

THE
Gardeners' Chronicle.

SATURDAY, AUGUST 18, 1877.

APPOINTMENTS FOR THE ENSUING WEEK.

MONDAY,	Aug. 20	Lee Bridge Horticultural Society's Show. Royal Horticultural Society: Meeting of the Fruit and Floral Committees, at 11 A.M. General meeting at 3 P.M.
TUESDAY,	Aug. 21	Coventry and Warwick Horticultural Society's Show. Flower and Fruit Show at the Agricultural Hall. Sale of Imported and Established Orchids at Stevens' Rooms.
WEDNESDAY,	Aug. 22	Sale of Dutch Bulbs at Stevens' Rooms.
THURSDAY,	Aug. 23	Reading Horticultural Society's Autumn Show.

IT is not long since we had occasion in these columns to give considerable prominence to an analysis of a work of Mr. DARWIN'S on the subject of the FERTILISATION OF PLANTS, by the Rev. G. HENSLAW, who took exception to some points raised by Mr. DARWIN, more especially as to the alleged necessarily injurious effect of what may be termed "in-and-in breeding." We have now before us another work of a similar character from the same pen.* It is hardly requisite for us to enter at such length into the subject of this volume as into that of its predecessor, and this for two reasons. In the first place the present volume is but an expansion, with many additions, of those memorable papers on the dimorphism of Primula, of Lythrum, of Linum, and other plants, which first appeared some years ago in the *Journal of the Linnean Society*. In the next place, the subject in its main features is so closely similar to that which formed the subject of *The Effects of Cross and Self-Fertilisation in the Vegetable Kingdom*, that, allowing for differences of detail, the same general remarks will apply in the one case as in the other.

In the year 1862 it will be remembered Mr. DARWIN first published his remarkable series of observations on the two forms, or dimorphic condition of the flowers in the species of Primula. It was not without some sense of humiliation and of wasted opportunity that florists and horticulturists found that they had been pottering over "pin-eyes" and "thrum-eyes" for generations, without having the slightest notion of the significance of the variations in question. Even from the restricted point of view of the professed florist, the meaning of the formations in question, and their direct practical bearing on the cultivation and selection of the forms most in consonance with his arbitrarily assumed standard were entirely overlooked. So-called botanists were, with very few exceptions, not one whit better. They had been splitting hairs, counting spots, wrangling whether this was a species and that a variety, discussing whether there were two or fifty British representatives of a particular genus, and so on, without troubling themselves in the least about the causes of the variations they observed in such minuteness of detail, still less about the practical meaning and significance of the observed facts. Instead of treating plants as manifesting ever active life and ceaseless change, and adaptation to outward conditions and inborn endowments, they treated them all as a schoolboy would do so many marbles. It is one of the special features of Mr. DARWIN'S work in all departments that he is the cause of work in others. No better test could be desired of the degree of influence exercised by a great thinker and a great observer than this. Accordingly, we find in this subject of dimorphism, as in others, that Mr. DARWIN'S experiments and deductions have stimulated a large number of observers at home and abroad. They have excited the attention of professed naturalists in America, in Germany,

and in Italy, where learned professors have been induced to observe and experiment for themselves, to expound and to extend Mr. DARWIN'S researches. Practical gardeners, like Mr. SCOTT, now of the Calcutta Gardens, and others have not failed to see the profound importance of these observations to their own pursuits. Amateurs have found a new and never-failing source of interest and amusement in observing and studying the endless adaptations, contrivances, and inter-actions designed by the great Architect for the welfare and perpetuation of His creatures. In every case, making allowance for differences in points of detail, substantial agreement with Mr. DARWIN'S main principles as regards the object of these dimorphic forms has been arrived at. The general result of the observations and experiments that have been made on these so-called "heterostyled" plants has been shown to be this—that to ensure the largest number of healthy seedlings the pollen from the anthers of one particular form or size of stamen must be transferred by insect agency or otherwise to the stigma corresponding in point of dimensions with the stamen. In this way there may be in one and the same species, two or three sexual pairs, as distinct practically as the pairs representing the sexes in another species. Without practical experiments this diversity cannot always be determined, the relative length of stamens and styles may vary; the structural arrangements may differ, and yet functionally there may be no diversity. DARWIN himself records how he has been deceived in this way; a caution is thus supplied deserving of careful attention. Where, however, the pollen grains differ in size, this dimorphism may be assumed pretty certainly without resorting to direct experiment.

In the introduction to the present volume, Mr. DARWIN adopts the old Linnean classification into "hermaphrodite" flowers, or those with stamens and pistils in the same flower, as in the Rose; "monœcious," or those in which the male and female flowers are separate, but on the same plant, as in the Hazel; "diœcious," or those in which the flowers of one sex are on one plant and those of the other sex on an entirely distinct plant, as in the Willow; and "polygamous," or those in which hermaphrodite flowers may be found on the same plant with male or with female, or with both flowers, as in the case of the Ash.

These four subdivisions, it is needless to say, were adopted from structural considerations only, before the physiological phenomena connected with them were thought of. To adapt them to the present state of knowledge various subdivisions and modifications have to be made. Thus Mr. DARWIN admits two sub-divisions of hermaphrodite plants, viz:—1, heterostyled or di-tri-morphic flowers, as in the Primrose; and 2, "Cleistogamic" flowers, or flowers adapted expressly for self-fertilisation, inasmuch as the flowers either do not expand, or their buds are inconspicuous, and thus offer no attractions to insects. Such flowers are very common on Violets, though frequently overlooked. They yield more numerous seeds than the brighter coloured flowers.

Monœcious plants like the Hazel, which have the sexes in different flowers on the same plant, may be sub-divided into two classes, according as the anthers are ripe before the pistil, or *vice versa*, the object clearly being to favour the cross fertilisation of different plants. Many hermaphrodite (structurally) flowers are organised in a similar manner.

Diœcious plants, or those with the flowers of the two sexes on different plants, must necessarily be cross fertilised, and as we have just seen many plants structurally monœcious are rendered practically diœcious by the different times at which the stamens and pistils respec-

tively come to maturity. Among diœcious plants the difference between the sexes is sometimes remarkably great: thus among Restiaceæ, sedge-like weeds of Australia and the Cape, it sometimes happens that the male and female plants of the same species are so different that the female much more closely resembles the male of a totally different genus, than it does the male of its own species. Of course this applies only to the general habit and appearance of the stem and foliage, and not to the intimate structure of the flowers. Lastly, we come to polygamous flowers, which Mr. DARWIN divides into two sub-groups, according as the three sexual forms are found on the same individual or on distinct plants. Of the latter case the Ash is an example; some trees bear in some seasons male flowers only, others female flowers only, and others hermaphrodite blossoms. The Ash then may be classed as trioicous. On the other hand, the common Maple bears all three sorts of flowers on the same tree, and is thus monœciously polygamous. Other polygamous plants may be grouped into "gyno-hermaphrodites," inasmuch as they exist under two forms,—one of which bears female flowers only, the other hermaphrodite flowers, as in the common Thyme. Some of the Chenopodiums bear on the same plant hermaphrodite and female flowers, and may therefore be called "gyno-monœcious." On the other hand, there are "andro-monœcious" plants, or plants bearing on the same individual male flowers and hermaphrodite flowers in some species of Galium. No case seems to be known of "andro-diœcious plants," or plants producing hermaphrodite flowers on one individual, and males on another. Probably now that attention is prominently drawn to it, illustrations of this form may be found.

We have alluded to these matters in some detail because we believe that the mystery of "bad setters" among Vines and Cucumbers, the existence of "blind Strawberries" and other similar phenomena will find their solution in the facts above mentioned. Indeed, we know already enough to be sure in a general way that this is so. External conditions of temperature and manuring, though not without influence, are less potent in effecting important structural changes than is generally imagined. Thus, in spite of the natural variability of the Cowslip, upwards of seven hundred plants raised by Mr. DARWIN by artificial fertilisation (the visits of insects having been prevented), and treated in the most varied manner as regards food and temperature, yielded no variation whatever except in size. This is an important confirmation of some results obtained in the experiments on the action of manures at Chiswick, inaugurated by the Scientific Committee, some few years since. The fact that a tree will in one year bear male flowers only, and in the next hermaphrodite flowers only, seems to show, however, that external conditions may have some effect, as also the curious case mentioned by the late Mr. HANBURY, of a Papaw, the produce of a female plant which, when grown at Mentone yielded hermaphrodite flowers. But here, for the present at least we must stop, our immediate purpose being to draw attention to Mr. DARWIN'S latest book, not to discuss the general principles of sexuality in plants.

THE main provisions of the "DESTRUCTIVE INSECTS ACT, 1877," the full text of which is given in another column, are directed against the Colorado beetle. Not a word is said about any other insect, in spite of the title of the Act. The Act provides that the Privy Council may, if it see fit, prohibit the importation of Potatoes or Potato stalks and leaves, or of any substance likely to introduce "the said insect." The Privy Council may take steps to prevent the spread of the said beetle, and direct the removal

* *The Different Forms of Flowers on Plants of the same Species.* By Charles Darwin. (Murray.)