

Practical Plant Breeding*

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THERE are two classes of plant breeders, both of which are doing good work of more or less value from the scientific and economic viewpoint, in the interest of advanced knowledge and our advancing civilization. The first is the breeder who works for the purpose of proving his theories, and who by a limited number of recorded crosses is able to place the simple analysis of his investigations in presentable form for educative purposes. The second, or the breeder for practical results, cannot do this without placing limitations upon his activity, which means his experience and success, as it is only the man who makes many crosses who may hope to approach even the border of a field of limitless possibilities in results.

By practical plant breeding I mean the application of that knowledge of the science which will enable the worker to secure the highest ratio of economic value in the results. In my work on the Canna, which embraced all available species and early European hybrids, as well as the latest and best productions obtainable, I proved yearly the correctness and value of my contention, for seven years of select breeding gradually eliminated types of no commercial value, until in the last season not only were discards practically nil, but the value and quality of the selected seedlings were equal to those of the best novelties of European introduction.

The great value of the system advocated by me is the fact that the success of breeding depends much upon the removal of every influence adverse to increased multiplication of advanced types. This will be appreciated by those workers on bulky plants and trees of slow maturing habit, requiring a large acreage for development, and the fact that I am speaking from an experience with nearly a million new hybrid gladioli, a plant that requires comparatively little space, although needing from three to five years to mature from seed. Fifteen years of unbroken work on this now my sole specialty has also proven the value of my views in practice. In the progression of my system the first five years only is known to commerce, having been discarded by me 10 years ago; the second series of five years is little known commercially, and received the Pan-American Exposition Gold Medal and St. Louis World's Fair Grand Prize; while the third series of five years is all in my personal possession, and unknown outside my trial grounds.

*Extracts from a paper submitted to the Plant Breeding Conference, held in London, England, last summer.

It is imperative that the breeder should specialize, that he should use every obtainable wild species of his specialty, and in using each for the purpose dictated by his judgment and experience, thus control and render amenable to his direction the vital forces and chemical constituents of this foundation stock. By using all obtainable species he multiplies the possibilities for practical results and increased diversity in the material to be evolved from the product of future years, and yearly discarding species and early hybrids as they are superseded in the course of his operations.

Wild species are only of value so far as they may supply some desirable quality for incorporation in a domestic type containing other good qualities such as size, vigor, vitality and adaptability. Illustrating from my specialty, the blotch of the small purpureo-auratus can be placed upon a six foot domestic type, free from the objectionable cowed habit of this species, the throat mottling of the weak growing *Saundersii* can be transmitted to a race of strength and vigor, with the added influence of its wide, open flowers, and so on indefinitely.

That the foregoing can be done is good reason for not developing race hybrids, with the consequent loss of the

most important quality of general adaptability to changed conditions. The natural development of wild species is usually accomplished by restricted conditions of habitat, an influence of ages impossible of neutralization by a few seasons' crossing. So highly do I appreciate this feature of adaptability that in bringing my productions to maturity I grow on four kinds of soil—sandy, sandy loam, clay loam, and humus or vegetable deposit—and before use in breeding they are proven in this quality in order that it may be also transmitted in crossing. Breeding from wild species is, therefore, of little practical value, as the farther our removal from their many objectionable features the better, and when by proper selection their best qualities can be controlled and applied according to our knowledge and discretion.

My advice to plant breeders is to multiply types by many thousands, using special proven selections as sires, on the lines of practice by successful animal breeders. Select and develop domestic races and sections of such high quality, vitality and general adaptability, that their progeny will not only be of higher quality than the parents, but that this quality will be produced in quantity in the highest possible ratio. This is practical plant breeding.

The Amateur's Greenhouse

SOME readers of THE CANADIAN HORTICULTURIST may have some chrysanthemum plants that they desire to keep over. While professional florists would not find it profitable to keep over old plants, amateurs may do so, as they do not make as close an estimate of the cost incurred through time and labor. Cut down the old stem to within an inch or two of the soil. After doing this keep the plants in a temperature of about 45 or 50 degrees. A comparatively cool temperature is necessary to prevent a too rapid growth of the young shoots that appear on the surface of the soil.

Water the plants often enough to keep the soil only fairly moist. Give air on warm days. When growth has reached about three inches pinch off the tips of the shoots. Repeat the pinching every three or four weeks until May. Then place the plants out of doors on fine days in a sheltered spot, to harden off the growth. Divide or pot the whole plant into a pot one or two sizes larger, or it can be set in the open ground to grow during the summer. Continue to pinch off the tip growth every few weeks

until July. Then the plants may be allowed to grow at will.

Cyclamen bulbs that are showing flowering buds will require plenty of water at the roots. Light applications of liquid manure will increase the density of color and the size of the flowers.

Cuttings of lobelia, double alyssum, cupheas, and similar plants desired for hanging baskets and vases should be taken now. This will give them a chance to make nice plants by the time they are required in spring.

Why not grow some perennials and house plants from seed? As soon as possible sow seeds of verbena, pansy, lobelia, petunia, snap-dragon, daisy, forget-me-nots and impatiens. The plants will be of good size by planting-out time in May. Sow seeds of tuberous begonia now, if you want large flowering plants by June. Among the house plants that may be grown from seed sown in January or February are Jerusalem cherry, heliotrope, *Primula obconica*, and various vines such as asparagus ferns and the foliage asparagus (*A. Sprengeri*), smilax and *Coclea scandens*.