

be divided into two large classes: "the first embraces the forms for which the exponential law may be regarded as at least a first approximation; the second, on the contrary, embraces the forms for which this law can not be regarded as even a crude approximation. Thus, the exponential formula, which for a long time was conceived as a sort of law of nature, is put in its proper light. For a large group of distributions arising in Kollektivmasslehre it plays a role similar, say, to the representation of the earth by means of a sphere in measurements of the earth."

In the chapter on the mixture of the arguments, it is shown that this process produces a tendency towards the exponential law. This result is of significance as accounting in part for the large number of distributions which approach this law. In the chapter on the mixture of distributions the essentials of correlation theory are treated.

Of the twenty-four chapters contained in the book, the last five deal with numerical applications. These numerical cases show the systematic methods of carrying the theory into practice, and indicate what parts of the work can be done once for all in many applications.

Dealing with a subject which we should like to see treated rigorously, this book takes a high place in point of mathematical elegance, and it should serve to make much better known this important field of applied mathematics.

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*Hermann Grassmanns gesammelte mathematische und physikalische Werke.* Herausgegeben von FRIEDRICH ENGEL. Bd. 2: Theil 1, *Die Abhandlungen zur Geometrie und Analysis*, x + 451 pp., 1904; Theil 2, *Die Abhandlungen zur Mechanik und zur mathematischen Physik*, viii + 266 pp., 1902. Leipzig, B. G. Teubner.

THE first volume of Grassmann's works is in two parts, each containing one of the two Ausdehnungslehren; the second volume reprints the miscellaneous papers and Nachlass. It is interesting to note that the earliest paper is a "Programm" on crystals and bears the inscription: Stettin, 1839. This was only five years before the publication of the first Ausdehnungslehre. The last papers are dated 1877 to 1879 and are concerned with various applications of the calculus so intimately associated