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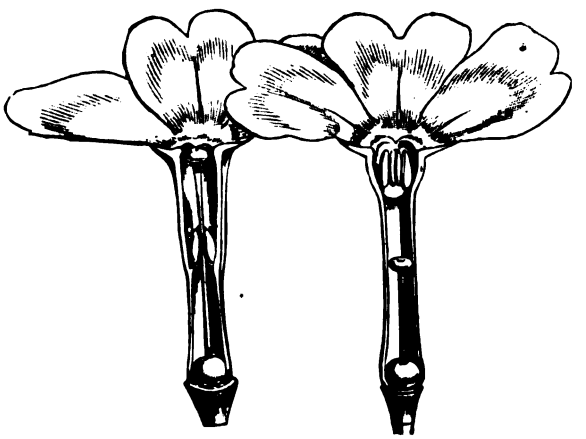
THE FORMS OF FLOWERS*

We have before us the latest addition which Mr. Darwin has made to his already voluminous publications. From the year 1831, when, at the age of twenty-two, he started with Capt. Fitzroy as naturalist to the voyage of the Beagle for the survey of South America and the circumnavigation of the globe—a voyage which is commemorated in the popular Berberis Darwini, a plant which was first introduced to our gardens as a result of this expedition, and which was named by Sir William Hooker in honour of its discoverer—up to the present time Mr. Darwin has been ceaselessly employed, not only in evolving and strengthening the theory with which his name is popularly associated, but in collecting and observing facts, and in publishing the result of his investigations. It is not only the evolutionist who can derive both pleasure and profit from the perusal of Mr. Darwin's works; they appeal to naturalists of every class and kind, and those who differ most from his theories are the first to admire the patience and perseverance which have been displayed in the accumulation of the facts upon which these theories are based. It is difficult to estimate the amount of routine work which our great naturalist has patiently gone through in pursuit of knowledge; in the volume now before us, he casually remarks that to ascertain one fact alone, he was "compelled to count under the microscope above 20,000 seeds of Lythrum Salicaria (the Purple Loosestrife), and from this we can form some idea of his energy and perseverance. The various points connected with cross-fertilisation in the vegetable kingdom were fully reviewed and considered in one of Mr. Darwin's recent volumes, which was duly noticed in these pages. On the present occasion he treats of the differently formed flowers normally produced by certain species of plants, either upon the same individuals or upon different individuals of the same species; and these differences have, as we shall endeavour to show, practical bearings which concern horticulturists quite as much as botanists.

"Florists who cultivate the Polyanthus and Auricula have long been aware," says Mr. Darwin, "of the two kinds of flowers [*i.e.*, those with long stamens and a short style, and those with short stamens and a long style], and they call the plants which display the globular stigma at the mouth of the corolla 'pin-headed' or 'pin-eyed,' and those which display the anthers 'thrum-eyed.'" These two forms he calls respectively the long-styled and the short-styled; and he proceeds to demonstrate that instead of affording a mere instance of variability, as had been supposed, the welfare of the species depends in a great measure upon the existence of these two forms, which usually occur together in about equal quantity. By numerous and careful experiments in the fertilisation of Primroses and Cowslips which had been protected from the visits of insects, the natural agents by means of which cross-fertilisation is insured, Mr. Darwin shows most distinctly "that the long-styled flowers fertilised with pollen from the short-styled yield more capsules, especially good ones [*i.e.*, containing more than one or two seeds], and that these capsules contain a greater proportional weight of seeds than do the flowers of the long-styled when fertilised with pollen from a distinct plant of the same form;" and that the same is the case with the short-styled flowers if fertilised with pollen from the long-styled form, and so clearly is this established, that the term 'legitimate union" is applied to the former method of fertilisation, while the union of two long-styled or two short-styled forms is styled "illegitimate." It needs no demonstration to show that these facts, which rest on unquestionable evidence, have a very important aspect for growers, not only of Primroses and Polyanthuses, but of all flowers in which this difference of form is observable, for the principle is one which holds good in all such cases, so far as our present knowledge goes. Mr. Darwin goes into the question of the specific identity of the Cowslip, Primrose, and Oxlip, which are considered by some authors to be merely forms of one and the same species; he concludes that although these are probably descended from "a common primordial form," they are now as fixed in character as many others which are universally ranked as true species, and that "they have as good a right to receive distinct specific names as have, for instance, the ass, quagga, and zebra." In speaking of the Oxlip it must be understood that the true Oxlip (Primula elatior of Jacquin, the "Bardfield Oxlip" of English writers) is intended. This plant, which is found in England only in Cambridgeshire, the north of Essex, and the west of Suffolk, is, as all who have grown it know, a most distinct plant; as Mr. Darwin says, it differs so much in general appearance from the common Oxlip that no one accustomed to see both forms in the living state could afterwards confound them, and yet it is difficult to define exactly any one point in which the two plants differ, except that in the true Oxlip the linear-oblong capsules are as long as the calyx. We have often wondered that this Bardfield Oxlip has not become more popular as a spring garden plant: we have been the means of introducing it to two gardens, in both of which it grew well and gave great satisfaction. In cultivation it is a much larger plant than any form of Primrose or Cowslip, and flowers very freely somewhat later than its congeners. The blossoms, which are usually described as inodorous, have in reality a very peculiar and rather unpleasant smell, resembling that of the Starch or Grape Hyacinth (Muscari racemosum), while those of the common Oxlip have a Primrose-like scent. The common Oxlip, which has often been regarded



Flowers of Primrose showing long-styled and short-styled forms.

as a development of the Primrose, Mr. Darwin thinks "there can be no doubt is a hybrid between the Cowslip (P. veris) and the Primrose (P. vulgaris), as has been surmised by several botanists. It is probable that the Oxlips may be produced either from the Cowslip or the Primrose as the seed-bearer, but oftener from the latter, as I judge from the nature of the stations in which Oxlips are generally found, and from the Primrose when crossed by the Oxlip being more fertile than conversely the Cowslip by the Primrose. The hybrids themselves are also rather more fertile when crossed with the Primrose than with the Cowslip." It would take too much space to go into Mr. Darwin's proofs of the specific distinctions of the Cowslip and the Primrose, but their comparative infertility when intercrossed, and the absence of any trustworthy evidence that either species when uncrossed has ever given birth to the other species or to any intermediate form, are strong evidences in favour of their specific rank. The Polyanthus is shown to be a variety of the Cowslip, as had been supposed by some authors, though others, such as Martyn, in his edition of Miller's "Gardeners' Dictionary," assigned it to the Primrose.

The practical outcome of Mr. Darwin's observations on Primroses and their allies, so far as cultivators wishing to raise seedlings are concerned, is the fact that by the interbreeding of a "pin-eyed" and a "thrum-eyed" variety the largest proportion of fertile seeds is to be obtained. Many other species of Primula present the same difference of form, and among them the Chinese Primrose (P. sinensis), as well as the Auricula and the favourite P. cortusoides, and to them the same rule applies. The pin-eyed form of the Auricula is, however, not common among the varieties distributed by florists, as its

*"The Different Forms of Flowers or Plants of the Same Species." By Charles Darwin, M.A., F.R.S. London: Murray, 1877.

flowers are less handsome than those of the thrum-eyed variety. According to Kerner, our garden Auriculas are descended from Primula pubescens, which is itself a hybrid between the true P. Auricula and P. hirsuta. This hybrid has now been propagated for about 300 years, and produces, when "legitimately" fertilised, a large number of seeds, the short-styled form being especially fertile.

The chapters devoted to the common Purple Loosestrife (Lythrum Salicaria) are full of remarkable facts established by patient and tedious experiments. In this plant—one of the handsomest of British wild flowers—there are three forms of blossom, each containing a pistil different from that in either of the other forms, and "two sets of stamens different in appearance and function: but one set of stamens in each form corresponds with a set in one of the other two forms. Altogether this one species includes three females or female organs and three sets of male organs—all are distinct from one another, as if they belonged to different species." These forms are described at length, as well as the experiments tried upon them, all of which go to show the great proportionate fertility of legitimate over illegitimate unions, and the remarkable manner in which insect agency is adapted so as to ensure the greatest number of the former class of union, and hence to enhance the well-being of the plant. But one passage we must quote—a passage which Mr. Darwin gives as offering "a remarkable instance [of] how profoundly ignorant we are of the life-conditions of a species." This truth—for it is undoubtedly such—does not speak creditably for the advance which we have made in the knowledge of the life-history of the plants and animals which we describe so glibly: and it suggests that in spite of the improvement in this direction which Mr. Darwin has done so much to initiate and foster, our natural history is still too much a thing of the museum and of the herbarium. The Purple Loosestrife grows naturally "in wet ditches, watery places, and especially on the banks of streams, and though it produces so many minute seeds it never spreads on the adjoining land, yet when planted in my garden, on clayey soil lying over chalk, and which is so dry that a rush cannot be found, it thrives luxuriantly, grows to above 6 ft. in height, produces self-sown seedlings, and (which is a severer test) is as fertile as in a state of Nature. Nevertheless it would be almost a miracle to find this plant growing spontaneously on such land as that in my garden." Here is surely a hint worth taking by those who invest in Lythrum roseum superbum, the grand name by which some of our nurserymen have rechristened this common and beautiful plant. We heard just lately of a somewhat similar instance of the prosperity of a species under altered and abnormal conditions; this was the case of a large patch of White Water Lilies, which were growing in a pond from which the water had almost entirely drained away; far from being injured by such a state of things, the Nymphæa produced flowers and leaves in abundant luxuriance, both standing erect on their stalks and forming quite a jungle. The large size attained by certain plants when introduced to entirely fresh regions under altered circumstances—as, for example, the Watercress in the rivers of New Zealand—is another aspect of the same subject, or perhaps more strictly speaking, another branch of it.

Such are one or two of the salient points of Mr. Darwin's volume, but it is unnecessary to add that no adequate idea of its value and importance, or of the interest and variety of its contents, can be gained from so brief a notice as we are able to give in the limited space at our disposal. Mr. Darwin's books are too solid to be fairly dealt with in the cursory manner which alone is possible to a horticultural journal such as THE GARDEN; but we trust that enough has been said to urge upon our readers to take the earliest opportunity of consulting it for themselves. They will find in it another illustration of the truth that science need not be dry or uninteresting, and they will thank Mr. Darwin, as we do, for this latest addition to his already numerous claims upon our gratitude.

JAMES BRITTEN.