

June 3rd, 1936

My dear Bliss,

I am extremely glad to hear from you, and especially to hear that all is going so well.

I am glad you asked me about rectifying the binomial distribution so as to equalise the variance, as this can be very neatly done for large samples. If p is the percentage killed and q the survivors, then if you let $p = \sin^2 \varphi$, $q = \cos^2 \varphi$, and φ changes from 0 to 90° as percentage mortality increases from 0 to 100.

The amount of information respecting p is known to be $I_p = \frac{n}{pq} = \frac{n}{\sin^2 \varphi \cos^2 \varphi}$

Then

$$I_{\varphi} = I_p \cdot \left(\frac{dp}{d\varphi} \right)^2$$

$$\frac{dp}{d\varphi} = 2 \sin \varphi \cos \varphi$$

so

$$I_{\varphi} = 4n$$

which is independent of φ . This is generally useful for giving an automatic weighting such as is wanted in the analysis of variance.

Miss Simpson will look after your offprints, if they come here. I hope to give your messages to Crozier, and to mention the possibility of your revisiting the country to anyone else likely to be able to give you a hand.

I am enclosing a photograph, but whether good or not you must judge for yourself.

With the best of luck,

Yours sincerely,