ing of the rate of mutation of a specific gene or of the total mutation rate of all the genes in the genome." (iii) "To say that the primary action is unitary, each gene having but a single primary function, is to formulate a simple straightforward hypothesis neither supported nor contradicted by experimental evidence, and at present not subject to experimental test by known and proven methods." (iv) "It is not possible to make a choice between [the particle theory versus the metabolic-state theory of cytoplasmic inheritance] or even to be certain they are mutually exclusive." (v) "The oft-stated claim that one strain differs from another by a single gene always carries with it the usually unstated qualification that they differ in only one known gene." (vi) "Genes have been variously described as (1) units not reduced by crossing over, (2) units of mutation, and (3) units of function."

The last sentence quoted is followed by a lucid discussion of these definitions; I wonder whether the term *gene* when used in the singular, is still useful in precise discussion. At a recent symposium, the terms *rit* (recombinational unit), *mit*, and *pfit*, or the more euphonious *recon*, *muton*, and *cistron* were proposed to distinguish these concepts. These were jocular suggestions, but they emphasize that recent studies have outgrown an outmoded, and often confusing, terminology.

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The Dynamics of Living Protoplasm. L. V. Heilbrunn. Academic Press, New York, 1956. 327 pp. Illus. $6.50.

The well-known Pennsylvania physiologist, L. V. Heilbrunn, describes changes in protoplasmic colloids which he thinks provide a basis for understanding mechanisms underlying living activity. From direct viscosity measurements, he concludes that protoplasm is fluid in the interior of a cell and stiffer near the edges, probably because of calcium ions. Near the edges, proteins are on the alkaline side of their isoelectric points and can combine with cations like calcium, while toward the interior they tend to become more acid, combining with anions like chloride. This difference contributes to the origin of gradients in electric potential in cells.

The author suggests a fundamental pattern of colloidal change during cell activity, similar to that noted in specific precipitation reactions, such as those that occur in clotting. Indeed, muscle contraction, nerve excitation and transmission, cell division, anesthesia, and biostasis are explained on the basis of such colloidal changes related to cation binding or release by protoplasmic proteins.

Here is offered a full account of a general physiological theory which, in its present elaboration, deserves serious consideration, both for the facts on which it is built and for the abundant indicative support to which reference is given. The necessity for extensive study on physicochemical factors in colloidal changes in living material is clearly indicated, especially such changes as are involved in the equilibrium between clotting inducers like thromboplastin and clotting inhibitors like heparin.

This volume is an important one in bolstering the position that the broad foundation of general physiology is essential for the progress of every field of biology and medicine.

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A Handbook for the Identification of Insects of Medical Importance. John Smart. British Museum (Natural History) London, ed. 3, 1956. 303 pp. Illus. £2.

This is a photolith reproduction of a book, the first edition of which was published in 1943, that was evidently intended to meet the needs of the British Commonwealth of Nations without special reference to other areas. It therefore contains but little information on insects of medical importance in North and South America. Nevertheless it is an admirable presentation of the material that comes within its intended range.

The numerous illustrations, which, always with adequate credit, have for the most part been borrowed, are all of unusually high quality, and the text may be accepted as being thoroughly adequate. More than half of the book is given to the identification of flies of medical importance, which, considering the significance of this group, is entirely just. A short, but entirely admirable section by Karl Jordan, on fleas, is perhaps somewhat longer than is strictly necessary, and a section by R. L. Whittick on the Arachnida is perhaps somewhat shorter than is deserved.

The book is a reprint of its second edition, which was published in 1948, with corrections and additions, especially to the bibliographies, which bring it up to date. In spite of its dealing primarily with other parts of the world, the book will be of value to American medical entomologists, many of whom are working at present in the parts covered, or even to those who stay at home.

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Clinical Electrocardiography. pt. 1. *The Arrhythmias.* With an atlas of electrocardiograms. Louis N. Katz and Alfred Pick. Lea and Febiger, Philadelphia, 1956. 737 pp.

The literal translation of the word *arrhythmia,* according to Paul D. White, is "not measured motion." Rephrased, the term indicates any irregularity in the force, equality, and sequence of the heartbeat. When the arrhythmias are studied electrocardiographically, variations in the nature of the electric potential engendered by excitation, either of the atria or the ventricles, are added to consideration of the force and sequence of the mechanical beat of the heart.

This book represents the first half of an edition in two volumes on clinical electrocardiography. The authors indicate that the second volume will be devoted to a consideration of contour changes in the electrocardiogram. Their decision to devote this first volume to the arrhythmias was based on the judgment that "no comprehensive textbook is now available for the student and practitioner." They define specifically their intention to base interpretation of arrhythmias on a physiologic approach, while emphasizing the clinical import of materials under consideration. Recent advances in their thinking that are included in this volume are "a larger scale evaluation of the concepts of concealed A-V conduction, of aberrant ventricular conduction, and of the effects of cycle length upon the duration of the refractory phase; the concepts of retrograde and unidirectional conduction, and of the re-entry phenomenon, and their bearing upon ectopic beats and rhythms; the concept of multiple areas of block; the concept of depression of cardiac pacemakers by extraneous impulses; and finally the application of well known concepts of mechanisms operating in A-V block to other areas of the heart such as the S-A region and the ventricles themselves."

About one-quarter of the 700 pages in the volume is devoted to text, while the remaining three-quarters are composed of illustrative electrocardiograms supplemented by detailed legends. So abundant are the illustrations that the impression may arise that a search sufficiently long and enthusiastic eventually would produce every conceivable variant in a field replete with variables.

Deciphering complex cardiac arrhythmias is an assignment for those who delight in puzzles. Pursuit of this assignment will promote an understanding of certain fundamental properties of the heart, namely, its rhythmicity, conductivity, and excitability. Competence in analysis of arrhythmias will enhance the stature of a teacher in the eyes of his pupils. There remains a reasonable ques-