February 16, 1942

Dear Mather,

I have been reading Lewis's very useful paper on the evolution of sex in flowering plants, in Biological Reviews. There is part of it that makes me wonder whether I really got my argument across in the section "Natural selection and the sex ratio", pp 141-143 in the Genetical Theory.

If natural selection were determined by "the advantage of the species", whatever definition might be given to this, I suppose that, as a stock breeder finds he can do very well with one bull to 20 cows, Natural Selection ought to have been expected to produce such a ratio in large herding ungulates; but it hasn't, and I think the section referred to does supply the reason. The same should, I think, be true of dioecious plants; if there were but one male to 20 females, and even if this ratio were sufficient to ensure adequate pollination of all ripe stigmas, then, on the average, every male plant contributes 20 times as much to future generations as a female plant, and the individual parent would gain great selective advantage if its style mechanism were such as to produce a high proportion of males. Setting aside small factors, such as differential viability of the sexes, this

would lead to a ~~most advantageous~~ stable sex ratio near to ~~of~~ 50%, ~~that is to say from the point of view~~ by reason of individuals competing to contribute ~~for~~ to future generations, though this might be not at all necessarily advantageous from the point of view of the species as a going concern.

I make this point because, if it is right, species such as the two Rumulus and two Rumex in Lewis's table do present a special evolutionary problem, and are not to be accounted for by saying that one male is quite enough to fertilise a large number of females.

If this argument were sufficient, the animal kingdom with its commonly segregated sexes would present a very different picture.

Yours sincerely,