adsorbent. Finally, there is a chapter each on the pore structure of the adsorbent, on the kinetics of adsorption and on mixed adsorption.

The treatment is thorough, up-to-date and discriminating. It is neither tiresome nor encyclopedic, as is so often the case in general treatises of this kind. Only such mathematics is included as is necessary to understand the course of the argument. Best of all, the author does not hesitate to point out the merits or demerits of the theoretical conclusions which he develops, but his comments are restrained and judicial. His style is clear, simple and direct.

The book can be recommended to any one who wishes a broad and thorough survey of our present understanding of the nature of physical adsorption; he will find it both competent and stimulating.

ARTHUR B. LAMB

TISSUE CULTURE

A Handbook of Plant Tissue Culture. By PHILIP R. WHITE. Pp. xiv + 277. Lancaster: The Jaques Cattell Press. 71 figs. 1943. $3.75.

INTEREST in plant tissue culture has been increasing rapidly in recent years. It is significant that we have now advanced to the point where a good handbook on the subject is a necessity. Fortunately a skilled technician in this field has provided an excellent book covering the tissue culture technique briefly but thoroughly. Seldom does one find a complicated subject handled so fully and so succinctly.

Dr. White presents the subject in ten chapters, the first of which by way of introduction stresses the importance of morphogenesis, out of the study of which tissue culture has arisen. He points out clearly the advantages of the tissue culture approach to the problems of the origin of form and function in organized beings.

The second chapter sketches the history of plant tissue culture, in four periods of development. The entire history covers a little more than a century, but most of the progress has been made since 1930. This progress hinged upon the successful development of culture media suitable for the unlimited growth of excised root tips. A fine feature of the historical account is the inclusion of portraits of the major investigators in this field.

The third chapter discusses the material which may be used successfully in tissue cultures, mainly those which are meristematic in character, such as apical meristems, cambial tissues and embryos.

Recognizing the importance of facilities for work, the author devotes the fourth chapter to a detailed description of the kind of laboratory which should be available for such investigations. A detailed floor-plan is given, showing a convenient arrangement for laboratory room, transfer room, media room, culture room and office. Even the equipment most useful to the work is detailed, with suggestions and directions for successful manipulation of all equipment.

Several succeeding chapters describe the methods and materials for making synthetic nutrient media—the methods by which cultures may be started; the culture techniques; and the methods of making measurements and recording them for later interpretation. These chapters are all written with the utmost clarity.

The last two chapters turn to the significance of plant tissue culture in the solution of biological problems. These are very stimulative, and will no doubt encourage much more work to be undertaken. Chapter nine, for instance, discusses the relation of tissue culture to the problems of pathology and general physiology; and chapter ten returns to the primary issue, morphogenesis. A bibliography of 457 citations covers collateral fields, as well as plant tissue culture. The work closes with an adequate index.

The book has been admirably planned, and the subject has been handled very skilfully. It is fortunate indeed that the first handbook in this field has been so well done. It should serve for many years as a sufficient guide to students and older investigators interested in tissue cultures. Because of its broad point of view it should find a place in every physiologist's private library.

CHARLES A. SHULL

THE UNIVERSITY OF CHICAGO

ESSAYS IN BIOLOGY

Essays in Biology. In Honor of Herbert M. Evans. Written by his friends. 687 pp. Berkeley and Los Angeles: University of California Press. 1943. $10.

FORTY-EIGHT papers on apparatus, endocrinology, the history of biology, nutrition, physiology, cytology, medicine, growth and experimental biology, together with a complete biography of Evans, are found in this memorial volume. It is issued in commemoration of his sixtieth birthday. Ten of the titles are upon the history of biology, including one by George W. Bartelmez, a translation, with notes, of Purkinje's paper on the "History of the Bird's Egg Previous to Incubation," another by George W. Corner of de Graff's article "On the Female Testes or Ovaries." In addition there are the following titles: "Kidney—Explantation in Relation to Arterial Tension" (8 pp.), Frederick M. Allen; "The Influence of the Endocrine Organs on Intestinal Absorption" (11 pp.), T. L. Althausen; "The Impact of the Introduction of Iron on Medical and Religious Thought" (6 pp.), Walter C. Alvarez; "The Physiology of the Salt-treated Adrenalectomized Animal" (15 pp.), Evelyn Ander-

son, in which the author concludes that "All these data strongly suggest that the adrenal cortical hormone acts on the mechanisms of the body which require salt"; "The Localization of Lipids in Cytoplasm" (7 pp.), R. R. Bensley; "The Source of Equine Gonadotrophin" (13 pp.), H. H. Cole and Harold Goss; "The Biological Standardization of the Vitamins" (7 pp.), Katharine H. Coward; "The Prevention of Deafness" (5 pp.), S. J. Crowe; "Gene *H* and Testosterone in the Fowl" (9 pp.), C. H. Danforth, in which we discover that "thus far we seem to have gotten no inkling as to the underlying basis for sexual differences in plumage . . . the whole situation may be altered fundamentally by a simple cytological change is apparent in the effects produced by the gene *H*"; "The Influence of Hormones on the Sexual Behavior of Domestic Fowl" (11 pp.), David E. Davis and L. V. Domm; "Pituitary Gonadotrophins" (7 pp.), Heinz L. Frankel-Conrat, Choh Hao Li and Miriam E. Simpson; "Estrogen Assay in the Human" (5 pp.), S. C. Freed; "Functional Interrelation of Cerebral Cortex with Basal Ganglia and Cerebellum" (10 pp.), John F. Fulton; "The Solubility of Proteins and Their Separation from Mixtures with Special Reference to Serum" (11 pp.), Arda Alden Green; "Gonadotrophic Stimulation of the Ovaries of the Adult Rhesus Monkey" (6 pp.), Carl G. Hartman; "The Pathological Clinical and Biochemical Correlation of Tumors of the Testis" (8 pp.), Frank Hinman; "The History of Hypophysial Diabetes" (10 pp.), B. A. Houssay; "The Symballophone: A Double Stethoscope for the Comparison and Laterialization of Sound" (16 pp.), Wm. J. Kerr; "On the Significance of the Forgotten Thermodynamic Theorems of Cärnot" (18 pp.), F. O. Koenig; "John Banister and the Pulmonary Circulation" (6 pp.), Stanford V. Larkey and Owsei Temkin; "Comparison of the Conditions under which Estrogens and Carcinogenic Hydrocarbons are Tumorigenic" (19 pp.), Alexander Lipschütz; "Lobulo-alveolar Mammary Growth Induced in Hypophysectomized Rats by Injections of Ovarian and Hypophyseal Hormones" (13 pp.), Wm. R. Lyons; "Pulmonic Interstitial Emphysema and its Sequelae: an Anatomical Interpretation" (32 pp.), Charles C. Macklin and Madge T. Macklin; "Charles Edward Brown-Séquard" (7 pp.), Ralph H. Major; "The Undischarged Ovarian Follicle" (5 pp.), F. H. A. Marshall; "Mechanism of the Descent of the Testicle under the Action of Sex Hormones" (9 pp.), Thales Martins; "A Hemorrhagic State in the Vitamin E-Deficient Fetus of the Rat" (9 pp.), Karl E. Mason; "Relationships of Sodium and Potassium to Carbohydrate Metabolism" (14 pp.), Irvine McQuarrie; "Harvey's Ideas of Embryonic Nutrition" (8 pp.), A. W. Meyer; "Observations on the Pathogenesis of Undulant Fever" (21 pp.), K. F. Meyer; "French Medical Education as a Legacy from the Revolution" (8 pp.), J. M. D. Olmsted; "Cytological Differences between Castration and Thyroidectomy Basophils in the Rat Hypophysis" (12 pp.), J. D. Reese, A. A. Koneff and P. Wainman; "Studies on the Growth of Lymph Nodes, Thymus, and Spleen in the Rat" (9 pp.), William O. Reinhardt; "The Self-Selection of Diets" (6 pp.), Curt P. Richter; "The Relationship of the Anterior Pituitary to the Thyroid and the Adrenal Cortex in the Control of Carbohydrate Metabolism" (19 pp.), Jane A. Russell; "Vesalius and Don Carlos; A Historical Footnote" (8 pp.), John B. deC. M. Saunders; "Impotence as a Result of Witchcraft" (6 pp.), Henry E. Sigerist; "The Coagulation of Blood: Quantitative Viewpoints" (4 pp.), H. P. Smith; "An Experimental Anatomical Study of Sensory Masking" (5 pp.), I. Maclaren Thompson; "The Effect of Progesterone and Lactogenic Hormone upon Prolongation of Pregnancy in the Lactating Mouse" (8 pp.), Kaisa Turpeinen; "Is Increased Capillary Fragility a Sign of Ascorbic Acid Subnutrition?" (8 pp.), Osmo Turpeinen; "The Experimental Production of Pseudohermaphroditism in the Monkey" (25 pp.), G. van Wagenen and James B. Hamilton. "An exogenous androgen can pass through the placenta to induce pseudohermaphroditism in the female young of the monkey." "The Heart in Myxedema" (18 pp.), James J. Waring; "Studies on the Growth of Antlers: II. Seasonal changes in the male reproductive tract of the Virginia deer (*Odocoileus virginianus borealis*); with a discussion of the factors controlling the antler-gonad periodicity" (23 pp.), George B. Wislocki. "Hence, unlike many other secondary sex characters, antler growth is not primarily dependent upon the gonads"; "Sex Differentiation in Heterogeneous Parabiotic Twins (Ambystoma × Triturus)" (19 pp.), Emil Witschi and Harriet M. M. McCurdy, "The growth of ovaries and testes is controlled by gonadal growth substances"; "Ovum, Cycle, and Menstruation" (7 pp.), Bernhard Zondek.

The shortest papers have but four pages; the longest thirty-two. An inspection reveals the fact that if these papers were grouped according to their subject-matter about one half would naturally appear together; the other half would be widely distributed. One may therefore question the advisability of putting out so diversified a group in a single book, admitting at the same time the fine personal tribute thus evidenced. However this may be, it is evident that the material that thus appears is, to a large extent, of such a character as to make quite a general appeal to medical biologists and others.

C. E. McCLUNG

SWARTHMORE COLLEGE