Whittingehame Lodge
44 Storey's Way,

28 March 1945

—55822

Dear Jackson,

Thanks for your letter. I think I can explain more fully the table of calculations than I did when you were here. You say that you have made out that column 3 represents total survivors at any day. Now really column 2 is the number released t days before zero, multiplied by r^t. These figures added from the beginning up to and including date t represent the total number of marked flying in the population after that release, multiplied by r^t, e.g. 28.90072 in column 3 is r^8 times the number of marked specimens flying between releasing on 19th and catching on 20th July. The 4th column, formed by adding the 3rd from the bottom, contains the corresponding number 84.82680, which also contains the factor r^8 and, apart from this, represents the total number of days which marked insects available for catching on the 20th have survived since their marking. The expected average number of days which the insects recaptured on the 20th have been marked is therefore the ratio of these two numbers, a trifle less than 3.

There were 4 recaptures on the 20th and the total number of days expected was therefore 11.740, whereas actually they scored 10 days between them. Hence the deficiency in column 7 of 1.740 days. In this part of the calculation, involving the ratio s_2/s_1, the fact that both columns contain the factor r^t does not matter, but in the estimate of population(column 9) this factor has to be allowed for. The estimate for the 20th is $\frac{66 \times 28.9}{4r^7}$. This tallies with the one case you have recognised for July 23,1943 when t=0, so that the factor r^t does not come in. t is always 0 on the last day of catching and, of course, any released on this day are never seen again. I expect you will see from this why the table steps down one day from left to right.

Yours sincerely,