. This mathematical background is used in the solution of a single example which occupies only the last 4 pages of the book. The amount of mathematical introduction seems out of proportion to the extent that it
is used. Further, the example is of such a degree of sophistication that the introductory material is inadequate for its solution. The value of experimentally testable mathematical models certainly cannot be disputed, however. The bibliography is substantial, covering the pertinent literature through a portion of 1969. These references can be helpful to someone interested in gaining a more detailed knowledge of this exciting and challenging field.

Dr. Margaret R. Parham, Tarry town, N. Y.

S. Meryl Rose: Regeneration. Appleton-Century-Crofts, New York 1970. X + 264 pp. US $ 7.95. This book gives the rather individual and unorthodox views of a distinguished developmental biologist on some fundamental problems of growth and differentiation. The title ‘Regeneration’ does not cover exactly the contents as the volume deals not only with phenomena of regeneration in the ordinary sense, i.e. secondary developmental processes leading to the replacement of lost parts, but also with some fundamental problems of embryonic development, morphogenesis in plants and protozoa and other problems (see below). Indeed, the subtitle indicates that the book is intended to be a ‘key to understanding normal and abnormal growth and development’. The key which the author offers is the concept of ‘polarized control’, based on a hierarchic sequence of developmental events, in which inhibitory rather than promoting influences play the dominant role. Structures which differentiate first in a developing system keep in check the later processes and prevent the appearance of similar structures in other, later-differentiating regions of the system. It is true that the author takes most examples to illuminate this concept from studies of regeneration, to which he himself has made some very substantial contributions. But he also extends his ideas to some processes of embryonic development, in particular to the well-known primary embryonic induction exerted by the dorsal lip of the blastopore (Sple-mann’s ‘organizer’) in amphibian embryogenesis. His interpretation of the nature of the ‘organizer’ and its mode of action is somewhat unorthodox. Also somewhat extreme is his insistence on the latent totipotency of differentiated cells and their capacity of total dedifferentiation, an idea which many developmental biologists are reluctant to accept. As a corollary of this stance, the author strongly criticizes the concept that ‘totipotent reserve cells’ exist in some organisms with high regeneration capacity, as for example flatworms. Although evidence in favor of this criticism is accumulating (recent issues of the Oncogenesis section of this journal contain papers supporting Rose’s view) the question of existence or non-existence of ‘totipotent reserve cells’ is far from being definitely settled.

The book has 9 chapters which deal with (1) the genetic theory of cell differentiation, (2) spatial tissue relations in lens regeneration of salamander eyes, (3) polarized control in amphibian limb regeneration, (4) transport of morphogenetic messages in plants, (5) polarized control of differentiation in the cortex of protozoa, (6) polarized gradients under nervous control in the regeneration of worms, (7) regeneration in coelenterates, (8) polarized control in embryos and, finally, (9) tumor formation. (This list shows sufficiently that the

566

Book Reviews
author’s survey covers a wide field.) Readers of this journal will be particularly interested in this last chapter which surveys a great number of more or less relevant data but will form a rounded picture only together with the previous chapters, in the framework of the author’s generalized morphogenetic concepts. Concerning cancer these concepts are best summarized in the following passage (p. 239): ‘When we cut away a part of a normal tissue, the remainder may grow but in
time growth ceases or an equilibrium of production and destruction is attained. A neoplasm is different... It is as though the neoplasm is constantly beginning to regenerate but it never achieves the normally-polarized cohesiveness which is the condition for stopping.’

The book is no easy reading and one must study the subject closely to be able to follow and enjoy the author’s sometimes ‘staccato’, zig-zagging trends of thought. But it is worth making the effort because the book gives a rich food for thought and this is its greatest merit.

A. Wolsky, New York, N. Y.