3 January 1933.

H. Greene, Esq.,
Gezira Agric. Res. Service,
WAD MEDANI,
Sudan.

Dear Mr. Greene:

The point you raise as to the choice of "blocks" is one of very wide interest, which has however, been frequently discussed. The apparent element of arbitrariness is really due to ignoring the requirement of randomisation. Mere replication makes possible an estimate of error (residual variance), but what is required is a strictly valid estimate of error, and many such estimates can be compared which are certainly invalid. If the experimental area is divided up into blocks of any shape of size you like, each involving an equal number of plots, equal to the number of treatments, then these blocks can be used as such in the analysis of variance, and will yield a valid test of significance provided that within each block the treatments have in fact been assigned to plots at random. If not we have no guarantee that the test of significance is valid.

Obviously this prerequisite can only be in fact true for one method of sub-division into blocks. It is true that the actual experimental arrangement might have been arrived at by a different sub-division followed by randomisation, but if it was not in fact, there is no justification for constructing new block divisions after the yields are available. To do so "judiciously" is bound to lead to an under-estimate of error, and to positive claims of significance, without real foundation.

I am afraid this may be disappointing to you. The logic of the situation is intricate, though I believe it is found clear once it is pointed out; and it is a real advantage that it emphasises the fact that the correct procedure in the statistical laboratory depends absolutely on what has been done in fact in the field.

As regards numerical examples I should be guided entirely by the audience for which you are writing. Readers of the Journal of Agricultural Science will be fairly familiar with the analysis of variance form, and will for the most part not require any explanation of the standardised arithmetic on which it is based, but there is never any harm in giving space to making clear any point which you think may be obscure.

Yours sincerely,

Greene's Latin Method