23rd.   January, 1930.

Professor E.B. Poulton,
    Wykeham House,
        Oxford.

Dear Professor Poulton,

I owe you an apology for my delay.   The fact is I
took your letter and Study's paper with me to Denmark, and
had no opportunity to answer from there, so it was in my
case when your reminder came.

I believe Study's method could be used very convincingly,
but his examples are very rough not only numerically but in
the principle of calculation used.   His best example in
principle is the Diurnal v Nocturnal comparison.   Looking
at this from the point of view of an opponent, I suppose
the following objections could be raised

(i) Is it possible to classify the 9000 Ethiopan
species sharply as Diurnal or Nocturnal merely, or should
there be a class of intermediate twilight fliers, or a group
which are active at very different levels of illumination?

(ii) Have the 6000 nocturnal species were been examined for
mimetic resemblance with such care as to exclude the possi-
bility that any one of them is sufficiently like any other

nocturnal or diurnal to be classed as mimetic?

(iii) Although mimicry is often well shown between groups not closely related, yet if one species of genus A mimics one of genus B, it does presumably increase the chance of another of genus A mimicking another of genus B, and the groups nocturnal and diurnal are not I suppose at all scattered at haphazard among the different genera, but include whole systematic families all alike in this respect.   This last is a type of argument very difficult to meet.

Of course it should be admitted that Study's odds are so long that they could afford considerable abatement in taking account of these points; but, there can be no doubt that the argument would be made more convincing if account could be taken of them and the odds still shown to be considerable, say one in a hundred.   On general principles I find it much more convincing to be able to say whatever group you try with sufficient numbers you will find the distribution difficult to ascribe to chance, than to take a single calculation giving incredibly long odds.

For example I suppose one could take any region or any systematic group of insects showing wasplike forms, and classify all the insects in the group in respect of (say) 3 characters

B   Wasp markings on the body

W   Transparent wings

S   Mock stinging movements

In some groups other characters such as the waste constriction, size of wings etc., would perhaps do better.

giving 8 classes

O	BW
B	BS
W	WS
S	BWS

    The the frequencies in these classes would I suppose nearly always show a significant association between any pair or all these of the chosen characters. Such an examination for a number of regions or families, regularly showing the same association would be to my mind very convincing, but it would need a good entomologist, and I suppose would take some time to do it. I have added a justification of the formula on p. 11.

                 Yours sincerely,

B = Work fallen on body

W = Transport wages

S = moste religion action

could may hays. part of [illegible] with a cloud form, or a
[illegible] or part of [illegible], both the former the [illegible] the
the right class?

O [illegible]
B
W
S
B W
B S
W S
B W S

The [illegible] in these [illegible] were the given a basis for [illegible]
[illegible].

For the number of ways in which r species may be selected at random from the n diurnal species only is

$$\frac{n!}{r!\,(n-r)!}$$

while without this restriction the number of ways in which r can be selected from the whole group of N species is

$$\frac{N!}{r!\,(N-r)!}$$

This number etc. ....