BOOK NOTICES

Simplified Statistics for the Agronomist

A full description of statistical procedures for the analysis of field experiments, without recourse to algebra, but with ample arithemtical examples, all in 33 pages, is the remarkable achievement of this little pamphlet. It commences with a practical discussion of experimental error and soil heterogeneity and leads through the *t*-test to the analysis of variance. It describes in full the lay-out and analysis of randomized block, Latin square, factorial, split-plot, and quasi-factorial experiments. The simultaneous analysis of two or more variables or covariance methods are not included. Explanations of the statistical operations do not involve the mathematical theory nor do they treat generally of the problem of biological variation; they appeal rather to the agronomist's logic in terms of practical considerations known to the field worker. Hence, for the experimenter who wants only a working knowledge of the analysis of variance as applied to field trials, this publication would seem ideal.—*C. W. Cotterman.*

Field Trials: Their Lay-out and Statistical Analysis, by John Wishart. 36 pp. Imp. Bur. Plant Breeding and Genetics, Cambridge, Eng. 1940. Price 216.

Animal Biology

Increase in knowledge may entail a change in concepts. Explanations which previously have been satisfactory, must often be revised in the light of new information. Textbooks especially must be kept as nearly abreast to information as possible. The textbook of zoology written by the late Professor Wolcott has recently been revised by his colleagues at the University of Nebraska. The organization of the first edition has been retained but many statements have been modified and new materials included. The work is well illustrated, sixty-four new illustrations have been added, approximately half of which are contained in the sections on reptiles and birds. A number of the illustrations used in the first edition have been improved. Except for the chapter on *Energy Changes in Organisms*, in which the concepts of oxidation within the organism are not handled in the light of modern physiological knowledge, the work is well done. This book designed as a text for a year's course in General Zoology, accompanied by laboratory, should be examined by those who wish to survey the animal kingdom.—*Paul E. Schaefer.*

Animal Biology, by Robert H. Wolcott. Second Edition, 649 pp., New York. The McGraw-Hill Book Company. 1940. $3.50.

A Century of Progress in Cellular Biology

Three interrelated topics of special interest to the cytologist and geneticist comprise the first volume of *Biological Symposia*, which were read at the 1938 meetings of the A. A. A. S. and are here presented in book form. The three symposia are titled: I. The Cell Theory, Its Past, Present and Future; II. Mating Types and Their Interactions in the Ciliate Infusoria; and III. Chromosome Structure. The volume itself is attractively printed. It contains contributions by 16 American biologists and will serve, on the biologist's bookshelf, to commemorate the centenary of the cell theory, even though, as shown by two symposium papers, the celebration must be regarded as somewhat overdue.

Though related, the three symposia differ greatly in the character of the papers which they contain. An interested outsider, desirous of studying the personality of the biologist, would find this book an excellent portrayal in three characteristic moods. The symposium on Cell Theory shows the biologist as a philosopher, somewhat exasperated by the immensity of his problem, carefully evaluating his past achievements, and using the full ponderosity of his language while describing his present difficulties. Following an introduction by Mayer and an historical review of microscopy by Woodruff are two very similar chapters by Karling and Conklin. These authors unite in taking from Schleiden and Schwann most of the credit commonly accorded them as founders of the cell theory. The next three papers by

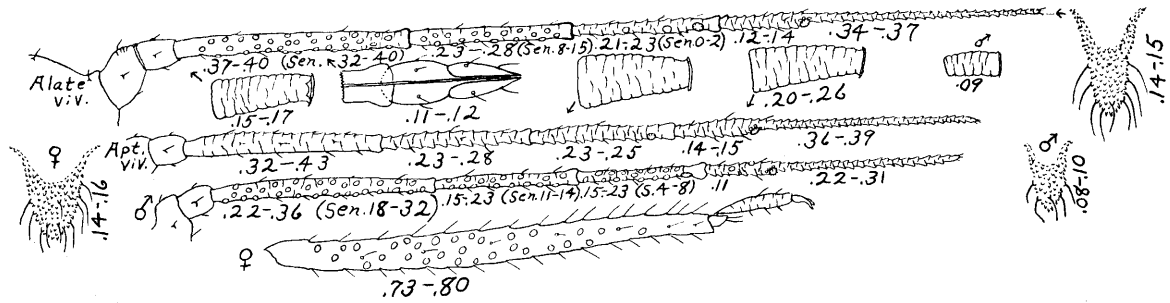
Baitsell, Schrader, and Weiss deal in turn with cells as structural units, mitotic machines, and as individuals in development. Prof. McClung concludes with a discussion of the future. Collectively, these last four essays tell a great deal about what is not known at present about life.

Quite a different sort of biologist is revealed in the second symposium, wherein a surge of new discoveries on mating reactions in the ciliate Infusoria are reported by five enthusiastic protozoologists. This section is "refreshing reading," to quote Dr. A. F. Blakeslee, who inscribes the Foreward to the book. "One feels as if one were in the laboratory with the workers, seeing the results coming thick and fast and trying to figure out how they fit into a broad picture, what their relation may be to sex, to self-sterility and incompatibilities in higher forms." This symposium deals with discoveries dating from 1937. A wide array of new facts are reported which might be summarized by saying that much of the former confusion about the problems of conjugation and exdomixis in the Protozoa has been largely removed by the discovery of hereditary mating "types" and "groups" comparable to multiple sexes and mutually intersterile subspecies in higher organisms. Also of interest are the facts that different species vary greatly in their mating systems, that, in certain cases, Mendelian segregation and mutation are exhibited, and that, like hereditary traits in general, the mating reactions are also influenced by a variety of environmental factors. This symposium would seem to hold a great deal of interest to many different kinds of biologists because of the many parallelisms.

The last symposium on Chromosome Structure is the shortest of the three and reflects a steadier, perhaps more normal, state of growth in biological theory. In the first paper "On Coiling in Chromosomes," Dr. Nebel gives a good explanation of current theories and adds one of his own which is quite ingenious and well illustrated by photographs of models but which seems to require quite a few new assumptions to meet the shortcomings of alternative theories. A very informative paper by Waddington deals with recent discoveries in the chemistry and physics of chromosomes. Dr. Painter, rediscoverer of the giant salivary chromosomes of Diptera, reaffirms their multiple-chromonema nature by ontogenetic studies, and Dr. Demerec closes the symposium with a review of chromosome structure in the light of gene physiology.—*C. W. Cotterman.*

Biological Symposia, Volume I, edited by Jaques Cattell. 238 pp. Lancaster, Pa., The Jaques Cattell Press. 1940.

The cut opposite was inadvertently left out of the article "Notes on Some Ohio Aphids" by Clyde F. Smith in the May number of the Ohio Journal of Science.



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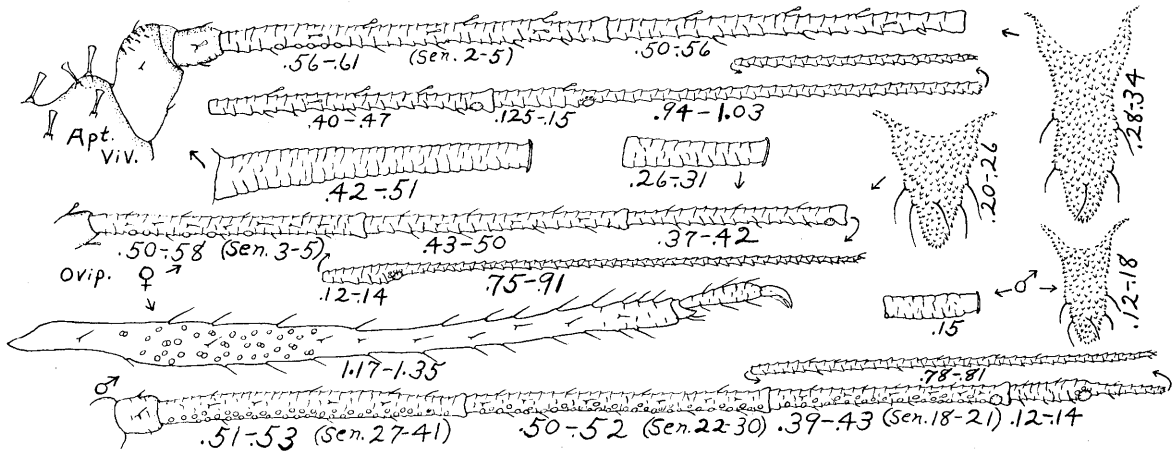

CAPITOPHOPUS OHIOENSIS