produce the unstable mesons, many of which reach the bottom of the atmosphere and even penetrate deep down into the earth. Another fraction of the energy goes into electrons and photons and eventually appears as ionization in the atmosphere. Another fraction is in the nucleonic component, some of the energy being used to break up atmospheric nuclei. Finally, in many of these interactions, energy escapes in the form of neutrinos and is never recovered. Almost one-fourth of the energy goes into neutrinos, about 60 percent into ionization in the atmosphere, about 10 percent into breaking up nuclei, and the remainder penetrates into the earth.

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Recent Progress in Hormone Research. vol. XII. Proceedings of the Laurentian Hormone Conference, 1955. Gregory Pincus, Ed. Academic Press, New York, 1956. 453 pp. Illus. $10.

Vitamins and Hormones. vol. XIV. Advances in research and applications. Robert S. Harris, G. F. Marrian, and Kenneth V. Thimann. Academic Press, New York, 1956. 486 pp. Illus. $10.

Both of these books attempt to present the recent advances in endocrinologic and vitamin research. Endocrinology is moving so rapidly that it is essential to have the means whereby new advances can be quickly disseminated. In this aim these two volumes will aid the busy investigator to a large measure but not completely.

Recent Progress in Hormone Research is divided into four parts: "Hormone biosynthesis and metabolism," "Hormones and metabolism," "Pituitary hormones," and "Sex hormones." The following chapters add new life to this series: "The adrenal medulla and the biosynthesis of pressor amines" (Paul Hagen and A. D. Welch); "Influence of steroids on cerebral metabolism in man" (Gilbert S. Gordon); "Human urinary gonadotropin" (A. Albert); "Pituitary syndromes in man" (Roberto F. Escamilla); "Male sex hormone and its role in reproduction" (Thaddeus Mann); and "Clinical studies of testicular hormone production" (R. B. Leach, W. O. Maddock, I. Tokuyama, C. A. Paulsen, W. O. Nelson). As a matter of fact, these contributions make this volume a *must* for the reading list and permanent scientific library of the busy endocrinologic investigator.

The current issue of *Vitamins and Hormones,* volume XIV, presents a truly remarkable synthesis of current and *new* research developments by eight contributors from Great Britain, Germany, and the United States. This volume is by far the most scholarly ever produced in this series, and all eight chapters will provide enough stimulation for at least the next 5 years. This volume includes: (i) "Intestinal synthesis of vitamins in the ruminant" (Olaf Mickelsen); (ii) "Some aspects of vitamin-A metabolism" (J. S. Lowe and R. A. Morton); (iii) "Regulation of carbohydrate metabolism in isolated tissues" (A. E. Renold, J. Ashmore, A. Baird Hastings); (iv) "Experimental hyperglycemic states not primarily due to a lack of insulin" (K. H. Shull and Jean Mayer); (v) "Biochemical studies on insect hormones" (Peter Karlson); (vi) "Glucuronide metabolism, with special reference to the steroid hormones" (G. A. Levvy); (vii) "Bioassay of pituitary and placental gonadotropins in relation to clinical problems in man" (J. A. Loraine); and (viii) "Microbiological transformations of steroids and their applications to the synthesis of hormones" (S. H. Eppstein, P. D. Meister, H. C. Murray, D. H. Peterson).

It is encouraging to have our foreign colleagues contribute so unselfishly to these two volumes. The endocrinology of the male receives a comprehensive evaluation and elucidation in the scholarly approach of Mann. His personal researches in a world-famous laboratory and his critical appraisal of hitherto embalmed "facts" provide not only a clear statement of male endocrinology but a sterling example of the scientific method. The pioneering researches of Mann and his associates at Cambridge University have illuminated an area of endocrinology that has been befogged with numerous misconceptions. Following the comments on the role of the male sex hormone in reproduction by Mann, in *Recent Progress in Hormone Research,* the observations on the clinical studies of testicular hormone production, in the chapter by R. B. Leach and his colleagues, prove of great scientific interest. This chapter indicates that (i) the Leydig cells, rather than Sertoli or germinal cells, are the source of estrogen secreted by the human testis; (ii) adult functioning Leydig cells respond to stimulation with human chorionic gonadotropin by secreting increased amounts of both androgens and estrogens; (iii) the increased titers of androgen and estrogen act on the pituitary, thereby inhibiting the secretion of the gametogenic hormone (F. S. H. in the male) and thus producing seminiferous tubule damage; and (iv) estrogen secretion is a more reliable and sensitive indication of Leydig cell function than is the excretion of the numerous 17-ketosteroids. (The authors conclude that "the most probable explanation for this is that 80 percent or more of estrogens normally arise from the testes, whereas less than half of the 17-ketosteroids originate from Leydig cell secretion, the majority being of adrenal cortical origin.") These two chapters on the male sex hormone are enlightening both from a research point of view and as an important contribution to the medical profession.

Levvy's chapter on glucuronide metabolism, with special reference to the steroid hormones, in *Vitamins and Hormones,* represents a careful appraisal of what is known concerning glucuronide metabolism. This chapter, which is heavily laden with significant references, indicates that (i) "quantitative changes in the β-glucuronidase activity of animal tissues do not necessarily provide qualitative evidence on the function of the enzyme"; (ii) "so far as the possible function of β-glucuronidase is concerned, there is nothing on which to base an opinion except its hydrolytic action on steroid and other glucuronides"; (iii) "the β-glucuronidase activity of all body tissues appears to be under endocrine control. It does not follow that an alteration in enzyme activity produced by a hormone is an essential feature of the metabolism of that hormone, nor that it is in any sense an adaptive response"; (iv) "in healthy individuals, deviations from the mean in the β-glucuronidase activity of an organ or body fluid may reflect variations in endocrine constitution, and in the extreme case peculiar susceptibility to degenerative disease"; and finally, (v) "the activity of the enzyme in sex and nonsex organs is under endocrine control and is also governed by hereditary factors." Biochemists working in this active area of research will find Levvy's analysis of present-day knowledge on the β-glucuronidase enzyme extremely worth while.

In the final analysis, both volumes are factual and are truly an asset to the scientific literature. The editors of both volumes are to be congratulated for their continued service in these ever-expanding areas of knowledge concerned with the hormones and vitamins.

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Principles of Color Television. Hazeltine Laboratories Staff. Knox McIlwain and Charles E. Dean, Eds. Wiley, New York; Chapman & Hall, London, 1956. 595 pp. Illus. $13.

When, on 17 December 1953, the Federal Communications Commission gave its approval to the transmission standards for compatible color television broadcasting which had been proposed by the National Television System Committee, new and unfamiliar problems were posed for the rank and file of engi-

neers in the field. Multiplexing of the three signals required for transmitting color into the same frequency band used for monochrome transmission was based on the application of two principles which were old in the communication art, but of which only a few specialists were aware. The techniques of circuit design required to insure the interference-free transmission of this composite signal and the recovery of its components in a receiver also were well known only to those engineers who were regularly engaged in the design of complicated communication systems. In addition, there was hardly an electronic engineer who had heard of, much less who was familiar with, the sciences of photometry and of colorimetry.

The Hazeltine Corporation set out to correct this situation for its licensees. First, by issuing a series of reports, and then by operating a school in which these reports were used as a textbook, the engineers in the organizations of the Hazeltine licensees were given an opportunity to become familiar with those principles which overnight had become important in television engineering. Tempered by the criticisms of other experts, and by their use as a textbook, these reports, along with some more recent material, became the basis for *Principles of Color Television.*

The ground covered by this book is indicated by its chapter headings: "Light and photometry," "Color perception," "Color space and color triangles," "Colorimetry," "Color in a television system," "Required information content," "Characteristics of the eye," "The choice of the color components and their interleaving in the composite signal," "Production of the composite color signal," "Synchronization," "Nonlinear amplitude relations and gamma correction," "The color television standards of the FCC," "Equipment for producing the transmitted signal," "Color television receivers," "Decoders for three-gun displays," "Decoders for one-gun picture tubes," "Test and measuring methods," and "Glossary of color television terms." This list is indeed a promise that every fact has been presented that a television engineer requires in order to become skilled in color. This promise is fulfilled.

Twelve members of the Hazeltine organization contributed to the text of *Principles of Color Television.* Skillful editing by Knox McIlwain and Charles E. Dean has done much in reducing the differences of style and treatment of the several authors. Such differences as remain are no greater than one might expect from the disparity of subjects, as is indicated by the chapter headings.

This is an authoritative textbook and reference book. The Hazeltine Corporation, which sponsored it, has made many important contributions to the standards under which present-day color television broadcasting is carried out. And of the 12 contributing authors, eight were parties to the deliberations of the National Television System Committeee in which the pros and cons of every detail of these standards were argued at length.

Principles of Color Television is recommended reading for anyone with some knowledge of monochrome television techniques who wishes to learn the fundamentals of our present system of color television broadcasting. The generous list of references at the end of each chapter of this book will be helpful to one in search of more information than is contained between its covers.

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New Books

Patent Notes for Engineers. C. D. Tuska. McGraw-Hill, New York, ed. 7, 1957. 192 pp. $4.

The Validation of Scientific Theories. Philipp G. Frank, Ed. Beacon, Boston, 1957. 242 pp. $4.

Biochemical Individuality. The basis for the genetotrophic concept. Roger J. Williams. Wiley, New York; Chapman & Hall, London, 1956. 214 pp. $5.75.

Man's Physical Universe. A survey of physical sciences for colleges. Arthur T. Bawden. Macmillan, New York, ed. 4, 1957. 822 pp. $6.25.

Amino Acid Handbook. Methods and results of protein analysis. Richard J. Block and Kathryn W. Weiss. Thomas, Springfield, Ill., 1956. 386 pp. $10.50.

Relaxation Methods in Theoretical Physics. vol. II. A continuation of the treatise *Relaxation Methods in Engineering Science.* R. V. Southwell. Clarendon, Oxford, 1956. 522 pp. $8.80.

Principles of Zoology. John A. Moore. Oxford University Press, New York, 1957. 667 pp. $7.50.

Mechanics for Engineers. Statics and dynamics. Ferdinand P. Beer and E. Russell Johnston, Jr. McGraw-Hill, New York, 1957. 673 pp. $8.

No Room for Wild Animals. Bernhard Grzimek. (Translated by R. H. Stevens.) Norton, New York, 1957. 271 pp. $3.95.

Fundamentals of Horticulture. A textbook designed for courses in general horticulture. J. B. Edmond, A. M. Musser, F. S. Andrews. McGraw-Hill, New York, ed. 2, 1957. 456 pp. $6.75.

Dahlak, with the Italian National Under-Water Expedition in the Red Sea. Gianni Roghi and Francesco Baschieri. Translated by Priscilla Hastings. Eleanor Brockett, Ed. Essential Books, Fair Lawn, N.J., 1957. 280 pp. $6.

British Scientific and Technical Books. A select list of recommended books published in Great Britain and the Commonwealth in the years 1935–1952. Published for Aslib. Clarke, London; Hafner, New York, 1956. 364 pp. $11.25.

Discussions on Child Development. A consideration of the biological, psychological, and cultural approaches to the understanding of human development and behavior. vol. I, *The Proceedings of the First Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child, Geneva, 1953*; vol. II, *The Proceedings of the Second Meeting of the World Health Organization Study Group on the Psychobiological Development of the Child, London, 1954.* J. M. Tanner and Barbel Inhelder, Eds. International Universities Press, New York, 1957. 240 pp.; 271 pp. $10 per set.

Transactions of the Symposium on Partial Differential Equations Held at the University of California, at Berkeley, 20 June–1 July 1955. Sponsored by Office of Naval Research; University of California, Berkeley; University of Kansas, Lawrence; and the American Mathematical Society. Interscience, New York, 1956. 334 pp. $6.50.

The Encyclopedia of Chemistry. George L. Clark, Ed. Reinhold, New York; Chapman & Hall, London, 1957. 1037 pp.

Vertebrate Embryology. Robert S. McEwen. Holt, New York, ed. 4, 1957. 701 pp. $6.50.

Faune de France. 60. *Bryozoaires.* pt. I, *Entoproctes, Phylactolèmes, Cténostomes.* Marcel Prenant and Geneviève Bobin. Lechevalier, Paris, 1956. 398 pp. Paper, F. 5000.

The Leibniz-Clarke Correspondence. Together with extracts from Newton's *Principia* and *Opticks,* edited with introduction and notes by H. G. Alexander. Philosophical Library, New York, 1956. 200 pp. $4.75.

A History of the Ancient Southwest. Harold S. Gladwin. Weelwright, Portland, Maine, 1957. 383 pp. $8.50.

Biographical Memoirs of Fellows of the Royal Society. vol. 2. Royal Society, London, 1956. 345 pp. 30s.

Statistics for Management. A simplified introduction to statistics. B. J. Mandel. Dangary, Baltimore, 1956. 408 pp.

Annual Review of Nuclear Science. vol. 6. James G. Beckerley, Martin D. Kamen, Leonard I. Schiff. Annual Reviews, Palo Alto, Calif., 1956. 471 pp. $7.

Gas Dynamics. Klaus Oswatitsch. English version by Gustav Kuerti. Academic Press, New York, 1956. 610 pp. $12.

Handbook for Vegetable Growers. James E. Knott. Wiley, New York; Chapman & Hall, London, 1957. 238 pp. $3.95.

Enzyme, Antigen and Virus. A study of macromolecular pattern in action. F. Macfarlane Burnet. Cambridge University Press, London, 1956. 193 pp. $3.50.

Medical Department, United States Army. Surgery in World War II. Orthopedic Surgery in the European Theater of Operations. 397 pp. $4. 1956. *General Surgery II.* 417 pp. $4.25. 1955. John B. Coates, Jr., Ed. Office of the Surgeon General, Department of the Army, Washington (order from Supt. of Documents, GPO, Washington 25).

Classics in Arterial Hypertension. Arthur Ruskin. Thomas, Springfield, Ill., 1956. 358 pp. $9.50.