Book Reviews

Analysis of Development. Benjamin H. Willier, Paul A. Weiss, and Victor Hamburger, Eds. Saunders, Philadelphia–London, 1955. xii + 735 pp. Illus. $15.

Between 1933 and 1940 a group of embryologists constantly sat on the sands of Cape Cod discussing the mysteries of morphogenesis and the interpretation of experiments old and new. In the fullness of time, their excogitations led to the volume now before us—a wholly admirable treatment of the broad field of experimental morphology and developmental physiology and biochemistry. It is essentially a statement of the present position in a region where events are moving very rapidly.

Perhaps the chief contribution is the discussion of dependent differentiation (induction) in amphibians (Holtfreter and Hamburger), and it is interesting to see that the advance of the subject has obliged a return to the stricter biochemical conceptions of an earlier phase. Unfortunately, the purely mesodermal inductor of Toivonen was too late for inclusion.

Although space does not permit even the mention of all the contributors, it may be said that this paper is preceded by excellent articles on nucleus and cytoplasm (Fankhauser, Stern, Tyler), colloidal organization and submicroscopic morphology (Schmitt), and a stimulating sketch of the history of experimental embryology (Oppenheimer).

There follow contributions on differentiation mechanisms in other kinds of animals (Rudnick, Watterson, Bodenstein) and on the differentiation of particular organs in vertebrates (for example, Weiss, Twitty, Yntema, Rawles).

Next comes a throughtful account of energy exchange and enzyme development during embryogenesis by Boell, who gives the best summary for many years of the vexed question of the sources of energy used by embryos during their ontogenies. The interesting study of the genesis of immunological properties (Tyler) prompts the suggestion that it might have been worth while to organize at least some of the material of the book in a framework less orthodox than that actually employed—for instance, to group together under one head all phenomena concerned with the experimental disaggregation and aggregation of living cells, tissues, and germ-layers, their mutual compatibilities and interactions. Finally, we have the ontogeny of endocrine correlation (Willier) and size-determination (Berrill), and the book ends with papers on regeneration and teratology.

The volume seems remarkably free from misprints, although editorial control over the texts and conventions shows some imperfections. Although most of the illustrations are exceptionally clear and good (for example, in the papers of Schour on teeth and Etkin on metamorphosis), one regrets that such valuable contributions as those of Bodenstein on insects and Twitty on eyes have no pictures at all. But for the most part this volume has done all that teamwork can do and will be accepted throughout the world as an outstanding justification of what can be done just by sitting on the sand.

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University Physics. Francis Weston Sears and Mark W. Zemansky. Addison-Wesley, Cambridge, Mass., complete ed. (ed. 2, based on Sears' 3-vol. work, *Principles of Physics,* with supplementary problems), 1955. viii + 1031 pp. Illus. + plates. $8.50.

This is the king-size Sears and Zemansky, 17 percent longer than its 1949 predecessor, and greatly modified in appearance and content. Not only does it come in the red jacket characteristic of "king-size," but a side-by-side comparison of the new book with the old one leaves the favorable impression that the authors have done a thorough revision, keeping in mind the fact that the book is primarily for instruction. They have been careful to rearrange ideas for better impact on the student, and the general attractiveness and teachableness of the book are enhanced by improved draftsmanship of countless figures. There is a liveliness about the new figures that is impressive and gives the book a completely new look.

Many parts are rewritten or recast, and there has been no slavish holding to old pages. Where the calculus is used, much care has been exercised in making the ideas behind this approach still clearer to the student. One major change occurs in the introduction of completely new problems for each chapter. However, the old problems have been retained in an appendix. Answers to all odd-numbered problems of both sets are given. This appendix alone contributes the greatest change in length of the book, accounting for approximately half of the 154 pages added. The largest other changes occur in electricity (30 new pages) and in optics (21 new pages). Many of the ray diagrams for optical systems are now produced in white against black, a device used many years ago but not often used in recent textbooks.

Some 18 new topics and extensions of treatment are enumerated by the authors as additions to subject matter. Many of these are just as "classical" as other materials already included; a few are newer. It is interesting to note, for example, that the engineering problem of architectural acoustics has given place to the treatment of musical scales! The effect of these additions, and of the book as a whole, is to make a complete and encyclopedic volume. Every author of a textbook must decide how closely to make his book like tomorrow's newspaper or next month's magazine. Sears and Zemansky have written a solid textbook, not a newspaper; but, because the emphasis is steadily upon principles and their application, the budding engineer and scientist should acquire from the study of this textbook an ability to read next month's magazine with understanding. In a world that needs technically trained persons, those who master the contents of this book should find strong positions.

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Pathology of the Dog and Cat. The genitourinary system with clinical considerations. Frank Bloom. American Veterinary Publications, Evanston, Ill., 1954. xv + 463 pp. Illus. $12. ($12.50 outside U.S.A.)

This book presents a very thorough coverage of the special pathology of the genitourinary system of the dog and cat. As with most first editions, there are obvious faults, but they are far overshadowed by the wealth of information provided, its presentation and organization, and the excellent illustrations.

The contents are presented in three sections or chapters; the urinary system, the male genital system, and the female genital system including the mammary gland. Fundamentally there is a brief

description of normal anatomy followed by a discussion of the various pathologic entities, their incidence, possible etiologic factors, the clinical pathology, and clinical correlations. The latter should prove of particular value to veterinarians in practice.

The first section, which deals with the urinary system, includes discussions on the kidney, urolithiasis, renal pelvis and ureter, the urinary bladder, and the urethra. In my opinion this section is particularly excellent.

The second section concerns the male genital system and includes discussions on hermaphrodism and pseudohermaphrodisms, the testis and epididymis, the spermatic cord, vas deferens, scrotum, penis, and prostate. The organization and coverage of this section is adequate and complete.

The third chapter, or section, deals with the female genital system and includes a discussion of the sexual cycle, the vulva, vagina, uterus, pregnancy and the placenta, the Fallopian tubes, ovary and mammary gland. Like the first two sections, this one is very complete.

The faults of the text are really minor and include a poor main title and a very poor index. The subtitle should be incorporated into the title of the text, which coverwise is misleading. There is a wealth of good information in the text which, unfortunately, cannot be found in the index. For example, there is an ample discussion of blood and urine alterations throughout the text, yet neither subject appears in the index.

In my opinion this book is a definite contribution and can be recommended highly to the veterinary profession as well as to those scientists who utilize the dog or cat as an experimental animal.

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Higher Transcendental Functions. vol. III. Based in part on notes left by Harry Bateman. Bateman Project Staff, A. Erdélyi, Ed. McGraw-Hill, New York–London, 1955. xviii + 292 pp. $6.50.

This is the last of the five volumes produced by the Bateman Manuscript Project [see *Science* **120**, 302 (1954); **121**, 464 (1955)]. Sections on Lamé functions, Mathieu functions, spheroidal and ellipsoidal wave functions, and miscellaneous functions (such as Mittag-Leffler's *E*-functions and the "higher trigonometric functions") follow the pattern of the earlier volumes: a survey of important formulas with full references to the specialized literature for proofs and further details.

There are also three chapters of a different character: an introduction to automorphic functions and a chapter on number-theoretical functions, both characterized by the editor as "frankly experimental"; and a chapter on generating functions. The first is a concise elementary survey, intended as background for some explicit examples. In the second, little unity or coherence is possible, but there is probably no single book on number theory in which all the information in this chapter appears. The chapter on generating functions (in the sense of functions whose power series have an interesting set of functions as coefficients) is a collection of results linked by an accidental similarity of form. Examples are given to indicate various ways in which generating functions are used. Unfortunately there is no way of predicting whether a given set of functions will have a useful generating function. However, anyone confronted with the power series of a complicated function containing a parameter will do well to look here to see whether the coefficients have already been investigated.

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World Outside My Door. Olive Bown Goin. Macmillan, New York, 1955. vi + 184 pp. Illus. $3.50.

Mrs. Goin is first and foremost a housewife, the publisher tells us; her household consists of her husband, an associate professor of biology at the University of Florida, two children, and two cats. Mrs. Goin's training as a biologist (mammalogist) and her obvious ability as a naturalist, combined with an artist's enjoyment of color and movement and a warm outlook on life, make her book alive, enjoyable, and, where she permits her biological training to dominate, most accurate.

A half-acre of backyard in a southern city becomes a Fabresque field for observation. *Bipalium* lives with marsh peepers, turtles, rain frogs, cardinals, and rabbits—all in balance with four human beings.

For those who prefer *Elaphe obsoleta quadrivittata* to four-lined chicken snake, there is an appendix listing some 70 species of vertebrates she has observed.

Mrs. Goin apparently believes that the naturalist's field is all life, and this total view blends her backyard into the community that naturalists have fashioned wherever they have tried to describe microorganisms (Leidy) or the animals of the African veldt (Akeley). So a rain frog's habits are projected into its evolutionary past, the spade-foot's activity is related to temperature, and the peck order of birds is noted and pondered.

Naturalists, young and old—and those who should be naturalists—should seek Mrs. Goin's company, if in no other way than through her book.

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Biochemistry of Nitrogen. A collection of papers on biochemistry of nitrogen and related subjects. Dedicated to Artturi Ilmari Virtanen. N. J. Toivonen, E. Tommila, *et al.*, Eds. Annales, Series II, Chemica. Suomalainen Tiedeakatemia, Helsinki, 1955. 535 pp. Illus. + plates. $12.

This Festschrift contains 48 papers from 14 countries on the biochemistry of nitrogen and related subjects. It is dedicated to Nobel laureate Artturi Ilmari Virtanen on the occasion of his 60th birthday. Most of the articles are in English, the others are in German and French.

The scope of the subjects represented reflects the range of interests and versatility of Virtanen. Thus there are articles on nitrogen fixation, reduction of nitrate, the biochemistry of nitrogen-deficient microorganisms, oxidation of amino acids by mitochondria, protein metabolism in cell nuclei, amino acids in protein-rich and protein-poor *Rhodotorula gracilis*, protein and nucleic acid contents of developing *Chlorella*, antibiotics and nitrogen excretion by microorganisms, inhibitory effect of Swedish ropy milk on fungi, symbiosis in bacterial biosynthesis, mutations and adaptations in bacteria, and free amino acids of the pea plant.

There are discussions concerning the effect of irradiation on the formation of hemoglobin, reversible splitting of hemoglobin, the prosthetic groups of cytochrome oxidase and cytochrome *a*, polymers of aminosugars, the significance of macromolecules, combination of phytic acid with protein, studies on the metabolism of citrate, tyrosine and tryptophan, and isotopically labeled fructose, milk proteins in nutrition, electronegativity (Pauling), magnesium diabetes, reductone, chaconin, and γ-aminobutyrate.

There are descriptions of column chromatography of proteins, immunoelectrophoresis, the enzymatic syntheses of adenosine, and chemical syntheses of nucleotide coenzymes, a pyridine nucleoside, peptides, and isotopically labeled kynurenine. Two phases of photosynthesis are described by Calvin and by Warburg, both with associates. Enzymes discussed include pancreatic lipase, hy-