always of greater benefit to their descendants for flowers to be fertilized by pollen from other flowers of the same kind growing upon other plants. He summed up his observations with the trite axiom: "Nature abhors perpetual self-fertilization." Which was first enunciated in his great work published in 1862 on the fertilization of orchids. The publication of this classic work marks the beginning of one of the most important eras in the history of the science of botany. Since then endless observations have confirmed the accuracy of Darwin's law, and it had been found that in the vast majority of plants special appliances exist which will secure a more or less frequent inter-cross, and that in many these appliances completely exclude the possibility of self-fecundation.

The cross-fertilization of some plants is ensured by the male and female organs occurring in separate flowers either on the same or different plants. Familiar instances of male and female flowers on the same plant are the male catkins of such trees as the butternut, hickory, the birches, oaks and hazels. The female flowers are much less conspicuous but easily recognizable near the tips of the twigs. In the willows we find the male and female catkins on separate trees, each tree bearing either staminate male flowers or pistillate female ones. In many cases where the two sexes occur in the same flower self-fertilizing is prevented by the male and female organs coming to maturity at different times, sufficiently far apart for it to be impossible for the pistil to be fertilized by the pollen borne on the same flower. In many cases there are remarkable contrivances which prevent the impregnation of flowers by their own pollen. In the species of primrose—and no better example can be found than the well known house plant from the Himalayas, *Primula obconica*—it will be found that the flowers on different plants are dimorphic, some flowers having the tip of the pistil at the mouth of the tube and the anthers well down towards the bottom, while in other flowers this order is reversed, and the anthers are produced at the mouth of the tube and the pistil is so short that it does not reach half way up. Darwin proved by growing many plants from the seed that by far better plants were obtained by the flowers bearing long or short pistils being crossed with pollen from the other kind of flower. There are some flowers which are actually sterile to their own pollen, but can be fecundated readily with pollen from flowers growing on another plant of the same species. It has been pointed out by Prof. Waugh, of Vermont, that this is the case with the red American plums, and it is also the case with many varieties of apples and pears. This fact at once indicates the important bearing the presence of insects in an orchard at the time of blossoming has upon the production of an abundant fruit crop. Moreover, it can be shown that, owing to its size, weight and habits, no insect is so well calculated to ensure the fertilization of fruit blossoms as the honey-bee, which flies rapidly from plant to plant, and, by running over the flowers in search of pollen or nectar, brushes off the pollen and carries this vitalizing element on the hairs of its body to the next flower visited. The habit of the bees, which has frequently been noticed, of confining the visits when collecting largely to the same kind of plant, is taken advantage off by the bee-keeper to store up at certain seasons particular kinds of honey, such as apple, raspberry, basswood, clover and buckwheat honeys. This habit is also, manifestly, advantageous to the plants on account of the pollen which is carried by the bee being of the kind necessary for the fertilization of its flowers, which could not be effected if the pollen were that of some other kind of plant.

The male and female organs of some flowers are very sensitive, the pollen being cast forth with some violence as soon as the stamens are touched by insects. An instance of this is to be found in the common Canadian swamp plant called Lambkill or Swamp Laurel; the anthers are held down in small depressions round the edge of the corolla, and when an insect visits the flower, the stamens spring up, the anthers burst and the pollen is thrown against the insect's body. The same thing may be observed in the common barberry flower.

In addition to the classes of plants already referred to, which are sterile to the own pollen, and in a few remarkable instances where the pollen is actually poisonous to the pistil of the same flower, there are numberless species which are partially sterile when fertilized with their own pollen, and to a less degree when fertilized with pollen from close relatives such as seedlings from the same parent as the plant bearing the flowers; and finally in a large class where there is no apparent obstacle to self-fertilization, cross-fertilization often occurs from what is known as the prepotency of pollen from another individual over a plant's own pollen.