

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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May 28, 1912

"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.

to substitute mechanical uniformity for individual freedom of expression. There is little probability that we shall ever fix upon a code of mathematically exact terms denoting abundance or rarity nor is there any need of so doing. What the term, a common bird, means in one place it does not mean in another. To understand its approximate meaning we must get a conception of a writer's whole work, the character of the region, the amount of time spent in the field, and the extent of country covered. This being the case, there is little ground for objecting to the use of a set of terms indicating relative abundance, because they are not patterned after some very precise model.

Few will conclude, as Mr. Kuser does, that "usually common or usually rare are the same as common or rare." Why deny us the use of the perfectly good and expressive word "usually"? We are glad to have extra-dictionary information concerning the exact meaning of "quite" and "tolerably," but hazard the prophecy that "quite common" and "tolerably common" will be in good standing long after our author has passed from earth away. Some of the other dicta in Mr. Kuser's paper will not impress every one as convincing, for instance: "Not uncommon is equal to common," "accidental is occasional or rare." These words have by no means customarily been used in the sense indicated, nor have "scarce" and "irregular" usually had the significance Mr. Kuser gives them, that is, respectively, reduced in numbers after having been common and sometimes common, sometimes rare. In spite of our adviser's assertion that "rare is very rare," the mere fact that the two forms often occur in the same bird list proves they have distinct meanings.

Gentlemen who seek to control the use of language usually have the opportunity to learn that they are sadly misguided. For an excellent exposition of this principle see Professor Thomas R. Lounsbury's article, entitled "Schoolmastering the Speech."² We have always had "schoolmasters," or in a Rabelaisian synonymy, pedagogues, pedants, moni-

² *Harper's*, December, 1905.

tors, dogmatists, grammaticasters, censors, hypercritics, doctrinaires, editors, recensionists, revisers, highbrows, purists, Sir Oracles, precisians, language-rectifiers, admonishers, reformers, talk-tinkers, stylists, theorists, word-catchers and speech-conservers, but usage has been little affected by their efforts. The language still pursues the sweet and even tenor of its way. Word-histories prove the authority and freedom of usage in molding the language. The objections of pedants are no obstacles to this progress; they are no more than clods in the path. The great principle to be borne in mind is that language is made for man and not man for language.

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IN SCIENCE, June 14, 1912, pp. 930-931, I see that Mr. Kuser has attempted to formulate a standard of general terms to denote specific density of populations. Though the use of such terms as "common" or "rare" is, owing to the great amount of personal equation involved in their application, unsatisfactory, there is, at present, no practical method of substituting any better or more accurate system in their place. Some writers have tried to give an approximation to the number of individuals occurring in a given unit of territory, but, owing to the difficulty of counting or estimating a moving or secretive population, the results are often little more than the expression of an opinion more or less biased by personal view-point, and nearly as much a matter of judgment as the old methods. Besides which, the results, as expressed in figures, are unfamiliar to most of us and difficult to translate into comparable conceptions.

That some system of standardization of the common colloquial terms is desirable is self-evident. How far it can be accomplished is open to discussion. The decision of just how many individuals make "common" or how few make "rare" varies so greatly with the personality and experience of the observer, the species in question and the locality studied, that absolute uniformity of use and comparability of record seems difficult if not impossible of attainment. However, if absolute

standardization can not be arrived at, it does seem possible that a comparative one can; whereby each observer's records may vary slightly from those of others yet be strictly comparable with themselves and approximately with those of others. To arrive at such a conclusion, some uniformity in the use of terms should be understood, and for such use a list of terms as before mentioned is of value.

To fulfill its mission, such a standard set of definitions should conform to the present-day average use, and the question is therefore, not what the strict dictionary or grammatical meaning may be, but what has been and is their meaning in present-day practise. Viewed in this light, I think Mr. Kuser's list is subject to criticism, and some objection can be made to his proposed use and interpretation of terms.

Should these remarks of mine be found not to tally with the conceptions of others, it will be but a concrete example of the variation in interpretation of these commonly used phrases and but another proof of the advisability of some such system of standardization.

Very Common.—Mr. Kuser says this is the same as "abundant." Are there not various degrees of commonness and does not a species become more common before it arrives at abundant? "Very common" is in such general use and carries such a clear concept that I should hesitate to discard it. At any rate, in practise it has not the same meaning as "abundant."

Usually Common.—Mr. Kuser says this is equal to "common." I think this is a mistake. According to my, and what I think is the general conception, "usually common" signifies that the species varies in numbers in time and place, but is more often common than not. It infers a rule with many exceptions.

Quite Common.—The academic and practical use of words is here confused. Though in theory the effect of the prefixing of the "quite" to "common" is neutral or slightly intensive, in practise it is diminutive and weakens the statement to "almost" or "barely common." "Quite common" is established in

our literature, is well understood, and I can see no good reason why it should not be retained, though I should prefer to use "rather common" in its stead.

Not Uncommon.—This certainly does not in practise equal the same thing as "common" nor does "not common" equal "uncommon." In either pair, one term is passive and the other active. One means a little less than "common" and the other a little more than "uncommon."

Accidental is not "occasional or rare." The word does not apply to numbers at all, but involves an explanation of a lack of numbers. A storm-blown petrel appears in the Mississippi Valley accidentally, Kirtland's warbler is noted there occasionally; both are rare there, but both are not accidental. This is a word to be used with great caution. Except in a few cases, we do not know whether an occurrence is occasional or accidental, and it is much better, unless we know certainly to use the former term, which merely expresses an observed fact, than the latter, which adds a theory to it.

Very Rare.—As a species can be "common" or "very common" so it can be "rare" or "very rare." The degrees apply to rarity as well as to commonness.

Scarce.—I can not see that "scarce" has any meaning of diminishment. In general use I think it merely refers to present conditions and comes between "common" and "rare." The word to be used in Mr. Kuser's sense is "decreasing," and to be used in its adverbial form in conjunction with other terms of number as "decreasingly common" or "decreasingly scarce."

Irregular.—This is another word that has no quantitative meaning, but deals with the constancy or inconstancy of the numerical status. It can be used adverbially with other terms as "irregularly common."

It is easy enough to criticize others' work and with the certainty that they will find it equally simple to criticize mine I here offer an alternate scale of terms and definitions that seems to me a little more satisfactory, as it agrees with general practise and overcomes

some of the difficulties about as well as can be expected.

As a basis I have taken four terms in general use that have (in my opinion) become more or less established in use and concept:

Abundant.

Common.

Scarce.

Rare.

Of course none of these terms can be defined by absolute numbers or density of population per unit of area. An equal number of song sparrows and golden eagles in a given territory would make either the former decidedly "rare" or the latter phenomenally "abundant." Therefore, in defining the terms I have tried to measure them by their effect upon the observer and not by the numerical occurrence of individuals. This, of course, has the objection of accentuating personality somewhat, but it follows the usual conception of the terms, and, if followed consistently, will make all observations of one recorder comparable with each other while affording some degree of uniformity between those of different observers.

Common.—This is the fundamental or zero of the system and all other terms must from time to time be compared with it. It is applied when individuals are noted in such numbers as to be readily found without special search. The test of commonness is when the observation of an individual, more or less, arouses little or no interest. When the observer passes by with the mental thought, "another song sparrow," and then dismisses the matter from the mind, the species is "common."

Abundant is applied when the species intrudes itself upon the senses so repeatedly that one can not help noticing it. In other words, when it is practically always present. The test for abundance is when the observer notes the numbers with a certain amount of interested surprise, and the mental ejaculation is "What! another song sparrow?"

Scarce.—Considerably less than "common." The test of scarcity is when the sight or observation of an individual arouses more or

less passing interest and self congratulation. The accompanying thought might be expressed as, "Good! another song sparrow."

Rare.—Decidedly less in number than "scarce." The test is when the appearance arouses decided enthusiasm and a thought arises such as, "Hurrah! here is a song sparrow."

With each of these terms I should advise using qualifying adverbs such as "very" and "rather"; thus we have "very rare," "rare" and "rather rare"; "very common," "common" and "rather common," etc.

Irregular, or its adverbial form "irregularly," denotes fluctuation of number at different times.

Local or Locally denotes variability in geographical distribution.

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"FLORIDA WEATHER"

IN reading Mr. A. H. Palmer's remarks on "Winter Weather in Florida" in the issue of *SCIENCE* for May 31, one wonders what unfortunate circumstances accompanied his experiences with Florida weather or whether he ever spent a winter in the state. One must believe from his remarks that in his opinion he has really discovered something about the climate of Florida not hitherto known.

While we do not question the accuracy of the official records he quotes, they are so arranged as to give an impression that is far from accurate. For instance, one would be led to infer that while California escaped the frosts of the past severe winter practically unscathed, Florida suffered severely; whereas the facts of the case are exactly the reverse of this. This false impression arises largely from his comparing northern Florida with the coast region of central and southern California, a comparison that is manifestly unjust. He deliberately chooses the coldest part of Florida (the record of -2 was at Tallahassee, although he does not say so in his article) for comparison with the warmest parts of California.