

the Chatham Islands plants are taken up; and, as there was no particular hurry, collision would have been avoided.

The collections made by various botanists in the islands comprise 129 species of apparently indigenous plants. We should here observe that this number must be taken *cum grano salis*, as in this volume Dr. Mueller exhibits very advanced views in the definition of species, going far beyond even Dr. Hooker. The author feels this himself, and at page 7 offers some explanation. "The description of a genuine species," he says, "clearly should be so framed, as to admit of its embracing any of the aberrations from the more usual type, to which, under various climatic or geologic circumstances, a species can possibly be subject; and the diagnosis should be so constructed as to include all the cardinal characters of the species, none of these ever admitting of exceptions." Of these 129 species, 42 are Dicotyledons, representing 32 Orders and 37 genera; 20 are Monocotyledons, distributed over 9 Orders and 19 genera; the remaining 67 plants are Acotyledons. There are besides 12 Mosses and 9 Lichens in Mr. Travers's collection. Only 9 phanerogamic plants are peculiar to the Chatham Islands, 8 of which are referable to the genera *Coprosma*, *Gingidium*, *Eurybia*, *Senecio*, *Leptinella*, and *Myrsine*, all represented in New Zealand; whilst only 1 constitutes a genus peculiar to the islands (*Myosotidium nobile*). Seven of these endemic species are figured in Dr. Mueller's book, the *Myosotidium* being already known from the plate in the 'Botanical Magazine.'

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*On the Sexual Relations of the Three Forms of Lythrum Salicaria.* By Charles Darwin, F.R.S. (Reprinted from the Journal of the Linn. Soc. Botany, vol. viii. p. 169.)

No long time has elapsed since physiologists were startled with the results of Mr. Darwin's experiments on dimorphic Primroses; dimorphism had, indeed, been previously noted in many genera, but systematic botanists (herein laying themselves open to such unsparing comments as Professor Schleiden dealt out to them) paid but little attention to the subject. It was reserved for one in high repute as a geologist and as a zoologist, but little known in the world of botany, to unravel in great measure the singular life-history belonging to the *Orchideæ*, the Primroses, the *Linums*, etc. Other observers (such as Mr. J. Scott, Mr. Trimen, and others) soon took up the matter,

and with the general result of confirming and extending Mr. Darwin's observations.

We have now before us, from Mr. Darwin's own pen, the results of his researches into the sexual nature of *Lythrum Salicaria*, and these results are more curious and important than any previously published. The details are numerous and somewhat complicated, hence we propose merely to lay before our readers the main facts of the case, referring them to the original paper for more copious information.

*Lythrum Salicaria* is, as to its stamens and pistil, trimorphic; three forms of flower are found on different individual plants. These three forms may be grouped as follows:—

1. Long-styled form has six medium stamens and six short stamens.
2. Mid-styled form has six long stamens and six short stamens.
3. Short-styled form has six long stamens and six medium stamens.

In all these instances, the long stamens correspond in length with the long style, the medium stamens with the medium style, and so on. Each individual flower therefore has a style,—long, medium, or short, as the case may be, and two out of the three sets of stamens which are above-mentioned.

In addition to these differences in length, there are other differences in the direction of the styles and stamens, in the size of the stigmas, the colour of the filaments and of the pollen, as well as in the number and weight of the seeds.

Mr. Darwin tells us that all these arrangements have reference to the comparative facility or difficulty experienced by insects in visiting the flowers, and he has endeavoured to work out for himself what nature effects by the agency of bees and other insects. Some idea may be obtained of the labour and patience involved in this undertaking from the fact that it was necessary to bring about eighteen distinct unions, fertilizing more than a dozen flowers on the average in the eighteen different methods; thus the long-styled form (No. 1) had to be fertilized with pollen from its own two distinct kinds of anthers; from the two sorts of anthers in the mid-styled form (No. 2), and from the two in the short-styled form (No. 3); the same process had to be repeated with Nos. 2 and 3. It might have been thought sufficient to have tried on each stigma the pollen from one set of long, or medium, or short stamens, and not from both sets, but the results proved that this would have been insufficient, and that it was neces-

sary to try all six kinds of pollen on each stigma. Into the details of these experiments we cannot go; we can merely say that they are recorded with Mr. Darwin's usual candour, so that the mention of his occasional failures and mishaps does but strengthen our confidence in the general results of his labours. From these results we glean the following more important facts:—First, that as in structure, so in function, there are three female organs; for when all three receive the same pollen, they are acted on most differently, and conversely the same holds good with the three sets of stamens.

Secondly, only the longest stamens fully fertilize the longest pistil, the middle stamens the middle pistil, and the shortest stamens the shortest pistil. These are the results of what Mr. Darwin calls "legitimate unions," of which there are for each pistil two; the other possible unions, "illegitimate unions," of which there are four for each pistil, are less fruitful, and the greater the inequality in length between the pistil and the stamens, the greater the degree of sterility. Now the insects carry the right sort of pollen to the right stigmas by reason of the structural arrangements before alluded to, but while they thus act "as special carriers" of the right kind of pollen, they do also act as "general carriers of pollen," and so the stigmas may become dusted over with different sorts of pollen. But the "illegitimate" pollen is neutralized by the "legitimate" pollen, even if the latter be not applied to the stigma until after the former. Mr. Darwin cites experiments of his own on *Primula* in proof of this, and also refers to Gærtner's experiments on the pre-potency of legitimate pollen, in support of his opinions.

The mid-styled form, No. 2, appears to be more feminine in its nature than the other two; it produces a larger number of seeds; on the other hand, the potency of the two kinds of pollen in this form is less than that of the corresponding stamens of the other two forms.

Furthermore, the green pollen from the long stamens of No. 3, and that from the precisely similar stamens of No. 2, although identical to all appearance, is nevertheless very different in its action. The same remark applies to the pollen from the short stamens of No. 1, and that from the corresponding ones of No. 2, so that not only does *Lythrum Salicaria* habitually produce three females differing in structure and function, but also five kinds of pollen differing in a marked manner in potency.