

SOME TOPICS IN SAMPLING THEORY*

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1. *Introduction.* Many important contributions have been made to “small or exact sampling theory” since 1908, when “Student’s” contribution† created a new interest in the subject. A general notion of the extent of the literature on this topic may be obtained by an examination of the excellent survey by P. R. Rider‡ in 1930. Next, J. O. Irwin§ gave valuable reports on this literature for approximately the years 1930–1934. Then Rider|| brought the survey on exact sampling theory well up-to-date in a paper of 1935, and again for part of the field in 1936.

The invitation to give a paper at this meeting left me free as to the selection of a subject. This freedom was interpreted to mean that you would probably prefer to have me speak on some topics in which I have a special interest, rather than to attempt a well-balanced discussion of recent progress for which we may well turn to the papers mentioned above as surveying the contributions to exact sampling theory.

On the side of applications, sampling theory is much concerned with judging, by means of one or more tests, whether an observed random sample, taken as a whole, conforms reasonably to samples expected from a specified population. Test criteria may be based on such concepts as the mean, the variance, the standard deviation, the Pearson χ^2 , the “Student” ratio, the Fisher z , the correlation ratio, and other statistical estimates of

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† *The probable error of the mean*, *Biometrika*, vol. 6 (1908–09), pp. 1–25.

‡ *A survey of the theory of small samples*, *Annals of Mathematics*, (2), vol. 31 (1930), pp. 577–628.

§ *Recent advances in mathematical statistics*, *Journal of the Royal Statistical Society*, vol. 94 (1931), pp. 568–578; vol. 95 (1932), pp. 498–530; vol. 97 (1934), pp. 114–154; vol. 99 (1936), pp. 714–769.

|| *Recent progress in statistical method*, *Journal of the American Statistical Association*, vol. 30 (1935), pp. 58–88. *Annual survey of statistical technique developments in the analysis of multivariate data*, Part I, *Econometrica*, vol. 4 (1936), pp. 264–268. See also C. F. Roos, *Annual survey of statistical techniques: The correlation and analysis of time series*, Part II, *Econometrica*, vol. 4 (1936), pp. 368–381.