ized functions are all considered in chapters which eventually lead up to a consideration of the role of macrophages in cell-mediated immunity and other immunological responses. I enjoyed following the author's discussion of the new facts of about 450 references against the conventional background of morbid anatomy. Nevertheless, too often, I was left in doubt concerning the exact implications of the new work for the residual hypotheses of the subject. Broad unifying concepts such as that of the mononuclear phagocytic system as opposed to the reticuloendothelial system of Ehrlich are not as clearly discussed as one might have hoped in regard to problems such as, say, the derivation of alveolar macrophages under varying circumstances and the composition of the red pulp of the spleen.

This book will, I am sure, be welcomed by established pathologists for the wealth of new data it introduces. The immunologist who wishes to broaden his acquaintance with the many specialist roles of the macrophage will find much to interest him. The graduate student will find a good introductory account of the nature and kinetics of phagocytosis, and of the exogenous and endogenous factors affecting phagocytosis, but is advised to look elsewhere for a clearer and more thoroughly resolved account of the experimental data relating to the macrophage's immunological role.

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Immunogenesis

Ontogeny of Acquired Immunity. A Ciba Foundation symposium, London, Nov. 1971. Associated Scientific Publishers (Elsevier, Excerpta Medica, North-Holland), New York, 1972. x, 284 pp., illus. $12.75.

The initiation of an immune response results from the interaction of antigenic receptors on preselected cells of bone marrow and thymus origin. There is a complex, cooperative interaction between thymus cells, bone marrow cells, and macrophages. The nature of the molecular genetic events that culminate in a given lymphocyte's expressing immunoglobulin receptors of single specificity, from among hundreds of thousands of possible specificities, is the central problem awaiting solution in immunology today. Its solution will illuminate the shadows in all of experimental biology and will sharpen the focus on methods of treatment of many human diseases. Preselection of lymphocytes with respect to antibody specificity occurs during ontogeny. This book is a progress report on our understanding of how this comes about, and, as it illustrates, progress has been substantial.

The book will be appreciated by the advanced student and the professional immunologist. The contributors are leading immunologists. The papers vary from theoretical and speculative discussions to reviews of specific topics to reports of new information. All are, more or less directly, concerned with ontogeny of immune responsiveness or with immunological phenomena during development. There are papers that deal with appearance of immunological competence in animals and man, with ontogeny of macromolecules and suppression of immunoglobulin allotypes, with immune deficiencies and attempts at treating deficiency diseases with bone marrow and fetal thymus transplants. Of considerable interest to the reviewer are the papers concerning (i) the fetus as a homograft and the possible role of blocking factors in preventing its rejection (Beer and Billingham; Hellström and Hellström) and (ii) the hierarchy of hematopoietic stem cells and their differentiative potentialities (Owen). Each paper is followed by extensive discussion among the participants. These discussions are almost as informative as the formal papers. In addition, they reveal the impressive exchange of ideas and information that was possible between the laboratory-oriented and clinically-oriented participants. The melding of basic research results and clinical trials and experience reveals how rapidly information obtained from animal experimentation is being applied to the treatment of human diseases such as hematopoietic defects, immune deficiency states, and cancers. Upon completing the book, one is left eagerly awaiting the next symposium, with the feeling that successful treatment of many diseases by immunotherapeutic methods may not be far away; and that it will, indeed, be a calamity if the present penury in federal support of research substantially retards the endeavor.

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Organogenesis and Oncogenesis

Tissue Interactions in Carcinogenesis. D. TARIN, Ed. Academic Press, New York, 1972. xviii, 484 pp., illus. $24.50.

This volume brings together anatomists, pathologists, and developmentalists to provide a new look at what the editor calls "the behaviour of the tumour as a whole." In his preface and introductory statement, the editor rejects as simplistic the notion that tumors represent merely escape from control mechanisms that regulate proliferation. Instead, he affirms that, beyond proliferation, tumors display cellular pleomorphism, disturbance of tissue organization, invasion by one tissue of the neighboring territory of another, and frank metastasis and dissemination. In an effort to illuminate these properties the volume considers the significance of tissue interaction in original organogenesis; the persistence of such interactive mechanisms in the adult; the interface between interacting tissue components and especially between epithelium and associated stroma; and the relationship of these matters to tumorigenesis itself. The result is a tightly knit account that brings the subjects under discussion up to date. The content, however, is not likely to deflect cancer research from its current direction, nor can the book be recommended as a handy reference on the state of oncology as a whole.

Kratochwil and Saxén make clear that the mechanism of tissue interaction still eludes us but that the weight of evidence is in favor of relatively short-range communication between interactants—shorter-range than diffusion but longer-range than direct interaction of cytomembranes. Tarin carries the story on to the adult, noting that the data are less abundant and that there are similarities with and differences from the embryonic state. Pinkus presents histological evidence of disturbed tissue interaction in both preneoplastic and neoplastic human skin. Sugár extends the evidence, dealing with both skin and other organs. He pays special attention to ultrastructural indications of reduced cohesiveness at the junction of epithelium and connective tissue during the development of human carcinomas. Frithiof deals with the ultrastructure of the epitheliostromal junction in human oral carcinoma, both preinvasive and invasive. In these presentations the nature and properties of the basement membrane figure prominently, and C. J. Smith presents concordant information

based upon his own studies of oral cancer in both humans and experimental animals.

The story turns to Tarin's detailed histological and ultrastructural observations of tumorigenesis in the mouse, emphasizing junctional changes. Although not peculiar to carcinogenesis these junctional changes, "collectively and in the sequence described," are regarded as "specially associated with carcinogenesis" and "likely to yield more information relevant to [its] mechanism." This view is supported by observation of wound healing in skin, in which the same sequence of junctional changes is not observed.

Orr's well-known work on separated and recombined epidermis and dermis is represented by a modified reprint of his 1963 paper in National Cancer Institute Monograph No. 10 and additional data by A. T. Spencer. Although still subject to varying interpretation, their experiments support the notion that epidermis is not directly induced to undergo carcinogenesis by methylcholanthrene but rather responds to primary dermal changes. Dawe then details his studies on polyoma-virus-induced tumors in mouse salivary rudiments, which lead him to the conclusion that "the unit responding to polyoma virus . . . is an epithelio-mesenchymal complex" since neither component affected alone yields tumors whereas recombined and infected rudiments do. Tarin and Sturdee then report that pure epidermis transplanted to the eye and peritoneal cavity fails to undergo tumorigenesis, indicating that the role of dermis is not merely to restrain an epidermal tendency toward carcinogenesis.

Mazzucco turns attention to the role of collagen, showing that collagen content of mouse skin falls during early stages of chemically induced carcinogenesis. Strauch, on the other hand, finds increased collagenolytic activity and a general shift of collagen metabolism toward increased degradation. Although these changes are believed to be generally related to the phenomenon of invasiveness, the exact relation is not clear and the phenomena have not yet been made practically useful; that is, it has not been possible to reverse collagenolysis and thus confine a tumor. The book concludes with a chapter by Cowell on control of epithelial invasion by connective tissue during embedding of the mouse ovum in the endometrium. Here decidualized endometrium halts the invasion whereas nondecidualized endometrium undergoes invasion in uncontrolled fashion.

In evaluating the volume one must note that the focus is not "where the action is" in current cancer research. The thesis almost certainly is sound that oncogenesis must somehow be affected by the mechanisms of organogenesis. It remains to be seen, however, whether this concept provides a new look or whether it is only an envelope to be added when initiatory intracellular changes, bet on as primary by most other oncologists, are identified.

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Change with Age

Intellectual Functioning in Adults. Psychological and Biological Influences. Two symposia, San Francisco (1968) and Miami (1970). LISSY F. JARVIK, CARL EISDORFER, and JUNE E. BLUM, Eds. Springer, New York, 1973. xiv, 178 pp., illus. $7.50.

Adulthood and senescence have never received attention from developmental researchers commensurate with the large proportion of the human lifespan they represent. Presumably this is because of the assumption that the first two dozen years of life are where the significant action is; but that assumption is faultily based on some vague conceptions of "maturity." Now there are encouraging signs of a growing recognition that development does not cease with the appearance of axillary hair and that significant changes occur throughout the course of life. More data on adult development, especially late adulthood, are accumulating. The volume under review is very much in the mainstream of this research.

The papers in the first section of the volume are summaries of major longitudinal studies of intelligence (and selected other variables) that have been conducted in the United States over the past several decades. These reports competently spell out the consistent finding that verbal performance stabilizes in adulthood and is maintained (and perhaps increased) over long spans of time; psychomotor performance, on the other hand, declines relentlessly in later life. (Most of the authors make note of one of the irritating but inevitable problems of longitudinal programs—selective dropout. Some subjects become unavailable for later retesting because of refusal to cooperate, inaccessibility, or death. There is evidence that such losses from a study population are greatest among subjects likely to suffer the most decrement with age. The implication of this finding should be clear to the reader: If asked to be a subject in a longitudinal program, don't refuse and don't drop out!)

Part 2 pertains to psychological change as it is related to such somatic variables as blood pressure, heart rate, and cerebral atrophy. Troyer's chapter, which sketches a picture of brain-body interactions in the aged, is perhaps the very best in the book. Also, Wilkie and Eisdorfer are to be commended for cautioning against the common tendency to impute observed performance changes in later life solely to deterioration of the biological system.

The third section contains two papers describing the development of procedures for collecting "life history" data, with the purpose of determining the biological, psychological, and sociological correlates of longevity and successful aging. Finally, there is a commentary by Birren, in which he rightly points out that gerontologists have paid far more attention than have child psychologists to the relation between cognitive functioning and the biological states of the organism. Birren calls for greater consideration of techniques for manipulative intervention to slow or reverse the deleterious features of aging.

The book offers a quick course (there are only 154 pages of text) from which the new student in psychogerontology can gain an adequate perspective on what has taken place in the study of intelligence in adulthood and old age. Most of the papers are clearly and concisely written, and all citations are gathered together in one bibliography, which is thus a good, compact reading list for the student.

On the other hand, the papers reflect the inadequacies of the research conducted within this paradigm. Investigations of psychometric intelligence have typically been devoid of a sound theoretical foundation; nowhere in this book, for example, is there a reference to Cattell's theory of intellectual structure, nor is there any acknowledgment of the qualitative models of intelligence represented by Piaget, Werner, and Bruner. Intelligence tests for adults are merely extrapolations of intelligence tests for children, which are based on school performance. As