Letters to the Editor

On the Distribution of the Means of a certain Bessel Function Population

S. Bose has made a certain study of the following Bessel function distribution :—

$$f(x)dx = Ce^{-ax}x^{m/2}I_m(q\sqrt{x})dx,$$

where $C = (2/q)^m a^{m+1} e^{-qe^2/4a}$,

and $q \geq 0$, $a \geq 0$, $m > -1$.

This distribution first arose in a specialized form in connection with the researches of the present author on the exact distribution of the D^2- statistic[1]. I have now found the distribution of the mean, of a random sample of n, from this population. It comes out as

$$C'e^{-nax}x^{(mn+n-1)/2}I_{mn+n-1}(nq\sqrt{x})dx$$

where $C' = (2/nq)^{mn+n-1}(na)^{n(m+1)}e^{-nq^2/4a}$

Hence the distribution of the mean is of the same type as the mother population. Since the type III distribution is a special case of the distribution investigated here, Irwin's distribution of the mean of a random sample of n, from a type III population, follows as a corollary.

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1. R. C. Bose : "On the Exact Distribution and Moment Coefficients of the D^2- statistic." *Sankhya*, 2 (2), 1936.