be regarded as a new type until its growth-factor requirements and the number of genes involved are definitely known. The possibility exists that further studies on the other biochemical mutants listed will show that new genes controlling these syntheses are mutated.

The preponderance of mutants which are unable to synthesize methionine (50 per cent of all the biochemical mutants) is not a unique result of mustard gas treatment, since this class is also the most frequent among radiation-induced mutations.

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Book Reviews

Human embryology (prenatal development of form and function). **W. J. Hamilton, J. D. Boyd, and H. W. Mossman. Baltimore, Md.: Williams and Wilkins, 1945. Pp. viii + 366. (Illustrated.) $7.00.**

The objective of the authors of this book has been to present a thorough study of the fundamental morphological and physiological aspects of development of the human embryo and to show their relation to the changes occurring in the mother during pregnancy. Many new facts of development uncovered during the past 20 years have been incorporated in the volume along with modern theoretical interpretations suggested by the work of experimental embryologists. The book is intended primarily for medical students and hence its chief emphasis is on the human embryo.

The opening chapters are concerned with introductory concepts, such as the meaning and scope of the processes involved in embryonic development and the details of structure and formation of the germ cells. As an introduction to the subject proper, there is a detailed account of the cyclic changes in the female genital tract as related to the function of reproduction. In particular, the ovarian and menstrual cycles are discussed in relation to the endocrines controlling them.

Early development, including fertilization, cleavage, and formation of the blastocyst, is dealt with as fully as possible on the basis of information gained from the study of the Macacus and certain other mammals. A very extensive tabulation, accompanied by valuable descriptions of the earliest known human embryos, shows the great advance in this particular field in recent years. Some 50 embryos are listed. Similarly, a thorough discussion of implantation and formation of the fetal membranes has been given. The anatomy and physiology of the placenta are explained as well as the mechanism for the maintenance and termination of pregnancy. Further details of the development of the germ layers and the growth and early development of body form are presented on the basis of the early stages mentioned above and from material made available by the Carnegie Institution of Washington.

In the chapters on organogeny which follow, the subject matter has been most thoroughly and carefully presented. These chapters are well documented, and important references are listed. Tabular summaries, of great value to the student, have been utilized frequently. While some attention is given to anomalous conditions arising during development, this phase of the study is not overdone.

Throughout the book at appropriate places the authors have introduced discussions of the modern theoretical concepts of determination, differentiation, and the role of the organizer stemming from the important work of the experimental embryologists, from the early studies of Roux and Driesch to those of such modern investigators as Spemann and Vogt. These would probably be more profitable to the student if a more extensive background of comparative embryology were provided. Recognizing this fact, the authors have incorporated a brief outline (20 pp.) of comparative embryology emphasizing the earliest stages of development. About half of this outline is devoted to the subject of placentation in various mammals. The apparent inadequacy of this portion of the book is compensated for, however, by the excellence of the rest of the volume.

Although the book conforms to wartime standards of compactness, there is throughout a lavish use of colored figures. For some unknown reason the legends for many of these illustrations are printed in such small type that they are often difficult to read. American readers will also note the use of certain terms in the text which, though frequently employed in England, are not so commonly used in this country.

Mistakes and inaccuracies have been kept to a minimum throughout. In general, this book represents a valuable contribution to the field of human embryology and is remarkably complete and up to date.

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