EDITORIAL

FUNDAMENTALS OF THE THEORY OF SAMPLING

I. Sampling from a Limited Supply

We shall consider first a population of s individuals, in which each individual possesses a common attribute that can be measured quantitatively. The sum of the associated variates may be expressed as follows:

$$x_1 + x_2 + x_3 + \cdots x_s = \sum^{s} x = sM_x$$

From this so-called *parent population* it is possible to select $\binom{s}{r}$ different *samples*, each consisting of r individuals, $(r \leq s)$. These samples may be ordered after any fashion, and the algebraic sum of the variates for the respective samples may be designated

$$\begin{array}{lllllll}
z_1 = & x_1 & +x_2 & +x_3 & \cdots & \cdot + x_r & = \sum^{r:1} x \\
z_2 = & x_2 & +x_3 & +x_4 & \cdots & \cdot + x_{r+1} & = \sum^{r:2} x \\
\cdot & \cdot & \cdot & \cdot & \cdots & \cdot & \\
\cdot & \cdot & \cdot & \cdot & \cdots & \cdot & \\
\cdot & \cdot & \cdot & \cdot & \cdots & \cdot & \\
z_{\binom{s}{r}} = & x_{s-r+1} & +x_{s-r+2} & \cdot & \cdots & \cdot + x_s & = \sum^{r:\binom{s}{r}} x
\end{array}$$

Thus, while $\sum^{s} x$ represents the sum of all the s variates in the parent population, $\sum^{r:i} x$ designates the sum of the r variates occurring in the i th sample.

We face now the problem of describing adequately, from a statistical point of view, the distribution of these $\binom{s}{r}$ values of z, that is to say, we must express the moments $\mu_{n:z}$ in terms of the moments of the parent population, $\mu_{n:x}$.

By definition $$M_z = \frac{\sum z}{\binom{s}{r}}$$