March 20, 1941

Dear Mr Lyle,

I wonder if the argument you want is the following:-

It is supposed that the true values of x and y are linearly related, following the relation

$$y = bx + c,$$

then, whatever may be the distribution of frequency along this line, the three quadratic quantities, variance of x, covariance of x and y, and variance of y, must be in geometric progression with common factor <u>b</u>. This, of course, is only true provided x and y are unaffected by errors. The actual effect of errors will be variable from case to case; but their average effect will be merely to add the variances and covariance ascribable To ~~for~~ error to the corresponding quantities ascribable to variation free from error.

In many cases we may know that the covariance of errors is zero. In addition there must be strong grounds for believing the error variances to be equal, e.g., if they are determinations of a ~~similarly~~ physically similar nature. In these cases it will be legitimate to estimate the error variances and the regression line by the method outlined.

Yours sincerely,

P.S. I believe not published, but almost certainly something like enough to be mistaken for it has.