Book Reviews

Science Is a Sacred Cow. Anthony Standen. New York: E. P. Dutton, 1950. 221 pp. $2.75.

A sprightliness of style, a few well-put and well-deserved cracks at the pompous and the fraudulent, and a fundamentally vulgar line of thinking make this book a minor success of the day. Mr. Standen, chemist and jacket-claimed humanist, discusses the five great branches of science, pays homage to mathematics and the Platonic ideals, and ends by urging the reader to watch scientists carefully against their putative lust for political power. He even draws a laugh out of the matter, for he is no sobersides. Scientists worship a sacred cow, he says, and that is the "most laughable thing in the world." I tried pretty hard to make out that fat, pampered animal, but Mr. Standen's cow seems to me a thin effigy of straw, and he flailed to beat the dust out of her at that.

The technique is simple. He recalls the most obvious prejudices of the chuckling reader. He avoids the great or the difficult like the plague, and gives quotations from a number of more or less obscure elementary texts or books on science teaching. When these are as bad as those things can become, the exposure is on. His arguments appeal to the least reflective, and gloss over everything that might tend to show where the real problems lie. For example, correlations, every reader of *Science* knows, can be and have too often been almost absurdly derived. But Mr. Standen seriously illustrates the meaning of scientific method by pointing out that if one gets tight on whiskey and soda, brandy and soda, and gin and soda, the scientific conclusion is that the common factor, soda water, is the responsible substance. This is really a bit harsh, even on an M.A. in education, who surely uses some controls. And after all it is only the long history of the controls that makes me, with Mr. Standen, believe that ethyl alcohol is the important tenth of the highball. The example cited is by no means unusual. The whole of the book has the same amused and insincere tone.

Physics comes off reasonably well in this ingenious essay. It can't *prove* things (in italics) the way mathematics can, but still it tries. Its results are not just probable, but *very* highly probable. Nearly equal is the same as equal to a physicist. The voice is disapproving, all right, but the words don't say exactly why. Then, in the order named, biology, psychology, and sociology come in for a drubbing, often deserved enough, more often extraordinarily unjust. His strictures on the psychologists who avoid introspective and subjective methods, and on the atomistic sociologists who belabor the evident with the statistician's heaviest clubs are worth reading. But though he speaks many a true word, as he himself gently implies, in jest, the book in sum is a patchwork of facile half-truths and cheap victories.

Mr. Standen says many things about religion which make a pattern. It would have been more candid of him to indicate his own philosophy, and not simply to assert as he does that "the first purpose of science is to learn about God and admire Him through His handiwork." With the many references to Aristotle and his successors, to ghosts and angels, to the saintly and ascetic, Mr. Standen's thinking seems to be recognizable not as that of a humanist but that of a theologian. Since, on page 199, he says that even an indifferent theologian (he so characterizes Plato) is better than a modern scientist, he cannot regard that as harsh criticism.

It is too bad that the good and great men, the fascination and the wonder, the sheer human joys and sorrows that every scientist knows in his science and in its history were ignored. That science can illumine a way of life is lost in this rush of cleverness. There is an acknowledgment to the Long Island Railroad, which gave Mr. Standen plenty of time to write, so he says, by its delays. Either the Long Island has much reformed its schedules since this reviewer last rode to Patchogue, or Mr. Standen is a secret player of canasta, for evidence that the writing of this book took much time is hard to find.

P. Morrison

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Brazilian Culture: An Introduction to the Study of Culture in Brazil. Fernando de Azevedo; translated by William Rex Crawford. New York: Macmillan, 1950. 562 pp. $12.50.

This book describes a significant negative contribution of science. Azevedo traces the absence of science through the history of Brazil and shows that it involves scholasticism, colonial economy, slavery, Jesuit education, literary culture, juridical aristocracy, imperial hierarchy, and republican bureaucracy.

The absence of science is not of course complete, and Azevedo gives discriminating consideration to the minor evidences and incidents of science: to the episode of Dutch invasion, to the establishment of technical training under the Empire, and to the interest of scientists of the Northern Hemisphere in the tropical biology and geography of Brazil, as made known by Humboldt, Darwin, Bates, and Agassiz.

The book is not itself scientific except in a sense so broad as to include analytical topical history as a work of science. The author is at his best when dealing directly with Brazilian culture in the spirit of his own cultural heritage and literary style (of which naturally something is lost in the English translation).

There is cause for regret in the fact that the book begins in another style, that of recent social science, partially outmoded. So the author puts his worst foot foremost, with an introduction theorizing on technicalities and five chapters on the "Factors of Culture," in stereotyped order. The first chapter, on "Land and

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.

F. M. WADLEY

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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.