

complexes (form-groups, race-groups, etc.). Thirdly, modern systematics now plays a most significant role in the study of the mechanisms of 'speciation', by which term we mean those phenomena which are concerned in the origin of new species and subspecies. Among the most important of these mechanisms is the recently found statistical effect of population size on the

intensity of speciation. Thus, it has been shown that new species will arise most rapidly in a population which is of intermediate size and is divided into a number of smaller, partially isolated population-groups. Lastly, the great practical importance of systematics is discussed, and some suggestions are made for the future development of that discipline.

MATHEMATICAL PROCEDURE IN STATISTICAL THEORY*

THE Presidential Address is an exposition of the basic elementary mathematical principles underlying the theory and application of statistical methods.

Experiments in any field of human activity yield values of a number of variables— x_1, x_2, \dots, x_k . In a k -dimensional Euclidean space the results of observation can be denoted by a finite number of points. The totality of all possible observations will give an infinite set of points. This infinite set is unknown and statistical theory aims at the study of this set—the unknown population through the observed finite subset which is ordinarily called the sample.

A mathematical approach to this study is to assume the existence of a distribution function. The parameters of this function will epitomise all relevant characteristics of the population estimates of these parameters can be calculated as functions of the observed set and the behaviour of these estimates in the long run of experimental evidence can be studied with the help of their sampling distributions.

In this connection, two remarkable results—the Law of Large Numbers and the Central Limit Theorem—which are the outcome of extremely delicate mathematical reasoning, have given elegance and wide applicability to statistical technique. The Central Limit Theorem gives the Gaussian Normal Error Law as the dominant term in the distribution of any statistic when the number of observations is large.

The approach to normality of a large class of distribution functions has made the theory of quadratic forms and matrix algebra very important in statistical analysis. Further, the theory of approximation in the sense of Least Squares and the corresponding geometrical symbolism are also indispensable to the statistician.

* Abstract of the Presidential Address delivered by Prof. U. S. Nair, to the Statistical Section of the Indian Science Congress, Allahabad, January 1949.

IMPROVEMENT OF AGRICULTURAL STATISTICS

NECESSITY for improvement in the methods of collection of data on agriculture, particularly on yield of principal crops, existed from a long time in India. Lack of accurate figures has made it difficult to judge the degree of success of several development schemes, particularly schemes connected with 'Grow More Food'.

The fact that Random Sampling method is reliable for collection of accurate data was

known from a long time and its practicability has now been recognised by the Advisory Board of the Indian Council of Agricultural Research.

At the suggestion of the Advisory Board, all Provinces of India will take up this method. The main objects will be to estimate the yield per acre for the Provinces as a whole and to fix the district normal yields for important crops.