DISCUSSION AND CORRESPONDENCE

SEX-LIMITED INHERITANCE IN CATS

TO THE EDITOR OF SCIENCE: In SCIENCE for May 17, Mr. C. C. Little, under the title "Preliminary Note on the Occurrence of a Sex-limited Character in Cats," describes first results from the mating black female by yellow male, and concludes that the black and yellow factors are sex-limited in the male cat. For some years I have been collecting evidence on this question, and have recently begun breeding experiments, the first litters from which are expected very shortly. From evidence which I have obtained from breeders, and which I propose to publish when my own experiments are sufficiently advanced to provide adequate comparison, I have no doubt that Mr. Little is correct in supposing that the male cat shows sex-limited transmission of a color-factor. That this is so has been clear to me for two years or more, and I welcome Mr. Little's further evidence in the same direction. My data, including records of from 30 to 80 kittens in each of the possible crosses between black, orange and tortoise, do not, however, entirely confirm the hypothesis which he suggests. I have evidence, from a breeder who is thoroughly reliable, that occasional black (or blue) *females* are produced from the cross black female $\times$ yellow male, and also from tortoise female $\times$ yellow male. That such black females are unusual is quite certain, and it is of the greatest importance to determine under what circumstances they occur. Their existence would seem to indicate that the sex-limitation is not absolute, but partial, as in the case of gametic coupling between members of distinct Mendelian pairs.

Mr. Little, if I understand him, assumes that both black and yellow factors are sex-limited in the male cat. I think a more probable assumption is that all gametes bear the factor for black, which appears to be hypostatic (recessive) to all other colors, and that the yellow female is homozygous, the yellow male and tortoise female both heterozygous for the yellow factor. Using the terminology X = male, XX = female, Y = yellow, y its absence, B = black; and supposing that Y is closely, if not invariably coupled with X in the male, we have

Yellow male = $XYyBB$, producing gametes XYB, yB;

Yellow female = $XXYYBB$, producing gametes XYB;

Tortoise female = $XYyBB$, producing gametes XYB, XyB.

Yellow is normally completely dominant (epistatic) over black in the male, only partially so when heterozygous in the female, giving tortoise. It is possible that the exceptional tortoise-shell males are the correlative of the exceptional black females from yellow sires. If the coupling between the sex-factor X and the yellow factor Y is occasionally broken, then Y, transmitted from a male parent apart from X might perhaps behave differently from Y coupled with X, and produce a tortoise instead of a yellow male. Until further data are available, however, this kind of speculation is of little value. My main object at present is to point out that the complete solution of the problem requires large numbers of observations, so that we may know not only what exceptional conditions are possible, but also the frequency and mode of their occurrence. My own experiments are unavoidably on a small scale, and with regard to data derived from breeders, it is notoriously difficult to avoid all chance of mistake unless the cats are kept in cages, a precaution not always taken by the amateur. It is therefore very desirable that further experiments should be done on a large scale, under absolutely trustworthy conditions.

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CAMBRIDGE, ENGLAND,
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"TERMS USED TO DENOTE THE ABUNDANCE OR RARITY OF BIRDS"[1]

THE paper under this title in a recent issue of SCIENCE seems to be another attempt to replace spontaneous choice by labored precept,

[1] Kuser, J. D., SCIENCE, N. S., Vol. XXXV., No. 911, June 14, 1912, pp. 930–931, chiefly a reprint from "The Birds of Somerset Hills," Rahway, N. J., 1912, pp. 128–132.