July 23, 1942

Dear Clapham,

You are quite right; the use of the tetrachoric r is very limited, namely to the case in which a bi-variate distribution known to be normal has been dichotomised in both directions. If one knows this much about the distribution, and has such a double dichotomy, without, of course, the metrical values which underlie it, e.g., mice which do or do not exhibit convulsions on a given dose of insulin, and, on a later trial, all being still living, mice which do or do not lose consciousness when fumigated with carbon di-oxide, then the tetrachoric r might well be thought appropriate to measure the association of the two attributes in the same mice.

I have scarcely ever had occasion to use the method, and mention it in S.M. rather to make sure that the reader gets hold of the difference between X^2 being a test of significance and practically always required, and r being an estimate of something which the investigator may or may not think has any meaning at all. Volume 2 of Pearson's Tables gives, in tables VIII & IX, quite a useful series of values. If you want to use them, however, note that the table is incomplete, but is fairly well completed by table XXX of

of the first volume - to which there is no cross-reference and which is given a different heading.

An awful lot of Pearson's middle period work was given to m- or n-fold tables, interpreted as a subdivision of successive tracts of supposedly normal underlying variates (variates in broad categories). The worst of his approach lay in the assumption that all the individuals placed in a higher category did, in fact, exceed all the individuals placed in the lower category; whereas in practical classifications, e.g. depth of pigment in the iris, even if it were true that eyes could usefully be classified in a univariate series for depth of pigment, it is quite certain that those classed as blue, light, medium, or dark, would form groups overlapping to an appreciable but unknown extent. Consequently any statistical analysis my must be interpreted as referring to eye colours as classified in such classes , rather than the hypothetical depth of pigment itself. This cuts the ground away from under Pearson's approach, but it leaves the observational classes all the real value that they possess, e.g., in the prediction of other things, such as blood groups, if in the population concerned they have any such predictive value.

Yours sincerely,.