Practical Plant Breeding

H. J. Moore, Queen Victoria Park, Niagara Falls, Ont.

IN writing this article, I feel that I am treading on dangerous ground, seeing that my profession is not that of plant breeder entirely, but that of horticulturist. However, I may be able to overcome the difficulty by approaching the matter from a practical standpoint and dealing only with that phase



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connected with practical horticulture.

No matter whether we are interested in the subject for practical or scientific purposes we must approach it systematically. We must discriminate in order to get the best results from our labors, or much valuable time wil be lost in beating around the bush. There is no reason whatever why every trained horticulturist should not become a practical plant-breeder, and the pleasure he would derive from associating himself more intimately with and understanding more fully the fundamental laws on which the science is based would amply repay him for the time spent in its pursuit. There is something indescribably fascinating about plant breeding, as one never knows what to expect; although, if we understand Mendel's Law of Inheritance and its relation to the particular group of plants with which we are working, we can predict pretty closely as to results.

The life of the man who is engaged in plant breeding is full of hope. This has a tendency to make him look more cheerfully upon the sterner duties which, as a horticulturist, fall to his lot. Even for the amateur, plant breeding has its charm, and there is no occupation more rdifying, more instructive, or more worthy of man's best efforts than the production of something better than already exists, or the creation of something new, which will either aid in the beautifying of our home surroundings or be of some utility in the economy of life.

Although it is impossible to make two blades of grass grow where one grew hitherto, it is quite possible to produce a better blade of grass, a better ear of corn, or a sweeter-scented flower, which will occupy only the same space as its less worthy progenitor. There is room for improvement not only in our fruits, but also in our flowers and vegetables.

There are essentials which are necessary in order to become a skilled breeder or improver of plants, the chief of which is an intelligent mind to grasp a knowledge of the subject to be de: . with. Before a doctor can diagnose the case of a patient he must have a thorough knowledge of human anatomy and physiology. He must know the various organs which constitute the body, and understand their functions. Thus it is with the hybridizer. He must know at least something about the other branch of biology, viz., botany, without which it is useless to attempt any discriminate work, because the operator, although having eyes, sees not; that is, he lacks the knowledge to intelligently carry out his desires.

REQUIREMENTS

A good course in First Stage Botany is the first requirement. When a person has studied the morphology, and physiology of plants, he or she understands at least what the various organs of the flower, the calyx, cololla, stamens and pistil, were intended for. Secondly, a course in Systematic Botany will be





found invaluable, because of the knowledge of the families or natural orders of plants that is obtained. Why is Systematic Botany necessary? Because it has been long known that plants of different natural orders will not hybridize, but plants of the same order may. Thus, when a person knows the characters of the plants which constitute an order, his chances of success in plant breeding will be greatly enhanced. It would be absolutely useless to attempt to hybridize a plant belonging to the natural order Ranunculacae with another belonging to the order Compositae. Different species of an order may cross; species of different genera of the same order occasionally cross, but rarely; bigeneric hybrids are uncommon. From the above remarks the value of Systematic Botany will be readily understool

Where is it possible to obtain these courses of instruction? At the agricultural and various other colleges of the country and at high schools. As some idea of the requirements of plants is if great value to the hybridizer, the pratical horticulturist has the advantage over his less fortunate neighbor who has never had facilities for work in this direction. A knowledge of soils, temperature, humidity, and other environmen'al conditions is essential in order that we may bring any class of plants to full maturity by giving them conditions is nearly natural as possible; otherwise our chances of success will be limited to the extent of our knowledge in this respect.

OHOICE OF SUBJECTS

Now, suppose we are through with ..." preliminaries, the next step is the selection of suitable subjects for hybridizing. The operator must have some definite purpose; there is very little to be gained by indiscriminately pollinating everything which appears likely to hybridize. The inevitable result of lack of forethought is disappointment. Some special type of plant should be selected, such as the primula, the lily, or any plant with flowers easy to manipulate at first, as plants possessing flowers more intricate should be left severely alone until the simpler flowers are mastered

It would be well at this stage to mention the intruments which are required for plant breeding. They are not numerous, but should be of good quality. A pair of forceps, a sharp scalpel, a good pocket lens, a camel's hair brush, and a quantity of alcohol, or other sterilizing medium, in a bottle, alone are re quired. The forceps, brush, and scalpel must be kept scrupulously clean, and immediately after use should be sterilized It may be found necessary to cover all pollinated flowers, and for this purpese small paper sacks are used, the dimensions of which will depend upon the size of the flower operated upon.

POLLINATION

Not having space in this short article to give the details of pollination, I may say that it simply consists in transf rring pollen from the anthers or mut organs of one plant to the stigma or female organs of another. As flowers are in most cases perfect, that is, pussessing male and female organs, ins sometimes necessary to pollinate a flower with its own pollen or with polen from another flower of the same plant. The primrose is a good example. It the case of "monoccious" plants, which possess both staminate and pistillate flowers, the only course to pursue is to transfer the pollen from the stammate flower to the pistillate one, or, if he staminate and pistillate flowers rc