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30.11.31

Dear Dr Fisher

Thank you very much for your letter & for the reprints. I think I am beginning to understand what likelihood is.

I think I will probably rewrite the paper I sent to you – omitting inverse probability (which is the part I was most proud of) & sent it to some journal dealing with pharmacology. I believe that my conclusions ~~were~~ are true for large samples. They are merely a repetition of Thomson's conclusions [– though I must say that the argument is different & that I don't believe Thomson's argument is sound. I think that the residuals the sum of whose squares is minimized are not the residuals of p (the probability of death), but those of the function of p which bears an approximate linear relation to the dose i.e. of D where $p = \int_{-\infty}^{D} \frac{e^{-\frac{D^2}{2}}}{\sqrt{2\pi}}\, dD$.]

The discrepancy between the estimate of the significance of the difference between two observations of mortality, obtained in this way, and that obtained by using χ^2 is not large. I think perhaps it would be best to emphasize the smallness of this discrepancy & to use it as justification for applying Thomson's (& my own) conclusions to small samples. It would thus be possible to tackle problems to which the χ^2 method would not apply ~~e.g. to calculate the probability that~~ e.g. a animals have died & b survived after a dose of drug I : ~~and~~ a' & b' after the same dose of drug II. It is required to find the probability of getting results as discrepant as this on the assumption that the ratio of the toxicity of I to that of II is k. The shape of the curve is given. That is, the chance of a given observed discrepancy being obtained when the ~~really dis~~ "real" discrepancy is a given quantity. Thank you very much for your help. I may worry you again later on. Yours sincerely J H Gaddum