AN INTRODUCTION TO GENETIC STATISTICS


There has been a definite need for a general text in the field of quantitative genetics. The author has entitled this book as "genetic statistics," indicating that the material is statistical in scope, but directed towards application in genetics. Since the appearance of the 1918 paper of R. A. Fisher and the 1921 papers of Sewall Wright much additional work has been done in various aspects of this field and has been reported in a large array of journals. For research workers and students of genetics and breeding it has been difficult to assemble the material into a workable form.

The present text brings together the important concepts and ideas which have evolved during the past 40 years. The first 10 chapters are concerned with probability theory, general genetic population theory, estimation of parameters and tests of hypotheses, with a detailed coverage of the theory of inbreeding. Much of this material is pure statistics but with examples in genetics. The remaining 13 chapters discuss the study of quantitative inheritance. An excellent to discussion is given of the partition of variance and derivation of mean square expectations. Definitions of additive genetic dominance, and epistatic components of variance are followed by methods of obtaining the correlations between relatives in terms of these components. The results are general for any number of alleles at a focus, any number of loci, and any given degree of inbreeding.

A series of experiments is described which one can use to obtain estimates of the genetic components. Many of these experiments have been described by various workers but one of the greatest assets of the book is the way in which these are combined into a general presentation. Most of the components considered are genotypic and the role of genotype-environmental interaction is not emphasized but must be of considerable importance to experimenters in the interpretation of the estimates of the genotypic components. Much of the material in the second section of the book has been published by the author in scientific journals, but he has included new material which ties together the methods and ideas of other workers.

This text would be a worthy reference book for breeders and geneticists and an excellent text for a course in statistical genetics. The author has been teaching a one-quarter course in statistical genetics and in the preface he suggests the chapters which could form the material for this course.—D. F. MATZINGER.

PROGRESS IN NUCLEAR ENERGY. VI. BIOLOGICAL SCIENCES


In this volume is presented a resume of the topics discussed in the biological section of the International Conference for the Peaceful Uses of Atomic Energy held at Geneva, Switzerland in August, 1955. The topics discussed may be divided into three categories: (1) the use and effects of radiation in genetics, including hazards of mutations to the human population, and use of mutations in plant breeding; (2) the techniques and results of using radioactive isotopes as tracers in studying the movement of elements in soils and plants; (3) the tagging of biochemical molecules to determine their disposition in plant and animal assimilation.

Most of the topics discussed are illustrated by choosing only a few key papers from those presented at Geneva. This appears to be a desirable way to present the information. It allows for a more continuous presentation and does not seem to be too much of a literature review. Without a review like this one it would be nearly impossible for a research worker to ever cover all of the material presented at the conference.—K. J. FREY.

EXPERIMENTAL DESIGNS

(Second Edition)


This book is described on the dust sheet as being "A working manual for research workers in all branches of science. Revised and expanded, it presents a picture of the most of the useful experimental designs, with detailed instructions for their use." No reviewer would quibble with this statement and indeed the book seems to have no competitors in this aim. If a research worker wants a working manual, this is the book in the English language that this reviewer would recommend. It does, indeed, present most of the useful experimental designs, the only omission that this reviewer noticed not being in blocks which could have considerable value in many branches of science if workers were aware of the existence and utility of the designs. Also in describing lattice designs it might have been worth while to include 6 x 6 unbalanced lattice squares as the reviewer has met a number of agronomists who are not aware of the existence of these.

The authors have augmented the first edition by adding new sections and chapters as follows: 2.21a, 4.15a, 4.27a on data arranged into two classes; 2.23a, sequential experimentation; 3.34a multiple comparisons; 4.6a, designs for estimating residual effects when treatments are applied in sequence; 5.24a, Yates' method for computing factorial effect totals; chapter 6A, factorial experiments in fractional replication; Chapter 6A, some methods for the study of response surfaces; 11.1a, balanced incomplete block designs in taste and preference testing; 11.57, statistical analysis for repetitions of the designs; 11.6a, partially balanced incomplete block designs; 11.7a, chain block designs; 13.21, analysis (of incomplete Latin square); recovery of information; 13.34a, other modifications of the Latin square; 13.35a, generalized chain block designs; 13.41a, partially balanced designs (in two-way arrays); and finally tables of "t" and "F". These additions make the book entirely up to date with regard to classes of design and the indices of designs have been expanded to the extent that the worker can easily determine what designs are available for any particular situation. The treatment of fractional replication in the first edition was very skimpy, and this has been remedied. The study of response surfaces was largely developed after the first edition appeared and the material on this topic is an excellent introduction.

The whole of the material of the first edition is included without any essential changes. This is perhaps unfortunate in that it carries the implication that in the light of experience with the book much of the first edition could not be improved on and did not merit sizeable additions and reorganization. Either or both of these implications may be true, but it seems to this reviewer that advances in a subject can rarely be dealt with in this way. This reviewer frequently found himself saying "They haven't covered such and such" to find that something was said elsewhere, and this is unfortunate for the reader and user of the book. The several chapters discussing incomplete block designs do not seem to be well organized, partially at least because of the procedure of adding sections. It seems appropriate to mention some general aspects of the book which appear unsatisfactory to the reviewer in one way or another, bearing in mind that there is no comparable book, and, indeed, because there is no comparable book. They are as follows:

1. The nature and role of randomization is inadequately discussed.
2. The definition and role of the experimental unit is obscure.
3. The role of estimability with linear models should be discussed.
4. The general area of transformations and role of additivity is not discussed adequately.
5. The validity of analysis of lattice designs as randomized blocks is not dealt with adequately.

Regardless of these inadequacies the book is to be very highly recommended to users of experimental designs. By and large it should be regarded only as a side reading for those interested in the basic philosophy of design, but this was not the aim of the authors.—O. KEMPThORNE.

SURVEY OF BIOLOGICAL SCIENCE


"Embryological Concepts in the 'Twentieth Century," by Jane M. Oppenheimer, of Bryn Mawr College, contrasts earlier embryological work, largely of a descriptive sort, with a more recent