situation could easily be avoided by taking $C$ and $C'$ as undefined and defining $K$ as $C+C'$. It is doubtful, however, whether irredundancy of undefined ideas is an especially useful concept.

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# DISTRIBUTIONS OF GREATEST VARIATES, LEAST VARIATES, AND INTERVALS OF VARIATION IN SAMPLES FROM A RECTANGULAR UNIVERSE*

BY E. G. OLDS

1. *Introduction.* It is proposed to present in this paper the distributions of greatest variates, least variates, and intervals of variation, in samples of size $N$ drawn, without replacement, from the population characterized by the frequency distribution

$$f(x) = \begin{cases} 1 \text{ for } x = 0, 1, 2, \cdots, b, \\ 0 \text{ elsewhere.} \end{cases}$$

This is a finite universe of discrete variates, distributed rectangularly.

The distributions of various statistical parameters, in the case of samples from rectangular distributions, have been investigated by Rietz† and others,‡ but they have been concerned with continuous distributions. The two investigations most closely related to the contents of this paper are those of J. Neyman§ and E. S. Pearson, and of P. R. Rider.¶

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* Presented to the Society, December 27, 1934.

† *On a certain law of probability of Laplace*, Proceedings of the International Mathematical Congress, Toronto (1924), vol. 2, pp. 795–799.

‡ Philip Hall, *The distribution of means for samples of size N drawn from a population in which the variate takes values between* 0 *and* 1, *all such values being equally probable*, Biometrika, vol. 19 (1927), pp. 240–244. Allen T. Craig, *On the distributions of certain statistics*, American Journal of Mathematics, vol. 54 (1932), pp. 353–366.

§ *On the use and interpretation of certain test criteria for purposes of statistical inference*, Biometrika, vol. 20A (1928), pp. 175–240.

¶ *On the distribution of the ratio of the mean to standard deviation in small samples from non-normal universes*, Biometrika, vol. 21 (1929), pp. 124–143.