

THE
Gardeners' Chronicle.

SATURDAY, MARCH 3, 1877.

APPOINTMENTS FOR THE ensuing WEEK.

MONDAY, Mar. 5. *Relief of Living Exposed and L. cultivation of the Garden.*
TUESDAY, Mar. 6. *Relief of Living Exposed and L. cultivation of the Garden.*
WEDNESDAY, Mar. 7. *Relief of Living Exposed and L. cultivation of the Garden.*

FOR our horticultural readers the great value of Mr. DARWIN'S last work on CROSS AND SELF-FERTILIZATION OF PLANTS, of which Mr. HENSLOW is providing us with an abstract suitable for our purposes, consists in the practical applications which follow from the author's very numerous, protracted, and laborious experiments. Seed growers and hybridists will find, as we have already pointed out, and as we shall have occasion to repeat again and again, that much that was mere haphazard and of a tentative nature in their practice has been by Mr. DARWIN reduced to rule and method. Uncertainty and loss of time are thus to a considerable extent replaced by certainty and confidence as to result, with a corresponding gain as to time. But although it is apparent to those who read the book carefully, say, in many cases, is proved to demonstration to those who can read figures and form anything like a clear estimate of the value of evidence, yet it is certain, judging from all past experience, that these practical results will be a long time filtering into the minds of those who will eventually most profit by them. The theories and speculations, on the other hand, that may be and are based on these facts, will be keenly discussed from the first. Good cannot fail to result from what may seem at first sight profuse discussion. New facts will be brought to light and old facts will be viewed in a new light, and so the results cannot fail to be of advantage. One of the first points which has elicited discussion is as to the ORIGIN OF THE SEXES IN PLANTS, and the question whether the ancestors of existing plants were "dioecious," that is, whether they had their male flowers on one plant and their female flowers on another, or whether the primordial flowers were hermaphrodite. Mr. Darwin (p. 47) adopts the former view, and in so doing is considered to be so far opposed to those great doctrines of evolution and progressive development of which he is the high priest. We should as soon think of contending as of defending so mighty a master, but if there is one quality for which he is more remarkable than another it is his perfect candour and freedom from dogmatism. We cannot doubt, therefore, that however adverse to barren controversy, free discussion on a proper scientific basis will be welcomed by him. It is under such an impression that we venture to make some remarks on this question of the origin of the sexes in plants. Without going into minute botanical details, though at the risk of sacrifice of precision, we may presume that there are some plants in which no difference of sex has been yet observed, others in which two sexes have been discovered in the same flower, as in the so-called hermaphrodite flowers, such as Lilies; others again, in which the two sexes are borne, not in the same flower, but on the same plant, as in the Hazel (necandrous); while still another class of plants, like the Acacias, for instance, bear the sexes on different plants (dioecious). All this is, of course, well known to most of our readers, but it is necessary to start with clear notions in discussing so intricate a problem. So far, then, we have (1) plants which bear stamens flowers (we use the latter word here in its widest sense, including the reproductive organs

of the so-called flowerless plants), (2) others which are as to structure and conformation two-sexed in the same flower, or (3) two-sexed on the same plant but not in the same flower, and (4) others again two-sexed on different plants. But now arises a complication: a flower may be two-sexed as to structure and as to function also. These are the so-called "self-fertilized" plants, of which a prominent instance is the common Red Orchid. But in the majority of cases, although both sexes exist in the same flower, yet the pollen from one flower must be carried by insects, or by the wind, or by some other agency, to another flower; and thus cross-fertilization is effected. The necessity for this arises from the circumstance that structural peculiarities of various kinds, or the fact that one sex is mature while the other is immature, prevent self-fertilization and necessitate cross-fertilization. So then a flower may be structurally two-sexed, but physiologically one-sexed, or "dioecious."

The assumption as the principles of evolution, adaptation, and survival of the fittest, would therefore be that hermaphrodite or two-sexed flowers were the progenitors of one-sexed flowers. In course of time the advantages accruing from the union of two parents of the same stock, but of remote degree, as contrasted with the results of the union of two very nearly related parents, would become greater and greater. The tendency of growth would therefore show itself in the production of one-sexed flowers, and ultimately of one-sexed plants, rather than of two-sexed flowers. In other words, the hermaphrodite condition would precede the dioeciousness, that the monocious, and that again the dioecious, the latter being considered the latest stage of evolution. We say yet this in the form of a table, thus:—

Flowers plants?	
Flowers two-sexed—	
Structurally and functionally	1. Hermaphrodites.
Structurally only	2. Dioeciousness.
Functionally only	
Flowers one-sexed—	
On the same plant	3. Hermaphrodites.
On different plants	4. Dioeciousness.

The order of progression would be from 1 to 4, according to the general principles of subdivision of labour and least expenditure of power to attain a given result.

Mr. DARWIN, on the other hand, to the surprise of some of his followers, supposes plants to have been originally dioecious, and that the hermaphrodite condition was subsequent.

If we look at the matter physiologically, it is difficult to resist the hypothesis of a primitive oneness of sex. No difference of sex exists in the first instance in the structure of any plant or animal; it is only after development has proceeded some way that any difference is observable. Thus, in the life of every individual a primordial oneness of sex. What happens in the individual may be true, as PLATO surmised, of the race. It may even be the foundation of the myth of the development of EVE from ADAM'S rib. Regarding plants, among the lowest forms we have an apparent oneness, or inseparable condition of sexes. The first stages of duality is merely a subdivision of one into two; and, indeed, looked at in its simplest form, the process of reproduction is nothing more than the repeated subdivision of an original unit. It is the cause of this subdivision which remains at present a mystery. From the very simple stage of plant life just referred to we advance gradually to those in which the sexes become well marked, and placed in possibility, or apart, or even on different places. Now, if we could trace a gradual unbroken line upwards from the lowest stage of monox or protoplasm to the most highly organized flowering plant, the pedigree would, of

course, be as complete as it would be interesting. It happens, however, unfortunately for the pedigree-makers, that the self-same conditions of one or two-sexed flowers (if we may so call them), and one or two-sexed plants, exist, broadly speaking, among fungi, among Algae, among Chara, among Ferns, &c., so that we cannot look upon these conditions as marks of progressive development from one group to another, though they may be so within the limits of each individual group.

If we regard the matter from a structural point of view only, then it appears as if we must begin by the simplest forms, and ascend gradually to the more highly-developed ones. We find geological evidence of the very simple-flowered, wind-fertilized Cycaads and Conifers long before there is any evidence of ordinary flowering-plants, much less of such highly specialized forms as Compositae, Umbelliferae, or Orchidæ. These latter, so far as we know, were late developments on the earth's surface. Again, in point of individual development, we have, first, the simplest sexless structure, then a development of stamens, then a development of pistils, so that each individual flower begins as sexless, but it becomes in time male, and afterwards hermaphrodite (structurally); or if growth and development of either stamen or pistil be arrested it may remain one-sexed. Now, then, can the hermaphrodite precede the dioecious condition? From this point of view, then, Mr. DARWIN seems to us to be unquestionably right. But it stands to reason, in a case of this kind, we must look at the matter on all sides, and so, in direct proportion to the diversity we see, in, of course, our ignorance of the matter, if a particular opinion is borne out by the facts of morphology or structure, and is not consistent with what we know of physiology, or else, if it is quite certain some part of our theories is untenable.

We cannot doubt that the existing structure of plants and animals is the direct consequence of a long inheritance by descent, modified more or less by necessary adaptation to surrounding circumstances. It is our business to study these relations and to profit by them. To know the exact line and course of descent of existing plants and animals may partake of that knowledge which is too wonderful for us. In any case it is quite certain that the depth of our ignorance is such that all speculations as to the pedigree, or, as it is the fashion now to call it, the "phylogeny" of existing organisms, are little more than guesses, mere or less wild.

— The accompanying figure of *ENTYCLIA AULACOMIS* (fig. 47), an almost leguminous amygdaloid-seeded plant, was made from one of a number of well-developed specimens cultivated at South Kensington on the 2nd of May, by Messrs. VITCH & SONS, of Chelsea. It is one of those paniculate plants in which the flower-stage is developed just in advance of the leaves, the latter being very broad, with a strongly marked cordate base, and petioles. The flowers are white, produced in a many-flowered umbel, and have a cylindrical tube and regular lobes of equal segments, with an inner cup or stemon. The genus comes very near to *Calceolaria*, and has the curious property of the seeds germinating in the capsule. HENSLER makes two species—*E. aulacomis*, a stove plant, requiring winter rest, and subject to great variation in the development of the stemon; and *E. australis*, an open subject, which, he says, has much narrower leaves, and is sufficiently hardy to bear greenhouse treatment. ALLAN CROMBIE, when E. was in the *Petaloid* stage (p. 1376), when E. was in the *Petaloid* stage, makes three species—*E. aulacomis*, *E. australis*, and *E. australis*, which he distinguishes the last from E. aulacomis, which has a simple stigma, by its smaller and fewer-flowered umbel, and its three-lobed stigma. KUNZE adopts the same three species. Finally, BENTHAM, in the *Flora Australasica*, adopts two species—*E. aulacomis*, in which he includes *australis*, distinguishing it by its very broad cordate leaves, and its

* We add the signs commonly used to express these conditions—1, for hermaphrodite, 2 for monocious, and 3-4 for dioecious; to these we venture to add 5 for dioecious flowers.