

(c) Herkogamous flowers, those in which there is a peculiarity in form or structure favorable to the prevention of self-fertilization to a great extent. This strange modification is especially seen in what are known as papilionaceous (from resemblance to a butterfly), flowers common in the order Leguminosæ (bean family). *Wistaria*, *Robinia* (locust), *Apios* (ground-nut), *Phaseolus* (bean), all have such peculiar corollas, that when an insect alights upon them to proceed in search of nectar, it receives a blow on the underside of its body from the pistil, which comes up in advance of the stamens and receives any pollen the insect may have about it collected from other flowers, and at the same time this pistil throws on to the insect pollen of that flower which has been prevented from reaching the stigma, by a collection of hair-like structures arranged on the style of the pistil. Thus we see a wonderful arrangement to aid in transferring pollen of one flower to that of another. In *Kalmia* (American laurel) and *Berberis* (barberry) we find the anthers of the stamens bent back into pockets on the petals, but the moment an insect alights on the flower, if the stamens are matured, they spring and fire the pollen upon the insect. This it is likely to carry away to other plants. The *Iris* (flag), and very many of the Orchids also show wonderful structures in their flowers, which seem to indicate that these modifications are for the purpose of favoring cross-fertilization.

6. *Practical results from a study of Fertilization.*—(1) It explains the innumerable varieties of plants in nature. (2) Becomes of practical value in developing new varieties by art, and enables man to obtain innumerable kinds of fruit, grain and flowers.

Fertilization of varieties gives rise to *crosses*, the seeds of which are fertile, while that of species gives hybrids of which the fertility of the seeds cannot be relied upon.

In hybridization the term generally applied to the process of crossing plants experience indicates:—

(a) That the characters of the new plant follow the nature of the plant in which the pistil was used.

(b) That the characters of the fruit follow those of the plant from which the pollen was taken.

In other words, if you wish a change in fruit use pollen from a better fruit-bearing plant, but if you want a better plant, use the pistil on a vigorous healthy tree, etc.

Some have succeeded in developing strange forms by hybridization, *e.g.*, a cross between pear and apple, giving rise to a tree which bore fruit, to which the name "What is it" may be well applied. Mr. Dempsey, well known to fruit-growers, succeeded in doing this.

Hybrid plants are not likely to revert, but if you take the seeds of such and sow them, they will likely give you innumerable varieties, and in some cases revert to the original.

Such are some of the teachings of science regarding this exceedingly attractive page in plant life, from which not only a wealth of interesting information has been gleaned, but also an immense profit derived from the practical adaptation of them in the pursuit of horticulture. We see this very markedly in our beautiful flowers, our varied fruits and valuable grains, and no doubt as the years roll on this inviting field will be worked by investigators, who will add more brilliant results to those already attained.

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