March 5, 1941

Dear Taylor,

I have been looking at the anti-A titrations, and I think I told you that I was somewhat troubled by the great variability found in several of the later lots in contrast to the rather close agreement in relative strength in the first 15 you published in the Lancet. These gave for the mean squares on 14 d.f.

Serum strength	A_1 v. A_2	O v. B	Interaction
2.417	.214	.179	.178

the best performance possible being, as judged by the previous multiple titrations, about .11. You will notice that O v. B and Interaction give practically the same figure. A_1 v. A_2 is slightly, but insignificantly, greater, while the variation in total strength is more than 11 times the apparent variation in the relative strengths of and , and indeed the latter bears every sign of being wholly due to chance.

The new material has been divided into 5 lots, namely, the first, second and third 25 sets of titrations, setting aside the 19 titrations after heat treatment, and finally 8 left over, from your p.15. The mean squares are as follows:

Mean squares - Anti-A titrations

1st 25	2.0411	.4280	.1955	.2194
2nd 25	2.2122	1.0927	.2680	.2910
3rd 25	3.0806	.7525	.3037	.3739
19 "after"	7.3496	.5357	.4995	.2435
8 - p.15	4.2459	1.4785	.6745	.6585

What one notices here is that, while O v. B and Interaction keep nicely parallel as though both were produced merely by chance, and no t by any real differences in the sera, the mean square in both these classes increases rather alarmingly as the series goes on. This looks like some cause of inaccuracy in titration which did not occur in the first 15.

On the point we were mainly concerned with, you will notice that the newer material differs from the first 15 in having decidedly more variance in the A_1 v. A_2 comparison than in the two I first spoke of. This looks as though there were, as we suspected, real differences in the proportion of to in different preparations; but it is noticable also that this contrast is almost gone in the group of 19 sera after heating. Heating might favour a conversion of into or vice versa, so that, after heating, the proportion of these two ingrediants is almost constant.

The contrast is emphasised by comparing the first two columns, representing variation in total strength and in the ratio of to respectively. In the first 15 I mentioned that this ratio was over 11; in the 19 after heat treatment it is over 13. In all the others the ratio is much lower, and does not ever exceed 5. In fact, the set of sera having heat treatment have a lower variance in the A_1 v. A_2 CONTRAST? NOT BECAUSE THE

contrast, not because the variance in total strength is lower among these; but, on the contrary, in spite of the fact that it is rather high.

I may say that the 4 d.f. between these five groups analysed separately above, show quite large values in all four classes, i.e.

101.89, 3.55, .87 1.28.

This is the sort of secular change one often finds in routine laboratory work of all kinds, and it is notable that these effects are greatest on the measurements of total strength and least on those of relative strength, as might, I suppose, be expected from such things as changes in the temperature of the laboratory at different periods, or perhaps in the conventions of classification. In any case I should have been surprised if these rather large differences had not appeared. The progressive increase in the mean square in the last two comparisons does, however, seem worth looking into, if you can get any clue to its cause.

Yours sincerely,

P.S. I hope you will like the enclosed three offprints (210, 211 & 213)