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165. APPLICATION OF SOME OF
THE PRINCIPLES OF HEREDITY TO
PLANT BREEDING**

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W. J. SPILLMAN

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U. S. DEPARTMENT OF AGRICULTURE.

BUREAU OF PLANT INDUSTRY—BULLETIN NO. 165.

B. T. GALLOWAY, *Chief of Bureau.*

APPLICATION OF SOME OF THE PRINCIPLES
OF HEREDITY TO PLANT BREEDING.

BY

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AGRICULTURIST IN CHARGE OF THE OFFICE
OF FARM MANAGEMENT.

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(Continued on page 3 of cover.)

CONTENTS.

	Page.
Introduction.....	7
Dominance and recessiveness.....	7
Segregation.....	8
Allelomorphism.....	17
Law of recombination.....	18
Fluctuating variations.....	23
Running out of varieties.....	25
Selection without artificial crossing.....	26
Vegetative propagation.....	26
Self-fertilized species.....	32
Mass selection.....	33
Individual selection.....	35
Cross-fertilized species.....	36
Hybridization and selection.....	43
Vegetatively propagated crops.....	43
Self-fertilized species.....	44
Cross-fertilized species.....	50
Mendelian analysis of heterozygote races.....	51
Heterozygote characters.....	52
Possibility of entirely new characters.....	55
Reciprocal crosses.....	56
Evolutionary changes and their relation to plant breeding.....	56
Place effect.....	58
Non-Mendelian characters.....	59
Mutations.....	61
Latency.....	62
I. Latency due to separation.....	62
II. Latency due to dominance of absence over presence.....	64
III. Latency due to homozygosis.....	65
IV. Latency due to hypostasis (masking).....	66
V. Latency due to inhibition.....	66
VI. Latency due to fluctuation.....	66
Correlation.....	67
Index.....	69

ILLUSTRATIONS.

	Page.
FIG. 1. Graphic illustration of the range of fluctuations of each of the eight pure races of <i>Paramecium</i> studied by Jennings.....	28
2. Graphic illustration of ten generations of corn with no selection, the first generation of which is <i>YySs</i>	38
3. Graphic illustration of the effect of mass selection in cross-fertilized species.....	39
4. Graphic illustration of ten generations of a hybrid in a self-fertilized species without selection to type.....	47
5. Graphic illustration of ten generations of a hybrid in a self-fertilized species selected for type <i>WWCC</i>	49
6. Graphic illustration of the effect of individual selection in a self-fertilized species on progeny of the hybrid <i>WwCc</i>	50

APPLICATION OF SOME OF THE PRINCIPLES OF HEREDITY TO PLANT BREEDING.

INTRODUCTION.

While the discussion in these pages of principles that may be applied in the improvement of crops by breeding and selection will involve principles other than those discovered by Gregor Mendel, the fact that Mendel's principles are somewhat complex renders it necessary to state them in a general way before taking up the subject of plant improvement.

DOMINANCE AND RECESSIVENESS.

The simplest of the principles discovered by Mendel is that which is usually referred to as the "law of dominance." This principle should hardly be called a law, because it is in no wise general and in very few cases is dominance absolute. The phenomena of dominance and recessiveness may be illustrated by a few examples.

If a red-flowered variety of the common garden pea be crossed with a white-flowered variety, the progeny will have red flowers. According to Mendel's original conception a cross of this kind brings together two antagonistic characters. The progeny inherit the red flower color from one parent and the white flower color from the other. It therefore has both these characters. It happens, however, that the red character predominates over the white and comes to expression while the white character is not visible in the cross-bred individual. Mendel suggested that a character behaving as the red character does in this cross should be called a "dominant character," while one behaving as the white character in this cross should be called a "recessive character."

If we cross a bearded variety of wheat with a smooth variety, that is, one that has no beards, the hybrids thus produced either have no beards or the beards will be only slightly developed. Hence, we say that smoothness is dominant to beards, at least partially, or, which means the same thing, that beards are recessive to smoothness. The cross between polled and horned breeds of cattle has no horns, though a small proportion of such cross-bred animals may have "scurs."