sents the result of a clear and open-minded thinking through of a difficult problem. It is a far cry from the theories involving hot filaments between colliding stars, which held sway not very long ago, to Urey's dust-cloud hypothesis! The principal value of the book probably lies not so much in the fact that it deals with an "up-to-date" theory of the origin of the solar system, as in the approach of a careful following through of the detailed physical-chemical processes that must have taken place as a consequence. One gets the distinct feeling that proponents of future theories on the origin and development of the solar system, who wish to be taken seriously, will of necessity have to examine with care the detailed physicochemical processes that follow from their hypotheses. One only hopes that there may always be enough Ureys in the world with ability, vision, and training equal to these tasks!

The book is well printed and is not tiring to read. As far as this reviewer has been able to judge, it is remarkably free from printing errors and errors in figures, although one cannot help but be amused by the editorial slip on page 123, where the word "retention" is in one prominent place spelled correctly, to be misspelled with equal prominence on the same page and on nine pages after that!

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Statistical Design and Analysis of Experiments for Development Research. Donald Statler Villars. Dubuque, Iowa: Brown, 1951. 455 pp. $6.50.

The appearance of another book on statistical methods in these days when statistics seems to be the vogue is noted with interest and hopefulness. This text is an attempt to acquaint research personnel (often lacking in formal statistical training) with the more frequently used techniques of statistical analysis. A wide variety of topics is included: (1) The use of calculating machines; (2) "Student's" t test and required size of sample for the detection of real differences; (3) a discussion of the binomial, Poisson, normal, chi-square, t, F, and other theoretical distributions of use in statistical methods; (4) analysis of variance and the design of efficient experiments; (5) the use of regression (linear and nonlinear) and an introduction to the principles of covariance; (6) quality control charts and the elements of sequential analysis; (7) miscellaneous topics including efficiency studies, components of variance, Sheppard's corrections, and a short note on the Behrens-Fisher test.

In the preface, the author indicates that this book is intended to aid the research worker in properly planning his experimental projects so that statistical methods may justifiably be used in the interpretation stage. A minimum of mathematics is to be used. In general, he does an excellent job of emphasizing the need for good planning. For example, on pages 84–5:

> It is desired especially to emphasize that the way the variability should be analyzed is entirely dependent upon the way the experiment was set up. There is only one correct way to analyze a particular experiment. It is predetermined the moment the runs are made. The manner of replication of the different possible effects is the determining factor. Obviously, use of an incorrect scheme of analysis can lead to erroneous conclusions. Incidentally, as has already been mentioned, if the results of the statistical analysis seem to violate common sense, the chances are great that common sense is right and that an error has been made because of an incorrect subdivision of the error degrees of freedom—one did not have as much replication in the places that the incorrect method of variance analysis implies.

On the other hand, however, the presentation of the techniques, especially analysis of variance, shows a certain lack of sophistication, with the result that incorrect test procedures are sometimes suggested or may be inferred. For example, the second paragraph on page 7 and the second paragraph on page 75 lead one to believe that an interaction mean square is the correct "error" against which main effects should be tested. Such is seldom the case! This matter is better explained later in the text, but it is feared that the damage has already been done. Then, too, at the top of page 69, the impression is given that, if F is significant (in an analysis of variance), one has the right to make t tests for comparing all possible pairs of treatment means. This is generally considered to be poor procedure.

It is unfortunate that Villars has not seen fit to adhere closely to the accepted terminology of statistics, poor though it may be in some instances. The addition of new terms, when no need appears to exist, only adds to the large list of terms and symbols that already awaits the statistical novice. His introduction of "replication degeneracy" seems a misguided effort, indeed. Also, the classification of designs given in Chapter 7 is peculiar. The setting up of two classifications—*simple* ("between and within") and *factorial*—is misleading, since factorials are not designs as the statistician interprets the word. What the author is attempting to do is to classify treatments according to their composition, simple or factorial; and designs as completely randomized ("between and within"), randomized complete block, Latin square, and so on. He adds further to the confusion by referring to a "between and within" design as a "uniform medium" design—another new term to be learned. Other items such as these could be mentioned if time and space permitted.

The reviewer is flattered to be included (a presumption on his part) in the ". . . small nucleus of agricultural statisticians in Iowa . . ." (p. vi) who have paid some attention in the past to small sample (*exact*) statistics. However, he feels that the implication that all other statisticians in America have only recently deviated from consideration of purely large sample (*asymptotic* or approximate) statistics and awakened to exact statistics is unjustified. It is realized, of course, that much depends on the interpretation given to the word "recently." In view of this wide latitude of meaning, let us be charitable and assume that people outside Iowa have heard of, and believe in, small sample statistics.

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