

seeds from this odd plant were sown and a crop raised. In this population a clear segregation between entire and branched bases was noticed. Counts were taken and gave 342 unbranched and 127 branched bases (*vide* illustration). The segregation was sharp.

The branching occurred over an area of two inches at the base. An analysis of this area together with a corresponding two inches of the normal unbranched area gave the following figures:—

		Unbranched area	Branched area
Number of branches	28
„ fascicles	..	142	1,446
„ grains	..	437	1,431
„ grains in a 2 gm. weight	..	135	263
Weight of grains (gm.)	..	6.39	10.95
„ chaff (gm.)	..	.96	2.95

The above table clearly reveals the economic disabilities of this branched atavistic condition which has proved a simple recessive to the normal rod-like inflorescence of this millet.

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Peucedanum graveolens—A New Host of Powdery Mildews.

DURING the last winter season a local variety of *Peucedanum graveolens* commonly known as soâ—a herbaceous plant used in curries and cultivated for its seeds and leaves—was found to be attacked by powdery mildews. Subsequent observations indicated that the first sign of the disease is found in the appearance of small white specks on the lower filiform leaves. The infected spots enlarge, coalesce and gradually cover the entire assimilating surface. With advance in season, the fungus spreads from leaves to the stem and finally infects the inflorescence. In severe cases the attack is damaging and the seeds fail to mature properly.

The usual organism appears to be similar to what has been described by Uppal and Desai on *Cuminum Cyminum*.¹

Detailed investigation is, however, in progress and will be reported subsequently.

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¹ *The World's Grasses*, 1929, p. 18.

² *Fl. Trop. Afr.*, 9-6, p. 1046.

¹ "Cumin Powdery Mildew", *Dept. of Agriculture, Bombay, Bull.* No. 169, 1932.

The Method of Selecting a Representative Sample in Social Research.

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IN Social Research, it is often required to estimate the average value of a character of some individuals. Such averages may be calculated whenever possible from the data supplied by the decennial census in India. These data do not, however, always provide the necessary material required for all types of population research and it is, therefore, imperative that fresh inquiries should be undertaken from time to time to collect the material.

It is, however, obvious that an *exhaustive* inquiry cannot be undertaken every time for want of both time and money. Nor is it necessary for the attainment of sufficiently accurate results. It is therefore advisable to base the results on the data supplied by

the process of sampling. This process has been termed the 'Representative Method'.

It has been shown by Dr. J. Neyman that the most general aspect of the representative method is that of random stratified sampling of groups.¹ The method consists in dividing the population studied into parts called 'strata' and in sampling randomly from separate strata. The number of sampling elements to be chosen from each stratum may be determined by any one of the following methods:—

(1) The method of proportional sampling suggested by Professor A. L. Bowley.²

¹ J. Neyman, *Jour. Roy. Stat. Soc.*, 97.

² A. L. Bowley, *Bull. Int. Stat. Inst.*, 22.

(2) The method suggested by Dr. J. Neyman.¹

The first method consists in choosing a number of elements from each stratum proportional to the total number of elements M_i in that stratum. The second consists in choosing a number from each stratum proportional to the product $M_i\sigma_i$ for that stratum. (σ_i^2 denotes the variance of the elements of the i th stratum about the mean of that stratum.) If σ_i^2 has different values in different strata, as is invariably the case, the second method is known to be more accurate than the first.

In general we do not know the values of σ_i . They can, however, always be estimated by means of a preliminary inquiry. It

has been shown that if the σ_i 's are estimated from sufficiently large samples (each of the order of 20 elements), then Dr. Neyman's method will almost invariably lead to more accurate results. Further it has been found that if the variability of the character sought within the single strata is very different in different strata, the gain in accuracy is of considerable magnitude.

The question of expense connected with the preliminary inquiry has also been considered and it has been found that in most cases Dr. Neyman's method is still advisable and may not prove too expensive.

The details will be found in the forthcoming issue of the Supplement to the *Journal of the Royal Statistical Society*, London.

Occurrence of Lime in Edible *Momordica*.

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ABUNDANT deposit of lime in the form of crystals or cystoliths have been observed in the body cells of our common "Uchhya or Corola" (*Momordica charantia* Linn.) and Kakrol (*Momordica cochinchinensis* Spreng). Lime as calcium carbonate occurs in the form of cystoliths in leaves and as calcium oxalate it occurs as crystals mostly in stems and petioles. Portions of the cuticular membrane of the under-surface of the leaves of the two species when seen under the high power of a microscope, groups of globular deposit of calcium carbonate over a cellulose skeleton are visible. Such an aggregation of globular deposit of lime is defined as cystolith. These cystoliths are frequently present in the lower epidermal cells of the leaves and due to deposits of large quantities of calcium carbonate the epidermal cells grow considerably in size. Sometimes they are as large as ten times that of the size of an ordinary epidermal cell. These inflated cells containing cystoliths are gradually pushed into a considerable depth of the mesophyllous tissue and hence in a transverse section they seem to arise from the spongy tissue of the mesophyll.

The presence of the cystoliths of *Momordica charantia* was first observed by an Italian scientist, Dr. Otto Penzig,¹ in 1881. He determined also the nature of the structures

of the cystoliths. Zimmermann² in his recent monograph on Cucurbitaceæ has described a few European and African *Momordica*. It appears that no contributions have yet been made towards the anatomical nature of the leaf-cells containing cystoliths of Indian species of *Momordica*. I have therefore made an attempt towards this direction. A group of cystoliths is the separate deposit of lime in various fantastic aggregations on a central skeleton. Cystoliths generally occur in groups of 2-7. In Fig. 1(A), Plate I, we find a cystolith of triple group as is found in *M. charantia*. In this species cystoliths occur also in groups of 2-4. Sometimes cystoliths are present in as many groups as seven (see Fig. 2(A), Plate I). Such groups of seven are seldom met with. In the process of the growth of cystolith calcium carbonate is strongly impregnated over a cellulose skeleton and when the deposit of calcium carbonate is dissolved in dilute HCl a skeleton of cellulose with concentric stratification makes its appearance. The cystoliths of *M. charantia* are more or less of definite regular oval-shaped structures and are non-branched and monoplanous.

The cystolith of *M. cochinchinensis* appears to have not yet been reported by any previous worker (see Figs. 3, 4). They are mostly irregular in structure, branched and

¹ Penzig, *Verbreit d. cystolith etc.*, *Bot. zentralbl.*, 1881, 8, 393-403 and Tables II-IV.

² Zimmermann, *Die Cucurbitaceen*, Jena Verlag Gustav, Fischer, 1922.