correlation between parent and offspring in characters subject to normal, or "fluctuating," variation, if such variations are not in fact transmitted.

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AGGREGATE MUTATION OF GOSSYPIUM

DR. O. F. COOK, in his official work for the U. S. Department of Agriculture, has observed several instances of abrupt change *en masse* of the distinguishing characters of varieties of cotton, full results of which he is preparing to publish. Some of those transmutations have occurred in connection with geographical transference, and some have not. Central American varieties on being brought to the United States have shown entirely distinct characters of habit and growth in all the plants from and after their first planting. In case of the well-known and long-cultivated upland cotton of the United States, he found all the individual plants of a whole planting to have become thus abruptly changed. The change involved the whole field crop of a planting, and the new crop differed equally from both the parent stock and the plantings of the same stock in other fields in the same season.

Dr. Cook properly regards these transmutations as identical in character with those which I have observed in the tomato and which in several publications I have designated as aggregate mutation. See especially *Popular Science Monthly*, Vol. LXVII., No. 2, June, 1905.

CHARLES A. WHITE

SPECIAL ARTICLES

THE CHROMOSOMES OF ŒNOTHERA

ON account of the general interest which attaches to this subject, it may be well to present some further facts, and also to review briefly our knowledge of the subject as developed up to the present time. The work is being continued upon a large amount of material collected during the summer from a culture which consisted of 1,700 pedigreed individuals, partly from pure races, and partly from guarded crosses. The collections made from each individual were kept separate from all others for examination. My work on the subject was begun on plants grown at Woods Hole, Mass., from seeds of DeVries, in 1905.

In December, 1906,[1] some of this work was reported upon. *O. lata* from a cross was found to have 14 chromosomes as sporophyte number, but quite unexpectedly one of the other plants from what was believed to be pure seeds of *O. lata* × *O. Lamarckiana* were found to contain 20 chromosomes. This result was published in a paper[2] on the abortive pollen development in *O. lata*, but it was discovered by the writer[3] a little later that *O. Lamarckiana* itself had 14 chromosomes. This result was afterwards confirmed by Miss Lutz,[4] and Geerts in a short paper[5] published the same result. After my first announcement of results Miss Lutz germinated seeds of several forms and examined the root-tips of the seedlings, finding[4] about 14 chromosomes in *O. Lamarckiana*, as already stated, but 28 or 29 in *O. gigas*.

I have since reported[6] 14 chromosomes in the *Lamarckiana* plants from *O. lata* × *O. Lamarckiana* as well as in the *O. lata* from this cross, also in *O. rubrinervis* and in *O. nanella;* together with various peculiarities of the reduction mitoses in the pollen mother cells of these forms. One of these interesting features is that sometimes in the heterotypic mitosis one chromosome passes to the wrong pole of the spindle, thus probably introducing

[1] American Association for the Advancement of Science, New York meeting.

[2] "Pollen Development in Hybrids of *Œnothera lata* × *O. Lamarckiana*, and its Relation to Mutation," *Bot. Gazette*, 43: 81–115, 1907.

[3] "Hybridization and Germ Cells of Œnothera Mutants," *Bot. Gazette*, 44: 1–21, 1907.

[4] "A Preliminary Note on the Chromosomes of *Œnothera Lamarckiana* and one of its Mutants, *O. gigas*," SCIENCE, N. S., 26: 151–152, August 2, 1907.

[5] "Über die Zahl der Chromosomen von *Œnothera Lamarckiana*," *Ber. deut. Bot. Gesells.*, 25: 191–195, 1907.

[6] International Zoological Congress, Boston, August 22, 1907.