produced 166,562 tons of alkali, less than was imported, while in 1900 the production was 539,541 tons and in 1905, 734,209 tons. In the last two periods the importation of bleaching-powder into the United States had decreased from 136,403 tons to 96,110 tons. Unfortunately this statistical portion is the only part of the book not brought well down to date.

J. L. H.

The Elements of Statistical Method. By WILLFORD I. KING, M.A. New York, The Macmillan Company. 1912. Pp. xvi + 250.

It is "the purpose of this book to furnish a simple text in statistical method for the benefit of those students, economists, administrative officials, writers, or other members of the educated public who desire a general knowledge of the more elementary processes involved in the scientific study, analysis and use of large masses of numerical data."

With this purpose in mind, the author presents only the most simple of the mathematical theorems on which the statistical method is based. The book is arranged so as to treat the subject in four main parts: (1) The historical development and general characteristics of statistics; (2) the gathering of material; (3) analysis of material collected; (4) comparison of variables. The great variety of topics dealt with under these general headings indicates the breadth of view desirable for an adequate treatment of statistical problems, and suggests the many pitfalls that endanger the certainty of conclusions drawn from some kinds of statistical data. The book is to be commended for the clearness with which it brings a large number of topics concerning statistics to the attention of the educated public. This is surely a matter of the highest importance.

It seems desirable to criticize the treatment of the notion of "the probable error." On p. 78, we find the following statement: "If $E =$ the possible error of the arithmetical average, the probable error of the same is approximately $E/\sqrt{n}$." For proof, we are referred to Bowley, "Elements of Statistics," pp. 303–315. I fail to find that Bowley attempts to obtain a relation between probable and possible errors. He does show, within the limits of this reference, that the probable error of the arithmetic mean of n variates is $E/\sqrt{n}$, where E is the probable error of a single variate. It seems to the reviewer that the book is not clear on the notion of a probable error, and even presents an incorrect conception of this subject. On pp. 213–214, the statement is made that the probable error of a coefficient of correlation varies inversely both with the number of pairs of items and with the size of the coefficient. Then the well known formula

$$\frac{0.67(1-r^2)}{\sqrt{u}}$$

is given for this probable error. It is therefore obvious that the author does not use the expression "varies inversely" in its usual meaning in mathematical sciences. Later, on p. 214, is the statement that the probable error indicates that the chances are that r actually lies between

$$r + \frac{0.67(1-r^2)}{\sqrt{n}} \quad \text{and} \quad r + \frac{0.67(1-r^2)}{\sqrt{n}}.$$

This statement is obvious but useless when taken in one sense. It tends to give an incorrect conception of the meaning of a probable error, when taken in another and important sense.

To summarize, it seems to the reviewer that the strength and usefulness of the book lies in its popular presentation of some of the leading ideas of the best statistical method of the present day. The weakness of the book lies in its presentation of a vague and even incorrect conception of the meaning of the probable error of a statistical result.

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POPULAR AND TECHNICAL BOOKS ON HEREDITY

Einführung in die Vererbungswissenschaft. By RICHARD GOLDSCHMIDT. Leipzig, Wilhelm Engelmann. 1911. Pp. x + 502. Price, 12.25 M., paper, 11 M.