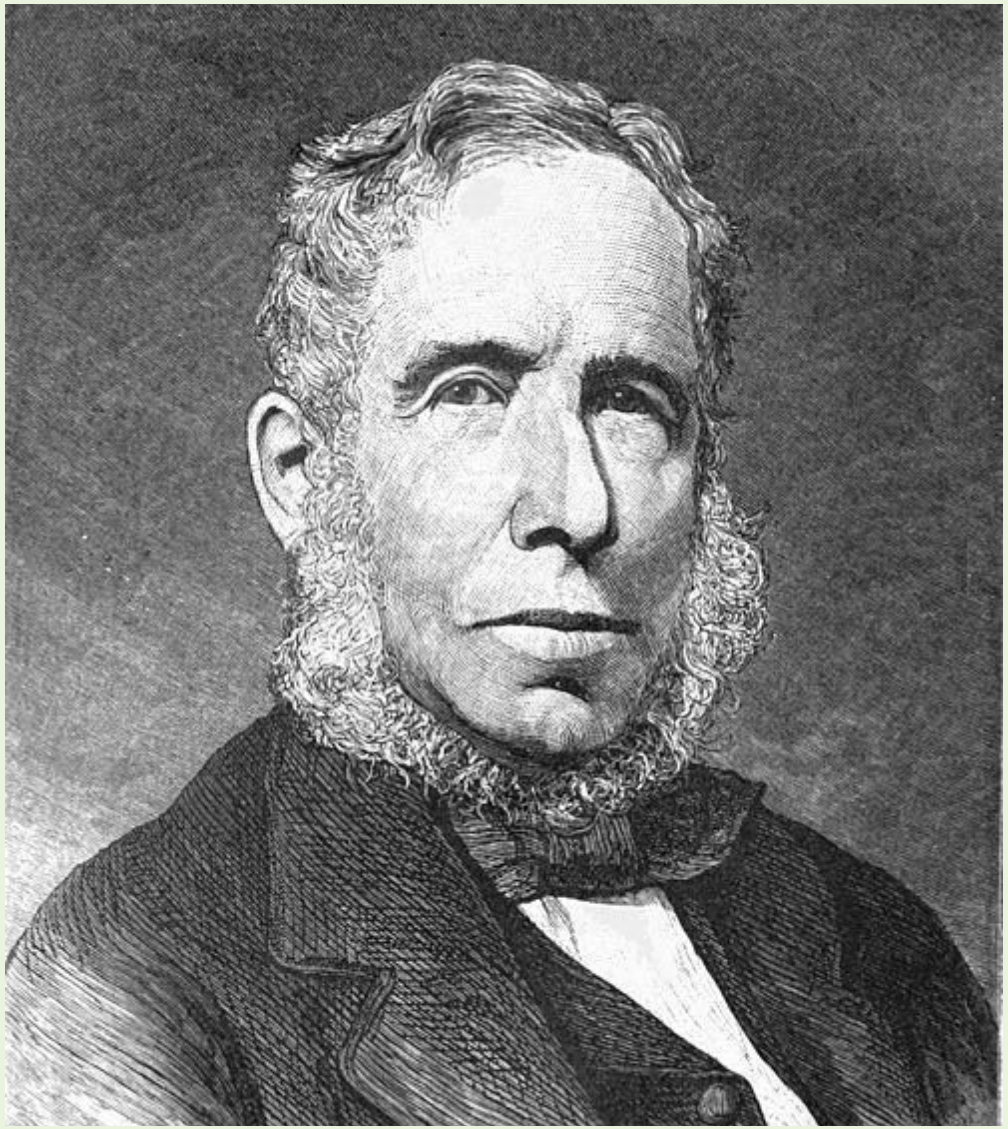
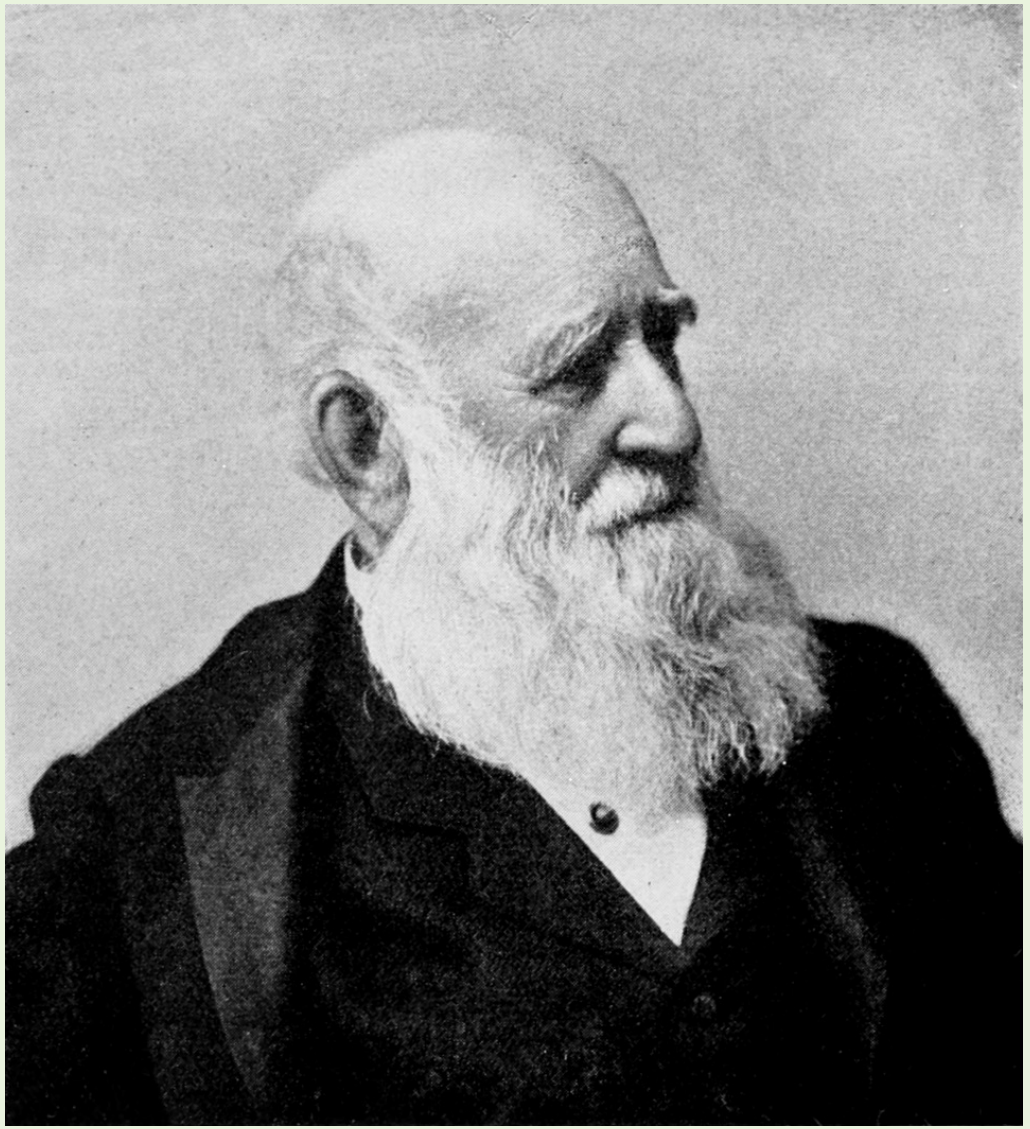
BASF
We create chemistry

Die Geschichte von Fishers Ideen

Iain Proctor, BASF SE

Limburgerhof, 25. Juni 2026





KAISERLICHES PATENTAMT.

AUSGEGEBEN DEN 8. JUNI 1911.

PATENTSCHRIFT

— № 235421 —

KLASSE 12*k*. GRUPPE 3.

BADISCHE ANILIN- & SODA-FABRIK IN LUDWIGSHAFEN A. RH.

Verfahren zur synthetischen Darstellung von Ammoniak aus den Elementen.

Patentiert im Deutschen Reiche vom 13. Oktober 1908 ab.

Es ist durch wissenschaftliche Untersuchun- | gen steigern lassen, macht diese Synthese noch

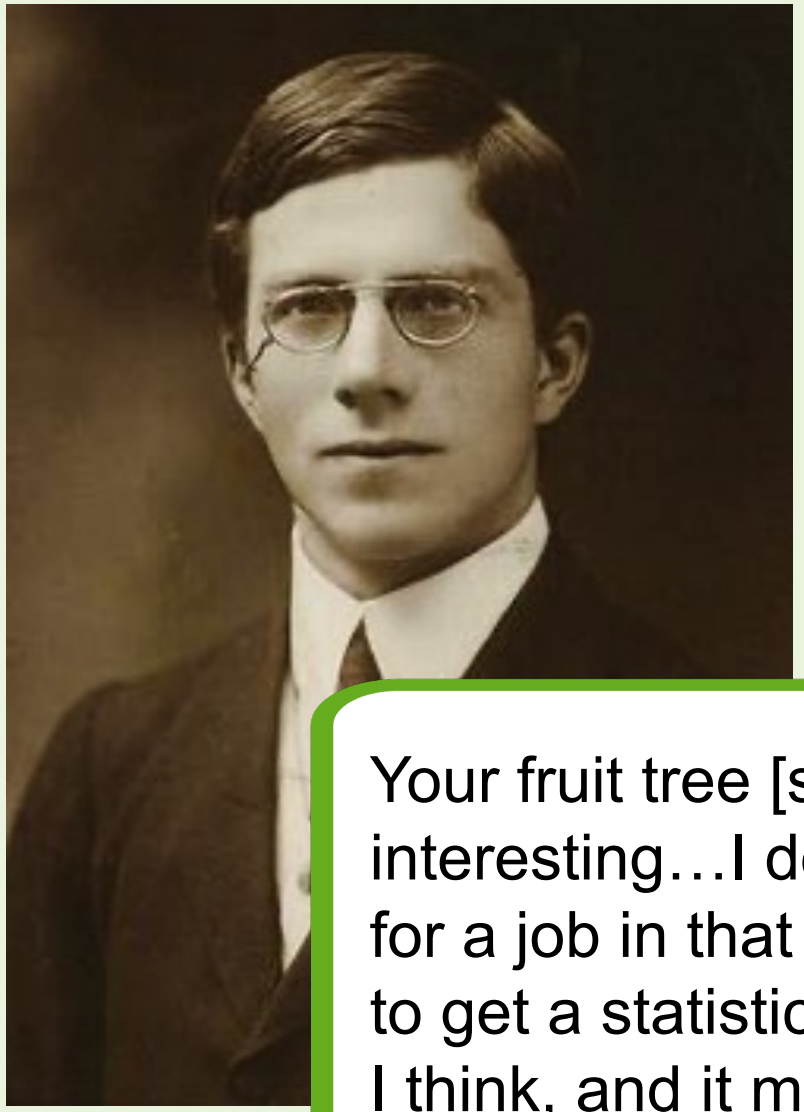
BIOMETRIKA.

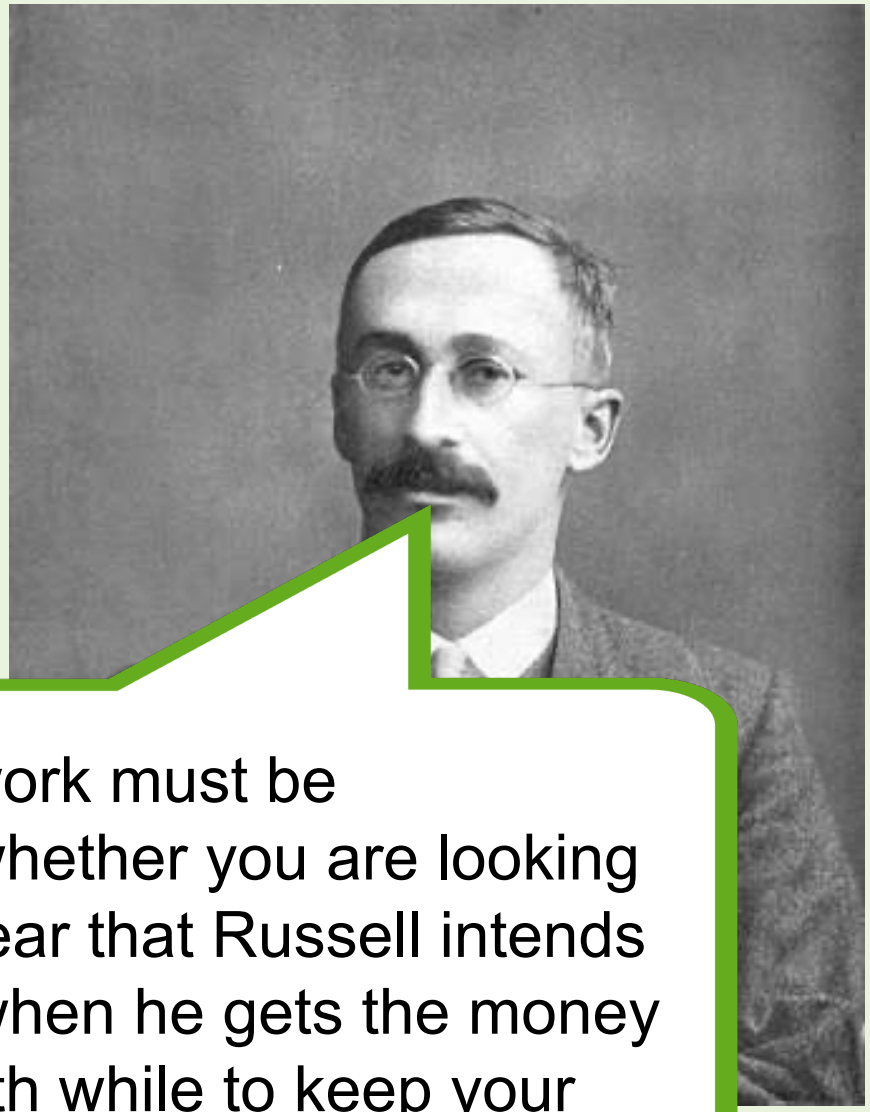
THE PROBABLE ERROR OF A MEAN.

BY STUDENT.

Introduction.

ANY experiment may be regarded as forming an individual of a "population" of experiments which might be performed under the same conditions. A series of experiments is a sample drawn from this population.





Your fruit tree [statistical] work must be interesting…I don‘t know whether you are looking for a job in that line but I hear that Russell intends to get a statistician soon, when he gets the money I think, and it might be worth while to keep your ears open to news from Harpenden.“

FIELD EXPERIMENTS: HOW THEY ARE MADE AND WHAT THEY ARE.

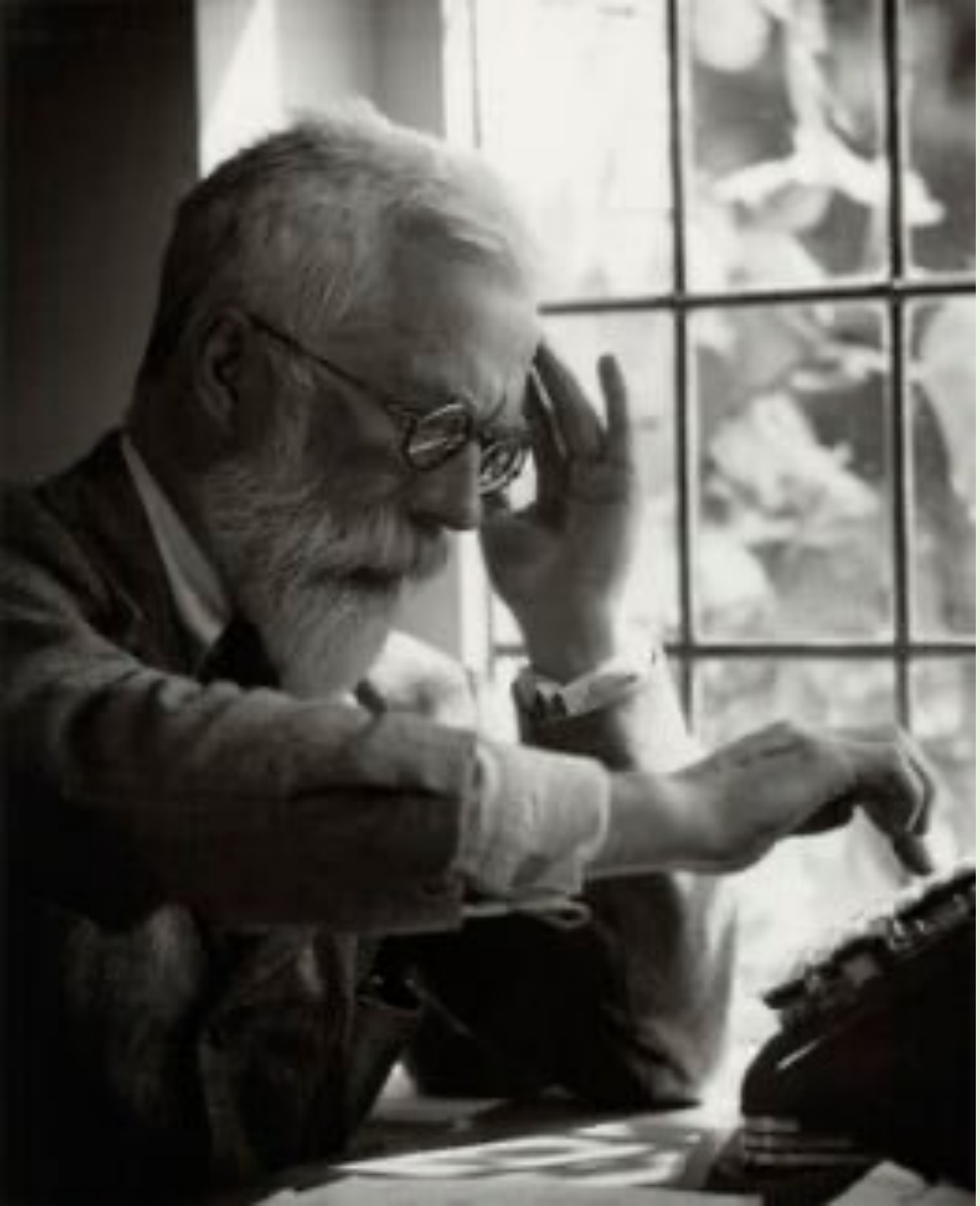
SIR JOHN RUSSELL, D.Sc., F.R.S.,
Director, Rothamsted Experimental Station.

The proper way to arrange a comparison between two treatments is to arrange them on a balanced plan, thus:

A B B A A B B A

THE ARRANGEMENT OF FIELD EXPERIMENTS

R. A. FISHER, Sc.D.,
Rothamsted Experimental Station.

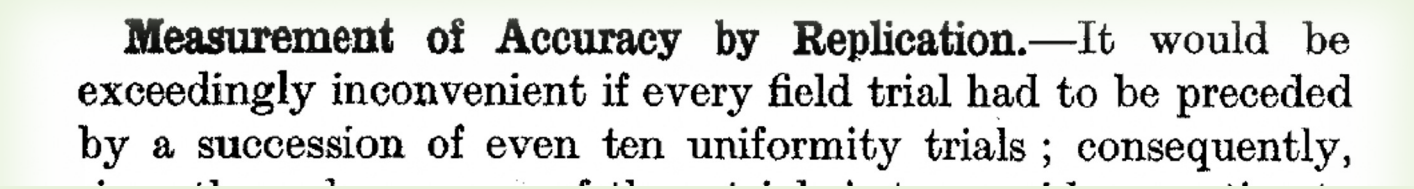


broadest outline the process by which a field trial, such as the testing of a material of real or supposed manurial value, is conducted. To an acre of ground the manure is applied ; a second acre, sown with similar seed and treated in all other

„To an acre of ground the manure is applied; a second acre, sown with similar seed and treated in all other ways like the first, receives none of the manure…the manure has yielded a crop larger indeed by, say, 10 per cent…

What reason is there to think that, even if no manure had been applied, the acre which actually received it would not still have given the higher yield?“

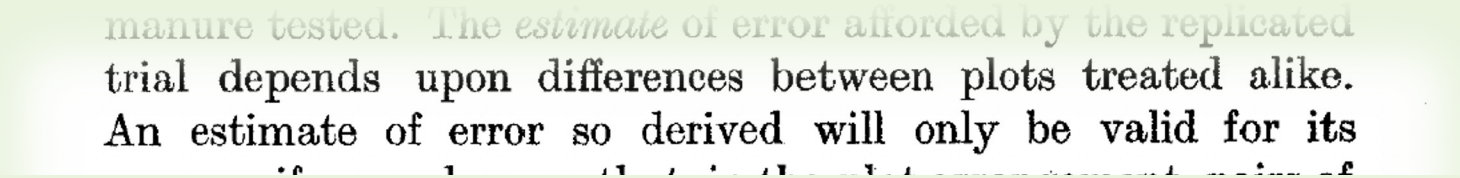
Replikation



Measurement of Accuracy by Replication.—It would be exceedingly inconvenient if every field trial had to be preceded by a succession of even ten uniformity trials ; consequently,

„It would be exceedingly inconvenient if every field trial had to be preceded by a succession of ten uniformity trials; consequently, since the only purpose of these trials is to provide an estimate of the standard error, means have been devised for obtaining such an estimate from the actual yields of the trial year…The method adopted is that of replication.“

Randomisierung


manure tested. The *estimate* of error afforded by the replicated trial depends upon differences between plots treated alike. An estimate of error so derived will only be valid for its

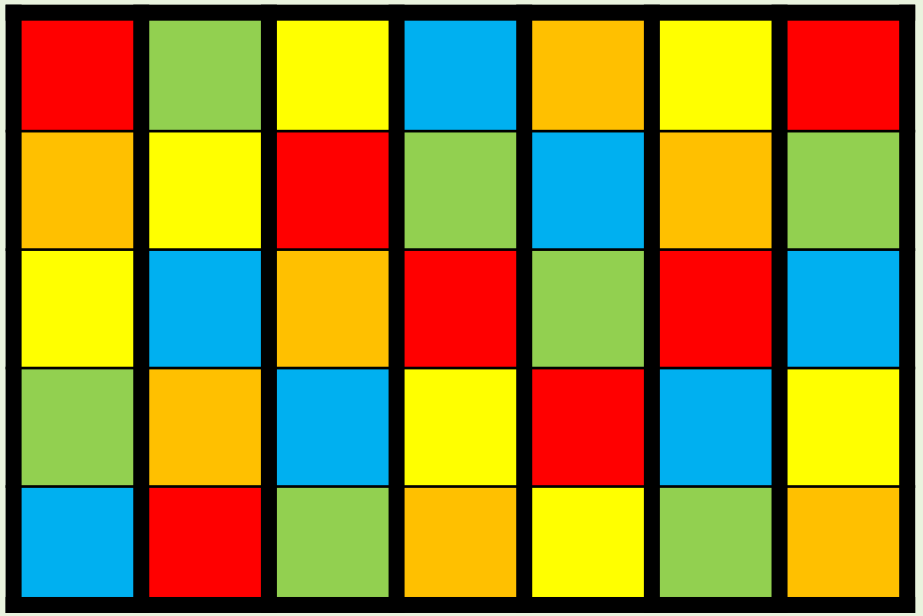
„An estimate of error…will only be valid…if we make sure that…pairs of plots treated alike are not nearer together, or further apart, or in any other relevant way, distinguishable from pairs of plots treated differently…

…One way of making sure that a valid estimate of error will be obtained is to arrange the plots deliberately at random, so that no distinction can creep in between pairs of plots treated alike and pairs treated differently.“

Blockbildung

useful and flexible types of arrangement, namely, the arrangement in "randomized blocks." Let us suppose that five different varieties are to be tested, and that it is decided to give each variety seven plots, making thirty-five in all. It would be a perfectly valid experiment to divide the land into

„It would be a perfectly valid experiment to…assign seven portions chosen wholly at random to each treatment…
On most land, however, we shall obtain a smaller standard error, and consequently a more valuable experiment, if…
the land is divided into seven blocks, which should be as compact as possible; each of these blocks is divided into five plots and these are assigned in each case to the five varieties, independently, and wholly at random.“



Kritik

Gosset invoked practical experience, but gradually his reasoning became more explicit. On reading the proofs of *Statistical Methods for Research Workers* in October 1924, Gosset protested: ''I don't expect to convince you but I don`t agree with your controlled randomness.

„I do not expect to convince you but I do not agree with your controlled randomness. You would want a large lunatic asylum for the operators who are apt to make mistakes enough even at present.“

Gosset zu Fisher, 1924

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