of annual rings at the bases of branches may also have a possible relation to the movements. At any rate, it seems more promising to seek for some anatomical differences between the upper and under sides of branches as the cause of the movement than to study their water content.

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SPECIAL ARTICLES

"YELLOW" AND "AGOUTI" FACTORS IN MICE

SOME time ago Mr. A. H. Sturtevant[1] suggested the hypothesis that there is negative coupling between the "yellow" and the "agouti" factors in mice. At that time[2] I offered certain facts which appeared to me to give evidence contradictory to the hypothesis which he advanced.

I included in this evidence the data offered by certain matings of mice made by Miss F. M. Durham.[3] It now appears that I misunderstood the true meaning of her tables, which were somewhat ambiguous, and that accordingly the only remaining evidence which I possessed against Mr. Sturtevant's hypothesis was afforded by the results of certain matings which I made about five years ago.

It seemed, therefore, advisable to make crosses calculated to test his hypothesis with the stock which I have at present on hand.

The first of these matings was between wild agouti mice and yellow mice which did not carry the agouti factor. To use Sturtevant's terminology these individuals were as follows:

Yellows—*Yt yt*,
Agouti—*yT yT*.

Two sorts of individuals, yellow and agouti, are expected in equal numbers from such matings. The actual results were 14 yellow, 28 agouti. The yellows should on Sturtevant's hypothesis be of the formula *Yt yT* and form only two sorts of gametes *Yt* and *yT*. Such yellows should by any non-yellow animal, or when mated *inter se*, give only two sorts of young, yellow and agouti. Actually they produced 23 yellow and 18 agouti young.

Thinking that possibly the *black* factor might be necessary to obtain such a result, I mated three homozygous dilute brown agouti animals with a single brown-eyed yellow (carrying no agouti). All these animals lack the factor for black. The first generation gave 11 yellows and 5 brown-agoutis. The yellows were then crossed with dilute *brown* animals which did not possess the factor for agouti. If according to Sturtevant's hypothesis there was negative coupling or repulsion between the yellow and agouti factors there would be only yellow and agouti young from such a mating. If, on the other hand, these factors were entirely independent we should have non-agouti young as well. The results follow.

	Yellow	Dilute Yellow	Brown Agouti	Dilute Brown Agouti	Brown	Dilute Brown
Observed	31	34	24	27	0	0
Expected by Sturtevant's hypothesis	29	29	29	29	0	0
Expected by independent recombination	28.5	28.5	14.2	14.2	14.2	14.2

The conclusion is obvious that the factors for yellow and agouti are unable to go into the same gamete. On the other hand, the factors for "density" and "dilution" of pigmentation show no such relation to any other factors.

Since I have no reason to doubt the authenticity of the contradictory cases, in my own work, to which I have already referred, it seems probable that the factors for "yellow" and "agouti" are not absolutely incompatible, but that they may in rare cases occur in the same gamete. As a general thing, however, it seems that Sturtevant's hypothesis is correct and that a negative association exists between these two factors.

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[1] Sturtevant, A. H. (1912), *Am. Nat.*, Vol. 46, pp. 368–371.

[2] Little, C. C. (1912), *Am. Nat.*, Vol. 46, pp. 491–493.

[3] Durham, F. M. (1911), *Journal of Genetics*, Vol. 1, pp. 159–178.