November 16, 1937

Dear Mr Lyle,

I may have given a wrong impression through misunderstanding the experiment you explained in your letter of November 9th, when you say:

"If 5 machines and 5 drivers are chosen - the drivers being changed to different machines at intervals- so that every driver is tested on every machine we get a 5 x 5 table with 25 compartments".

I took you to be referring to a test which might be carried out on a single day. It was for this experiment that I suggested the analysis of my letter of November 10th, with, as you say, only 24 degrees of freedom, for in such a case there are only 25 performances recorded. Later in my letter I discuss the possibility of repeating the experiment on a number of days, arbitrarily chosen as 10, in order to exhibit what subdivisions of the sums of squares are logically distinguishable and might really be affected by different causes of variation.

In your letter of November 15th you say: "If I include periods surely I then have 5 x 5 x 5 mean observations", and add that if it were carried out on 5 days you would have 625 means. This must refer to a more complex unit of experimentation than I had in view. I assumed that the same machine was operated

continuously and exclusively by the same driver until the end of some period when the driver might be changed.

To illustrate possible interaction between drivers and machines may I take the case of computing machines? In using them one is influenced by both touch and ear, by the relative importance of these two differences in different makes. It is quite possible that, for a computer using her ear predominantly, one machine is superior to another, while, for another computer not so sensitive to the sound of the mechanism, the reverse may be the case. The point, however, of habitually calculating sums of squares contributed by interactions does not depend on the probability that such interactions are important, but on the advantage of always being able to know whether they are important or not.

Yours sincerely,