BURGESS ON STATISTICS

Introduction to the Mathematics of Statistics. By Robert Wilbur Burgess, Senior Statistician, Western Electric Company. Boston, Houghton Mifflin, 1927. viii+304 pp. $2.50.

The addition of another textbook on statistics to a field already rather crowded is not justified unless the new book has worthwhile advantages. The reviewer feels that the new text by Burgess meets this test. Up to the present time textbooks on statistics have fallen for the most part into two distinct groups: fairly condensed texts which were intended to appeal mainly to students with considerable mathematical training, and the voluminous texts to be used in connection with work in economics. The text under review combines the two types in a relatively small volume.

Although no two trained statisticians would probably agree in all particulars upon a definition of statistics, it is all to the good that the author undertakes a simple and direct explanation of the meaning and need of statistics from the very start, which not only serves to orient the student but also paves the way well for what follows. The summaries at the ends of the chapters also add to the effectiveness of the text.

The author has succeeded remarkably well in covering so much ground without employing the principles of the calculus. However, the reviewer feels that the author should have been consistent and referred elsewhere for some of the lengthy algebraic work (pp. 101–2, 142, 165, 225, 240–42, 245, 250–51) which will tend to distract the attention of the student from the main discussion unless, as will probably happen, the student skips that work. Such work might well have been relegated to the appendix.

There are several places where the author does not say exactly what he surely meant. For example, we are told (p. 33) to use the ratio chart when we wish "to compare *changes* (my italics) rather than absolute magnitudes." Also the author uses "percentages" in several places where "rates" are surely meant; thus, on this same page (p. 33) he says that "equal vertical distances represent equal percentages of change." In another place (p. 34) we are referred to "the downward curve" of a graph which has a positive slope throughout; the reference is, of course, to a decrease in the slope. Again, we are told (p. 133) that "the number of series (to be used to determine an index number) should be large enough . . . but not so large as to cause undue difficulty . . . ."; we know only too well how some students would interpret this advice. It is rather cruel to say (p. 258) "In order to help the student to understand the *fundamental idea* (my italics) of the probable error (of which little has been said so far), let us follow through the proof of the formula for the probable error of the mean." However, most of such slips are not serious, especially in the light of the text just preceding or just following.

Although one of the claims of the author is generality of treatment, rather condensed explanations of the usual work with index numbers and time series are included. The text carries one finally to the theory of correlation of three and four variables.

The space devoted above to criticism of individual excerpts is relatively much greater than they deserve, and is apt to give an erroneous effect. The main impression made upon the reviewer is that the book is very readable and even interesting (rarely true of textbooks on statistics), except possibly for the algebraic passages referred to above. Teachers of courses which cannot, or do not, require any knowledge of the calculus, will probably find in this book the text they have long sought.

C. H. FORSYTH

HUDSON ON CREMONA TRANSFORMATIONS

Cremona Transformations in Plane and Space. By Hilda P. Hudson. Cambridge University Press, 1927. xx+454 pp.

The appearance of a first exhaustive treatise in any field of mathematics is a matter of concern to those who pursue the particular subject. Books of that type frequently determine the trend of mathematical thought and progress for a considerable period. Perhaps no topic in algebraic geometry has been in greater need of such exposition than Cremona transformations. The earlier presentations are either elementary or incidental to some immediate geometric need. Existing encyclopedic accounts are rather cursory. Thus a large body of researches on the subject, widely distributed in the journals, has been either inaccessible or unknown to those who might wish to become acquainted with the field.

To digest and to unify this mass of material was a task which demanded not merely a mastery of the subject but also an uncommon capacity for detail. This task Miss Hudson has accomplished in a most admirable manner in the book under review.

The book itself gives an impression of unity which is rather remarkable in view of the diversity of the transformations of which it treats. This doubtless is due to the wisdom of the author in selecting from the field a naturally related group of topics. Only transformations in the plane and in space are considered. For each case these are discussed first with reference to the properties common to all and secondly with reference to their division into various types. The single application considered is to the resolution of singularities of curves and surfaces and a treatment of this is practically inevitable since such singularities are present in the transformations. This is the division of the subject to which most of the author's own contributions have been made. No geometric applications are given except as they may be involved in the construction of a type, or as they may be inherent in the general class such as the isologues of a transformation in superposed planes or the complex associated with a transformation in space. Applications to other fields of mathematics are omitted. No account of Cremona groups, finite or infinite, appears.

The nomenclature of the author is on the whole well chosen even though individual contributors to the subject must generally expect to find that their own notations have not, in all cases, been adopted. Miss Hudson adopts the term *F-system* (*fundamental system*) for the aggregate of points in S whose correspondents in S' are indeterminate; and *P-system*