Dear Professor Fisher,

Permit me to thank you for the four reprints just received and read of papers of yours, and one of Sukhatme's, which however I am forced to postpone perusing completely for the present. I am glad to see from one of your shorter notes that Youden is making good use of his time. I was very favorably impressed by him.

Your paper on "The Statistical Utilization of Multiple Measurements" is one of great value and interest. Not only do you perform in it a valuable service in drawing together three independent lines of thought, but the beautifully ingenious work of the last section gives a result of interest and practical value going quite beyond those previously published. I shall call it to the attention of Dr. Mary Loveless, who in the course of her experiments with allergy seemed to be groping for some such thing when I saw her several months ago.

A generalization both of the analysis of variance and of the use of T is provided by the work of Wilks, which may be interpreted as testing the question whether, in a p-dimensional scatter diagram, the scatter among the centers of gravity of the sets of points representing samples is excessive in comparison with the scatter within the sets. He measures scatter, or what he calls "generalized variance," by the determinant of the sample covariances, within or between samples. In his 1932 paper in Biometrika he found, among other things, the exact distribution of the ratio of generalized variances when p = 2, with expressions for higher values of p in the form of multiple definite integrals. More recently he has been extending and applying these results and finding asymptotic expressions for the integrals.

With cordial regards, I remain

Faithfully yours,

Harold Hotelling

P. S. In Section V, "Extension of Discriminant Analysis," your highly ingenious analysis leads to the thought of utilizing the linear function determined by a set of homogeneous linear equations involving a parameter, and hence to the calculation of the greatest root of a determinantal equation. If p is more than about 4, this root and linear function may be calculated with relative ease by an iterative process, either of the kind recently recommended by Aitken or those used in my papers on "Analysis...into Principal Components," "Simplified Calculation of Principal Components," and "Relations between Two Sets of Variates."