related metabolites. In the next chapter, "Metabolism of sulfur-containing compounds," Greenberg gives further information on methionine and cysteine and describes the important role of the sulfur group in several coenzymes. H. Borsook, author of "Enzymatic syntheses of peptide bonds," presents the biochemical data in terms of thermodynamic types. Such welding of organic and physical chemistry treatment is most desirable. The important nuclear substances are covered in the next two chapters, "Purines and pyrimidines," by M. P. Schulman, and "Nucleotides and nucleosides," by L. A. Heppel. The first of these deals with the modes of synthesis and breakdown; the second, with deamination as well as enzymatic splitting and exchange, with special reference to synthesis of the coenzyme nucleotides. In the last chapter, "Metabolism of heme and chlorophyll," S. Granick traces the metabolic pathways of principal members of the porphyrin family, giving more space to the heme than the chlorophyll branch.

The book is authoritatively written and is interlarded with hundreds of citations of original articles. The chapter organization follows a uniform pattern. The authors are to be commended for the clarity achieved through liberal use of graphic formulas and diagrams in presenting complicated structure and mechanism. Although the story at times becomes involved, I found little that could be pruned. The volume is printed on good paper, is relatively free of error, and is well indexed by both author and subject. It is recommended to all those interested in a comprehensive review of this field.

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An Outline of Developmental Physiology. Chr. P. Raven. Trans. by L. de Ruiter. McGraw-Hill, New York; Pergamon Press, London, 1st Eng. ed., 1954. viii + 216 pp. Illus. + plates. $5.50.

This book was written to *introduce* topics of interest in embryology. The fault in accepting this as the total tale is in the reader, not the author.

This work was completed in 1942, published in Dutch in 1948, with an English translation in 1954. In it Raven has given a running account that brings together the parts of the developmental story which never should have been separated. The separatists usually subdivide the continuity of embryology by stressing the individual attacks upon the continuum of development. Embryology is, therefore, referred to as consisting of (i) classical (prehistoric or maybe slightly in the historic period), (ii) experimental, which is premodern, (iii) chemical, including enzymatic, almost modern, and (iv) novogenesis. In this artificially fragmented area both the embryo and the embryologists are bewildered.

Raven has attempted to discard some of these artificialities in giving a nicely organized view of the embryo from the standpoint of the embryo's chronology. He has oversimplified the treatment of his topics with full knowledge and intent, for he is trying to present a subject to readers who are new to it. He has avoided as far as possible the overcomplicated jargon which has been superimposed upon the description of development. Since such treatment must always be a compromise, many experts will take exception to all of the book and all will object to some of it. This is a calculated risk that Raven must have had in mind. As for the embryo, it will be a relief to try to develop in Raven's pattern rather than some of the others which it finds entirely too difficult to follow.

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Elements of Food Engineering. vol. 3: *Unit Operations,* pt. 2. Milton E. Parker. With the collaboration of Ellery H. Harvey and E. S. Stateler. Reinhold, New York, 1954. 241 pp. Illus. $6.75.

In this third volume of *Elements of Food Engineering* the authors complete their discussion on the conversion of raw materials, the first part of which was presented in volume 2. In this continuation, special reference is given to aspects of evaporating and distilling, dehydration and drying, and controlling as a unit operation.

In the chapter on evaporating and distilling, there are descriptions of atmospheric evaporators including steam-jacketed kettles and pans, jam pans, continuous sugar cookers, an atmospheric concentrator, reduced-pressure evaporators (including single-effect, multiple-effect, and recompression evaporators), and distillation equipment.

The procedures used and the types of equipment available for food dehydration or drying of solid and liquid foods are presented. An explanation is given of the general practice of quality control by objective testing and statistical analysis, and there is a section on measurements of temperature, pressure, humidity, fluid flow, and liquid level as well as a brief discussion of the instruments that may be utilized in controlling the physical properties and the composition variables of processed food products, ingredients, and raw materials.

A chapter on the treatment of the final products of food processing is concerned with the unit operations of coating, decorating, panning, enrobing, forming, and packaging.

Considerable space is devoted to the packaging aspects of food engineering, including descriptions and various tests of the properties of packaging materials, the different forms of packaging containers, packaging machinery, and the different aspects of quality control in food packaging, such as the legal, purchasing, production, traffic, sales, consumer, and sampling aspects.

Definitions and explanations of technical terms used, illustrations and diagrams of equipment, tabular presentation of information, formulas, and equations for