3 August 1933.

J.H. Gaddum, Esq.,
National Institute for Medical Research,
Hampstead,
London, N.W. 3.

Dear Gaddum:

Many thanks for your letter and offprints. I hope you will come and see us at the new Laboratories. It will be a funny department to start with, but I value the chance of doing some real experimentation.

Yours sincerely,

Where x is the log. concentration Y the normal deviate expected

$$3 = \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{1}{2}Y^2}$$

$$P = \int_{-\infty}^{Y} 3\,dY$$

Owing to the fact that the weight of an observation decreases for large positive or negative values of Y, trials in which more than the few expected die or survive will be overweighted if the weights are based on the observed numbers. Equally, they will be under-weighted if the observed ratio is more extreme than the expectation. Thus, if a survival of 8 in 100 is expected, and two samples give, respectively, 1 and 15 survivers in 100, the two probit values, when weighted appropriately to the frequencies observed, will give an estimate biassed systematically in the direction of higher survival. The tendency will, therefore, be to make all fitted lines less steep than ~~will~~ would be obtained if very large samples ~~have~~ had been observed for each point.

Whether or not Bliss's method produces, as I think you suggest, any bias in the opposite direction, will, perhaps, best be tested by fitting lines by the two methods in some half dozen practical cases, such as

those which Bliss has fitted in his recent papers, and comparing the two pairs of discrepancies from zero shown by the left hand sides of the two equations above.

Yours sincerely,