NOTES

This section is devoted to brief research and expository articles, notes on methodology and other short items.

<hr>

THE ALLOCATION OF SAMPLINGS AMONG SEVERAL STRATA

By J. Stevens Stock and Lester R. Frankel

1. **Introduction.** The problem of selecting a random sample so as to obtain optimum precision in making estimates has been the subject of inquiries by Bowley,[1] Neyman,[2] Sukhatme[3] and others. In estimating an average value of a variate in a population it is often profitable to stratify the universe into several homogeneous parts and sample at random within each of these parts. In order to obtain maximum efficiency for a given size of sample it appears that the number of samplings from each stratum should be proportional to the standard deviation of the characteristic under consideration and to the total number of units within the stratum. By distributing the sample in such a manner optimum precision will be obtained in estimating a general average.

However, it often happens that it is not the purpose of an investigation to study the aggregate of the universe. Evaluations and interrelations of characteristics in different groups or strata within the universe may be of importance. Thus, in cost-of-living surveys in a number of urban centers the object is to compare costs among the cities of different backgrounds. In such cases it is desirable for each city to have equal reliability so that each one may be treated as a unit. There are many other situations in the social sciences where analyses of this type are of importance.

2. **The Problem.** In general, the sampling problem is: Given several well defined areas of study and a fixed number of observations with which to make the survey, how best to distribute the observations such that each area will be represented with equal precision.

There are n observations to be distributed among m areas or strata. In the

<hr>

[1] A. L. Bowley, "Measurement of the precision attained in sampling," *Bulletin de l'Institute International de Statistique* 1926 Rome, Tome XXII, 1-ere Livraison, 3-eme partie, pp. 1–62 (supplement).

[2] J. Neyman, "On the two different aspects of the representative method," *Journal of the Royal Statistical Society*, 1934, pp. 558–625.

[3] P. V. Sukhatme, "Contribution to the theory of the representative method," Supplement to the *Journal of the Royal Statistical Society*, Vol. II, 1935, pp. 253–268.