December 5, 1942

Dear Dr Discombe,

Yes, as you thought, your problem is quite a straightforward one, though a little confusing owing to the factors which enter into it, e.g., the number of leucocytes is estimated to be *n*, but this is based on a count, not of *n* but of *a* cells observed in the haemocytometer. The variance of *a* is *a*, so the variance of *n* is

$$\frac{n^2}{a^2} \times a = \frac{n^2}{a}$$

and the variance of log *n* is simply $\frac{1}{a}$.

If *p* is the proportion of a particular kind of leucocyte observed in a sample of *b*, then the sampling variance of *p* is, as is well known,

$$\frac{p(1-p)}{b} ,$$

so the sampling variance of log *p* is

$$\frac{1-p}{pb} .$$

As *n* and *p* have been estimated independently, we may now say that the sampling variance of the log of the absolute estimate np is

$$\frac{1}{a} + \frac{1-p}{pb} .$$

Multiplying this by the square of the estimated np will give the sampling variance of this estimate.

I have set the above out in full, as I thought you would prefer to see the detailed working to my sending you a dogmatic formula, which has the disadvantage that its symbolism may be misunderstood.

Yours sincerely