26 June 1930.

Dr Mordecai Ezekiel,
Federal Farm Board,
WASHINGTON, D.C.,
U.S.A.

Dear Dr Ezekiel,

I have read through the chapter on the significance of correlations and regressions, and congratulate you on the skill with which you have dealt with a very difficult subject.

The only point I should like to raise is that of testing the significance of simple correlations. You take an example of $r = .50$ from 7 pairs of observations, and if I have your method right you take

$$t = .50 \div \frac{1-(.50)^2}{\sqrt{5}}, \quad n = 5$$

$$t = 1.491 \text{ nearly;}$$

the exact method is to take (p. 159)

$$t = \frac{r}{\sqrt{1-r^2}}\sqrt{n'-2} = 1.291, \quad n = 5$$

The factor $\sqrt{1-r^2}$ comes in to allow for the abnormal

distribution of the form $(1-\rho^2)^{\frac{1}{2}(n-4)}$, and does not belong to the S.E. formula. For testing significance from zero one would need the formula for $\rho = 0$, for which the factor $(1-\rho^2)$ reduces to unity.

I think the charts will be very useful; you have, I expect, noticed that for true correlation $\hat{(\rho)}$ zero, they differ slightly, as one would expect from the approximation used, from the values given in my book for simple correlations, and the values which Wishart tabulated from my z-distribution for the multiple correlation. But the discrepancies are of a magnitude rather to confirm, and give an estimate of the order of accuracy of your curves, than to discredit them.

I enclose a copy of Wishart's paper.

Yours sincerely,

Enclosures:
Chapter
1 separate.