ADVISORY COMMITTEE ON WEATHER CONTROL

1128 General Services Administration Bldg.   *Washington 25, D. C.*

11 July 1955

VIA AIRMAIL

Sir Ronald A. Fisher
Whittingeham Lodge
44 Storey's Way
Cambridge, England

Dear Sir:

I hope you will pardon me for asking a rather simple question which your vast knowledge of the statistical literature will, I am sure, provide the answer for without effort.

We are interested in combining the results of n t-tests, each of which has about 40 degrees of freedom, to obtain a single test of significance. Now it is fairly easy to show, I believe, that the distribution of the final t (mean t) will be very close to normal however the n-variances vary.

In one of his rather common appendices to papers, Karl Pearson uses the χ^2 combining technique on a table from E. M. Elderton's paper, "The Lanarkshire Milk Experiment", Annals of Eugenics (1933), Vol. 5, p. 337, to obtain combined test of significance. Now as far as I can see, if he had simply averaged the z's, divided by the square root of 5, and referred to the normal table, he would have obtained almost exactly the same probability. S. A. Stouffer uses this technique in the "American Soldier" (1949), Princeton University Press, p. 45. His reference to the method is very casual (small footnote). Hald gives the method in his book, "Statistical Theory with Engineering Application", p. 407, but with no reference to its origin.

Now my question is: Do you know of a clear-cut reference to where this technique was developed or used? It seems incredible to me that such a simple method would not have been used earlier in the literature of statistics.

Sincerely yours,

H. C. S. THOM
Chief Climatologist