

*The Different Forms of Flowers or Plants of the Same Species.*

By CHARLES DARWIN, F.R.S. London: Murray.

THOUGH modestly proclaiming himself no botanist, Mr. Darwin continues to produce botanical researches whose sterling value must be admitted even by the most determined adherents of the old school of Natural History. The work before us treats of some very interesting points connected with the reproduction of plants. A certain number of vegetable species were grouped together by Linnæus as hermaphrodites, and amongst these are a class which Mr. Darwin studied and described some years ago as "dimorphic" and "trimorphic," and which have since been named "hetero-styled" by Hildebrand. In plants of this class there are individual flowers of two, or in other cases of three, forms, differing principally in the relative length of the pistils and stamens. A familiar instance may be found in the common cowslip, polyanthus, and auricula. In some of these flowers the globular stigma appears at the mouth of the corolla, whilst in others the stigma does not protrude, and in its stead appear the anthers as an annular tuft. These different forms of the flower are named by florists respectively "pin-eyed" and "thrum-eyed." The former type is named by our author the long-styled, and the latter the short-styled. These two kinds of flowers are never found upon one and the same plant. Mr. Darwin has investigated the meaning of this diversity, and finds that it is by no means accidental or unimportant. If the long-styled form is fecundated by the pollen of the short-styled form, or *vice versa*, we have complete fertility; the seed is abundant and good, and the author accordingly speaks of this as a "legitimate union." If, on the other hand, a long-styled flower is fertilised by the pollen of a long-styled flower, or if a short-styled flower is fecundated by the pollen of a short-styled flower, we have two cases of "illegitimate union," in which the seed produced is not merely much less in quantity, but inferior in quality.

There are other plants, again, in which we find not two, but three different forms, as in certain species of *Lythrum*, *Nesæa*, *Oxalis*, and *Pontederia*. Here, again, we mark the same difference between the effects of legitimate and of illegitimate union. The author remarks that there is a wonderfully close parallélism between the effects of illegitimate and of hybrid fertilisation. "It is hardly an exaggeration to assert that seedlings from an illegitimately fertilised hetero-styled plant are hybrids formed within the limits of one and the same species. This conclusion is important, for we thus learn that the difficulty in sexually uniting two organic forms, and the sterility of their offspring, afford no sure criterion of so-called specific distinctness. If anyone were to cross two varieties of the same forms

of *Lythrum* or *Primula* for the sake of ascertaining whether they were specifically distinct, and he found that they could be united only with some difficulty, that their offspring were extremely sterile, and that the parents and their offspring resembled in a whole series of relations crossed species and their hybrid offspring, he might maintain that his varieties had been proved to be good and true species, but he would be completely deceived. In the second place, as the forms of the same trimorphic or dimorphic hetero-styled species are obviously identical in general structure with the exception of the reproductive organs, and as they are identical in general constitution (for they live under precisely the same conditions), the sterility of their illegitimate unions, and that of their illegitimate offspring, must depend exclusively on the nature of the sexual elements, and on their incompatibility for uniting in a particular manner. And as we have just seen that distinct species when crossed resemble in a whole series of relations the forms of one and the same species when illegitimately united, we are led to conclude that the sterility of the former must likewise depend exclusively on the incompatible nature of their sexual elements, and not on any general difference in constitution or structure. We are, indeed, led to this same conclusion by the impossibility of detecting any differences sufficient to account for certain species crossing with the greatest ease, whilst other closely allied species cannot be crossed, or can be crossed only with extreme difficulty. We are led to this conclusion still more forcibly by considering the great difference which often exists in the facility of crossing reciprocally the same species, for it is manifest in this case that the result must depend on the nature of the sexual elements, the male element of the one species acting freely on the female element of the other, but not so in a reversed direction. And now we see that this same conclusion is independently and strongly fortified by the consideration of the illegitimate unions of trimorphic and dimorphic hetero-styled plants.

It can scarcely be denied that these latest researches of Mr. Darwin have dealt a most serious, if not an absolutely fatal, blow at the so-called physiological test of species, and consequently at the line of absolute demarcation by which some naturalists still consider species—as distinct from varieties—to be bounded.

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*The Methods of Physical Science.* A Lecture delivered at University College, Bristol, as Introductory to the Course of 1877-78. By SYLVANUS THOMPSON, B.Sc., &c. Bristol: T. Kerslake and Co. London: Longmans and Co.

WE have here a lecture which brings forward not one novel fact, and probably no conclusion which has not been arrived at and