

Race," is on that part of the subject in which the author is least at home. The geographic thought is of a previous generation. Environmentalism is retained in practice although disclaimed in theory. Determinism is included by implication. Pages are crowded with place names, meaningless without maps to show their localization and the sweeping lines of movement by which they are related.

An assortment of good pictures and two good specialized maps distributed through the book are given no useful function. They are not referred to in any case and are not presented to show any relation to the text.

If the reader will penetrate beyond Part I and overlook the pictures, he will be rewarded finally with historical understanding of the major absence and minor presence of science in Brazil. For anyone interested in Brazil, the great positive contribution of the book will be found in Azevedo's keen interpretation of the rich nonscientific aspects of the country.

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**Experimental Designs.** William G. Cochran and Gertrude M. Cox. New York: John Wiley; London: Chapman & Hall, 1950. 454 pp. \$5.75.

Application of biometric analysis to research problems has made much progress in the past generation. Experimental design is the culmination of such statistical work; after a little experience in analysis of results, the need for better planning becomes very evident. Plans to insure validity and increase efficiency of experimental work have received increasing attention.

The present textbook has been eagerly awaited for several years, and a preliminary mimeographed version has already proved useful. The book follows the path of useful and usable application of techniques, opened up by Fisher, Yates, Snedecor, the authors, and others. The book is put together substantially and printed clearly. Material heretofore widely scattered, if available at all, is here given organized treatment.

Two short chapters on the philosophy of statistics in experimentation, and a longer one on basic methods of analysis, are followed by ten chapters on specific designs. Completely random designs, randomized blocks, and latin squares (including switch-backs) are first considered. Then factorial designs, confounding, split-plot designs (treated as designs with main effects confounded), quasi-latin squares, and various incomplete block designs are discussed. The last-named group includes various lattices, lattice squares, balanced incomplete blocks, and Youden squares. In each case the discussion includes not only the description and adaptation of the design, but methods for arrangement, randomization, and analysis of results. In numerous cases results from actual experiments, in field and laboratory, are cited in illustration. The extensive tables of plans of treatment combinations, in some cases indexed, should be very useful. The jacket states that 150 plans are listed.

The 14th chapter deals with analyses of series of similar experiments, such as identical tests carried on in several localities; the 15th and last with methods of randomization. References follow each chapter, and a selected bibliography on general principles of design is included.

The more complex designs of limited application receive more space than the simpler and more widely used ones, but this is inevitable because they are more difficult to explain. A little more space might well have been given to the philosophy of experimental proof at the start.

On the whole this volume will be indispensable to forward-looking experimenters and biometricians.

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## Reviewed in Brief

**Surface-Active Quaternary Ammonium Germicides.** Carl A. Lawrence. New York: Academic Press, 1950. 245 pp. \$6.00.

The author has attempted here to compile the literature of the surface-active quaternary ammonium germicides, incorporating much unpublished work of his own. The contents are grouped into eleven sections. A short introduction is followed by a consideration of the chemical and physical properties of these germicides, and of the problems encountered by the presence of compatible and incompatible materials. Attention is directed to various theories of the mechanism of action, with emphasis on the lack of specific information. There is an excellent discussion of the practical applications of the quaternary ammonium compounds in surgery, in general disinfection, and in industries such as textile plants, laundries, and paper making. A bibliography of 550 references directs the reader to the original sources of material.

It is apparent that a conscientious effort has been made to maintain an impartial attitude in considering the data, although suggestions of a preference for the quaternary substances as antibacterial agents consistently appear. The book is highly recommended as an authoritative survey of our present knowledge in this field.

**The Physical Chemistry of Electrolytic Solutions.** 2nd ed. Herbert S. Harned and Benton B. Owen. New York: Reinhold Publ., 1950. 645 pp. \$10.00.

The six years that have elapsed since the publication of the first edition of this book have not seen any considerable changes in the fundamental concepts of this field. The appearance of revised estimates of certain physical constants has led the authors of this volume to include in an appendix a series of tables representing recalculations based on the new constants. With this exception, the subject matter and organization of this work remain, as before, a standard of excellence.