

SOME REMARKS ON MONŒCIOUS AND DICŒCIOUS PLANTS.

(From a Correspondent.)

Among the numerous subjects for inquiry presented to the botanical observer, few stand in greater need of complete investigation than the monœcious or diœcious condition of certain plants. Not but that the condition itself is sufficiently well explained by the suppression of the stamens, or pistils, as the case may be, but the cause of such suppression is still in the main utterly unknown; albeit, the few facts we have in reference to this subject are of so interesting a character, that it is a matter of surprise that they have not tempted observers to further research in these all but untrodden fields.

Perhaps an overweening sense of the difficulties to be met with in penetrating into so obscure a subject has deterred many from making the attempt, still, a difficulty is a "thing to be overcome," and there are many points within the compass of an ordinarily intelligent observer, which would not necessitate laborious and protracted research on his part, and yet would add to our somewhat meagre stock of information on this subject, and perchance lead to the most important results. The best way to illustrate these remarks, and to supply suggestive hints to those who have it in their power to make observations, is to throw together a few *excerpts*, which will show in part, at least, what has been already done.

One of the most remarkable, and, at first sight, puzzling circumstances, is the rarity with which the male and female plants, in the case of diœcious plants, are found collected together in anything like equal proportions, even when all the circumstances are taken into consideration. Thus, how rarely are male and female plants of the wild Hop, Bryony, Nettle, Black Bryony, and perennial Mercury, etc., associated together. The plants just mentioned are perennial plants, and the prevalence of plants of one sex in one situation to the entire or partial exclusion of the other has been accounted for by referring to the *shoots* by which such plants are propagated, which shoots produce flowers of the same sex as those on the plant from which they sprang. But are the sexes more intimately blended, as far as numbers go, in the case of annual diœcious plants, where such propagative shoots are not produced? We think not. On this point our experience

is opposed to that of M. Lecoq, who, in his elaborate work on the 'Botanical Geography of Europe,' says that in *Mercurialis annua* he has always seen the two sexes mixed in about the same proportions. According to our own experience the female plants of this species are not so commonly met with as the male, but this is a point on which we should be glad to have the experience of other observers. Annual plants dependent upon the fertilization and dispersion of seeds for their reproduction, ought naturally to have greater facility for promoting the fecundation of the ovules than plants provided with other means of reproduction. Thus it is that M. Lecoq accounts for the great rarity of dicœcious annual plants. From this author we cite the following facts. Unisexuality is more common in perennial than in annual plants, and in both, monœcious plants are more common than dicœcious. Referring especially to Central France, he gives these statistics, which will apply nearly as well to the rest of Europe. Of 563 annual plants 16 are monœcious, or 1 in 35. Of 1,245 perennial and woody plants, 147 are unisexual, or 1 in 8·5; and of the 147, 103 are monœcious, or 1 in 12 of all perennials, and 44 dicœcious, or 1 in 28, and of these latter the majority are trees and shrubs, often lofty, and provided with an abundance of pollen.

Another provision of Nature for ensuring the fertilization in unisexual plants, especially in dicœcious ones, is shown in the fact that such plants have either small and imperfect floral envelopes, or, it may be, none at all, and thus access of the pollen to the stigma is facilitated. In hermaphrodite flowers the provisions are equally marked to ensure the due contact of the pollen with the stigma, but here it is by the presence of protecting envelopes, by the situation of the stamens, etc.

From these circumstances it becomes a question whether it would not be possible to convert a dicœcious plant into a monœcious, or even into an hermaphrodite one, by checking the formation of shoots, by encouraging the formation of flowers at the expense of leaves, or by other means. That this is not so wild a notion as at first sight it may appear, is shown by the numerous recorded instances of dicœcious plants becoming occasionally monœcious, or even perfecting hermaphrodite flowers.

What are the circumstances which have tended to such results? Again, is there any possibility of ensuring with certainty the growth of either sex from seed?

In the 'Gardeners' Chronicle,' 1851, is an account and figure of a monœcious Hop, and the writer, Mr. Masters, of Canterbury, therein states that in his own garden he has known an instance wherein a hop-plant has, after producing female blossoms only, in the next year produced both male and female, and in the following year male flowers only.

We are not entirely without evidence as to the effect of temperature on unisexual flowers. Thus Nolte, of Copenhagen, states that *Stratiotes aloides*, which extends from 48° to 68° of latitude, produces perfect flowers only between 52° and 53°: north of that, female flowers alone are met with; south of that, males alone.

This plant is one which, as is well known, increases rapidly by off-shoots. This is in accordance with the observation of Knight, that a high temperature favours the formation of stamens; a low one that of pistils. That accurate observer found this to be the case in the Water-Melon, Cucumber, and other plants. In this country *Honckenya peploides* is diœcious, in America it is not so, according to Dr. Gray.

Mr. Hampe observed in *Salix repens*, that twigs above the water blossomed as females, whilst those twigs that had been in the water, and subsequently blossomed when the water was dried up, had only male blossoms. (Linnæa, vol. xiv. p. 367.)

But there are other and still more striking facts lately discovered which throw much light on the distribution of the sexes in diœcious plants, by showing that the presence of the pollen is not in all cases necessary to ensure the formation of the embryo.

Thus Radlkofer has submitted to renewed examination the *Cœlebogyne* at Kew, a female plant which year after year has produced seeds without possible contact of pollen. In this plant Radlkofer has traced some stages of the development of the embryo, but has not been able to detect any trace of pollen.

Naudin also has observed the like phenomena in Hemp, Mercury, and *Bryonia*, where all precautions to exclude pollen have been taken.

These facts are analogous to what has been found to be the case in bees and butterflies by Siebold and other naturalists.
