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ROTHAMSTED EXPERIMENTAL STATION
(LAWES AGRICULTURAL TRUST)

Director: SIR E. JOHN RUSSELL, D.Sc., F.R.S.

Statistical Department
~~Dr. R. A. FISHER, Sc.D., F.R.S.~~
F. YATES, B.A.

HARPENDEN
HERTS

12th February, 1934.

Professor R.A.Fisher,
Galton Laboratory,
University College,
Gower Street,
London, W.C.1.

Dear Fisher,

Thanks very much for letting me see the M.S. of the χ^2 correction paragraph, which I return herewith. I haven't had any time to search for examples, and no suitable one has come my way. You doubtless got my letter re Mainland as a possible fund of examples. I think it might be worth while including an example of his if by any chance he turns up a more suitable one. Your present example (as you point out) has the disadvantage of giving a probability in the region where disagreement with the corrected χ^2 does not matter, and where it is not claimed that even the corrected value gives a tolerable approximation.

As regards limits I have tentatively come to the conclusion that "expected" values are a good criterion and that with no expected value less than unity the correction gives an adequate approximation. It also appears that with expected values of

5 or even considerably higher the uncorrected value is very misleading. The values for the symmetrical cases,

χ		
		50
		50
50	50	100

(1)

χ		
		10
		10
10	10	20

(2)

for example, are shown in the accompanying table. It might be worth giving a word of warning on this point.

I am sorry I have not yet applied the finishing touches. Routine work at the moment is intollerably pressing, but I have written up most of it now, and have only to make certain that unity is a good limiting value.

Yours sincerely,

F Yates

P.S. I enclose a table belonging to the paper on 6 x 6 Latin squares which you left here.

Table

(1)

x	True P	$P(\chi^2)$	Corrected $P(\chi^2)$
16, 34	.0006	.0003	.0007
17, 33	.0026	.0014	.0027
18, 32	.0090	.0051	.0093
19, 31	.0274	.0164	.0278
20, 30	.0714	.0455	.0718
21, 29	.1612	.1096	.1615
22, 28	.3174		.3173
23, 27	.5488		.5485
24, 26	.8416		.8415
25	1.0000		1.0000

(2)

x	True P	$P(\chi^2)$	Corrected $P(\chi^2)$
4, 16	.0004	.00015	.0006
5, 15	.0038	.0016	.0044
6, 14	.0256	.011	.0268
7, 13	.1128	.057	.1139
8, 12	.3430	.206	.3428
9, 11	.7524		.7519
10	1.0000		1.0000