Book Reviews

Physics of Fully Ionized Gases. Lyman Spitzer, Jr. Interscience, New York, 1956. 105 pp. Cloth, $3.50; paper, $1.75.

The growing importance of the knowledge of the behavior of fully ionized gas plasmas, both in astronomy and in physics, indicates an urgent need for a convenient comprehensive summary of the basic characteristics of such plasmas. Existing analyses of the basic theory are largely scattered through an extensive, dispersed literature in the form of original papers serving interests ranging from those of the astrophysicist to the experimental physicist working on high-temperature arcs, intense shock waves, and glow discharges.

Lyman Spitzer, who has been actively interested in plasma properties and has been one of the major contributors to the field, has collected the basic mathematical theory of the plasma in a concise little treatise for the use of graduate student and investigator alike. The subject matter is well chosen and restricted to the properties that are essential to an understanding of the subject. Where observational data are readily adapted to confirm the theoretical deductions, they are indicated. However, no attempt is made to give a detailed comparison between theory and experiment. The applications and significance of the relationships derived are, however, indicated along the way.

This book is written for those who have had an introductory course in theoretical physics and for those who have a knowledge of Maxwell's equations and a working knowledge of the vector analysis.

The contents cover five chapters: "Motion of a particle" (equations of motion, particle drifts, magnetic moment, and acceleration of particles); "Macroscopic motion, principles" (electric neutrality, basic equations, steady-state solutions, and relationships between microscopic and macroscopic velocities); "Macroscopic motion, problems" (electric currents, motion of material across lines of force, and pinch effect); "Waves in a plasma" (electromagnetic waves, hydromagnetic waves, electrostatic waves); and "Encounters between charged particles" (distant encounters, diffusion coefficients, relaxation times, electric resistivity, thermal conductivity, and radiation).

This book is up to date, and the literature coverage is adequately complete. It is extremely clear, concise, and well written. It is an excellent and welcome addition to the literature in the general field of gaseous electronics and will be useful to astronomer, physicist, and engineer alike.

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Advances in Genetics. vol. VII. M. Demerec, Ed. Academic Press, New York. 1955. ix + 309 pp. Illus. $8.

This latest in a series of annual monographs on genetics contains six chapters, an index of this volume, and, of special value, a cumulative index of the preceding six volumes. A study of the cumulative index yields a broader perspective of the diverse phenomena and of the multiplicity of organisms used in studies of genetics than the study of any one volume alone. The fruit fly *Drosophila* is still a favorite organism for genetic studies, although its position is being rivaled by certain microorganisms, Lepidoptera, corn, cotton, mice, and man. The studies involve physiological, population, and cytogenetics as well as many aspects of formal genetics, including linkage and recombination.

In the present volume, the first chapter on "Microbial drug resistance," by Vernon Bryson and Waclaw Szybalski, is an incisive discussion of the origin of drug resistance, pointing out that induced resistance may be either genetic or nongenetic and that critical evidence must be adduced if one is to discriminate between the genetic and nongenetic origins. In the second chapter on "The 'obscura group' of the genus *Drosophila*," Adriano A. Buzzati-Traverso and Renzo E. Scossiroli bring together the wealth of data on this group to offer a unified picture of the phylogeny and distribution of the American and Eurasian members.

The role of chromosomal inversions in tying together adaptive gene combinations is thoroughly reviewed in the next chapter on "Chromosomal polymorphism in the Diptera," by A. Brito da Cunha. By means of hybridization and several experimental techniques, an astonishing variety of nuclear-cytoplasmic combinations is possible in Amphibia. The contributions of studies of these combinations to embryology and to some extent to the interpretation of evolution are discussed by John A. Moore in the fourth chapter on "Abnormal combinations of nuclear and cytoplasmic systems in frogs and toads."

The fifth chapter on "Recent genetics of the domestic rabbit," by Paul B. Sawin, is an exhaustive survey of the 100 or more studies on the genetics and physiology of the rabbit in recent years. There are 38 named loci, and 16 of these are distributed in six genetic linkage groups. In addition, a large number of loci are known to affect the variability in numerous quantitative characters. The final chapter, by Ryuhei Takahashi, is on "The origin and evolution of cultivated barley." Since barley enjoys a position as an important food crop and has probably been even more important in the remote past, an unraveling of the problem of its origin will be of interest to geneticists, agronomists, archeologists, and anthropologists. The question cannot be finally settled at this point, because several alternative hypotheses are admissible.

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Resonance in Organic Chemistry. George Willard Wheland. Wiley, New York; Chapman & Hall, London, 1955. xiii + 846 pp. Illus. $15.

George Wheland candidly presents in this book an unvarnished picture of the sad state of affairs that exists regarding attempts to treat quantitatively from first principles the forces that hold together even slightly complicated molecules. At the same time he imaginatively explores the firm, qualitative successes of the application of the theory of resonance to molecular structure and reactivity in organic compounds. His treatment refreshingly avoids any tendency toward oversimplification and reflects an outstanding command of the material.

Readers who are familiar with his earlier efforts to translate quantum mathematics into the symbolism of organic chemistry will be pleased to find that the new work contains sections on spectroscopy and systems in transit, omitted from the earlier works. Some may object to the somewhat limited treatment afforded portions of these subjects, but their objections should be tempered by