

siderably diseased. Several cloacæ existed, and the integument was much involved. Her general health was fair, and the lung complications, which were active when she was first seen, had not increased. It was now doubtful whether Syme's amputation should be performed, for these reasons: the disease had advanced too far, the skin was greatly involved, and there was a chance of recurrence of the disease in the malleoli. It was, however, decided in consultation with the whole surgical staff to try this operation, which was accordingly done strictly antiseptically, according to Professor Lister's method. Most of the vessels were twisted, and two were tied with carbolised gut ligatures. Recovery was perfect and complete. Union took place by first intention throughout the entire wound, which in six days was almost completely healed. It was always dressed under carbolic spray. From the second day the pulse was normal. The temperature never rose above 99°. A slight weeping occasionally appeared from some of the old openings in the skin. About the fifth week after operation the scars in the skin, the marks of the old openings, showed signs of irritation, and gradually became inflamed, discharge every now and then issuing from some of them.

The practical and important sequel of the case may be told in a few words. The patient was removed to a convalescent home, where she had every care and constant attention, but in spite of this the disease returned in the stump. On the 14th of December amputation by Teale's method was determined upon. This was accordingly done antiseptically. She made a speedy and perfect recovery. Her general health and all the lung symptoms improved after the first operation, and she in no respect suffered from the second.

SYME'S AMPUTATION FOR DISEASE OF TARSUS; MALLEOLI FOUND TO BE INVOLVED; CARDEN'S AMPUTATION; RECOVERY.

Miss S—, aged fifty, wretchedly emaciated and debilitated from disease of entire tarsus, was admitted on December 11th, 1876. In consultation, it was considered a fair case to give the patient the benefit of Syme's amputation. The integument of the heel was healthy, and there was no evidence of disease of the malleoli. Accordingly the usual Syme's operation was performed under the antiseptic spray on December 20th. The os calcis was diseased, and adherent to the integument of the heel. The articular surface of the astragalus was healthy. The malleolar ends of the tibia and fibula were softened and carious. It was therefore resolved to perform Carden's operation in the middle third of the leg. This was at once done under the spray. The posterior tibial artery was the only vessel ligatured, and for this carbolised gut was employed; all the other vessels were twisted. The recovery was not quite so good or rapid as in the preceding case. This may have been attributable to a low state of health in a wretchedly bad subject and to the shock of the double operation. Unfortunately, too, the hospital spray apparatus got out of order, and for some few days the dressings perhaps were not so perfectly antisepted as they might have been. The surface of the stump for some days appeared unhealthy, and a slight slough took place from the anterior flap. At length she progressed most favourably, and the stump healed. The antiseptic dressings were maintained throughout.

Reviews and Notices of Books.

The Different Forms of Flowers on Plants of the same Species.
By CHARLES DARWIN, M.A., F.R.S. London: John Murray. 1877.

In this volume Mr. Darwin puts together a large number of observations that he has made, as incidentally appears, in the course of many years, upon the differently formed flowers normally produced by certain kinds of plants, either on the same stock or on distinct stocks. He accepts the primary divisions, made by Linnæus, of hermaphrodite, monœcious, dœcious, and polygamous species. Amongst the different forms of flowers that occur in hermaphrodite plants are, first, those in which the pistils and stamens

differ in length in two or three sets of individuals, accompanied by a difference in the size of the pollen-grains or in the state of the stigma. Such flowers, adopting the name given to them by Hildebrand, the author terms "heterostyled." They are found in fourteen natural families. A second set consist of hermaphrodite plants bearing two kinds of flowers: the one perfect and fully expanded; the other minute, completely closed, with the petals rudimentary, often with some of the anthers aborted, and the remaining ones, together with the stigmas, much reduced in size, yet with flowers that are perfectly fertile. Such flowers he terms "cleistogamic." A third set present conspicuous flowers adapted for cross-fertilisation by the aid of insects, and smaller and less conspicuous flowers adapted for self-fertilisation. Mr. Darwin notices, but does not enter into any minute details in regard to, the remarkable differences that exist between the ray and circumferential florets of various Compositæ and Umbellifera. He next proceeds to consider the monœcious plants, with their arrangements for securing cross-fertilisation by the early maturation of the anthers in some—proterandrous,—and in others of the stigma—protogynous. Whilst there are others, again, including those of the diœcious species, in which it appears that the differentiation of the sexes has affected the whole plant to such an extent that Mr. Bentham and Prof. Oliver have often, amongst the Restiaceæ of Australia and the Cape of Good Hope, found it impossible to match the male and female specimens of the same species. The last class considered consists of the plants called polygamous by Linnæus, which Mr. Darwin shows are subdivisible into several groups, according to the combinations of the sexes; and he instances an observation he made on some ashes growing in the same field, of which some produced exclusively female flowers, others exclusively male flowers, whilst others were hermaphrodite, some of which last developed numerous seeds, whilst others were barren. Further investigation showed that there are plants which bear on the same plant both hermaphrodite and female flowers, and for these he proposes the name of "gynomonœcious," the *Atriplex* being an example. There are others, like the common thyme, that are gynodiœcious. In the same way, some species of galmin are andromonœcious; but it seems to be doubtful whether there are any androdicecious plants.

The first special case taken by Mr. Darwin is that of the cowslip, of which he states that even village children are aware that there are two forms, the long-styled and the short-styled. Other differences are found to be correlated with the length of the style of the pistil. Thus, the long-styled plants have not only a much longer pistil than the short-styled, but have also a globular and much rougher stigma, standing high above the anthers. The stamens are short, the grains of pollen smaller and oblong in shape. The upper half of the tube of the corolla is more expanded; the number of seeds produced is smaller and the ovules larger. The plants tend to flower earlier than the short-styled specimens. Experiments made showed that the best results in the production of seed were obtained when pollen from the long filamented anthers was applied to the long-styled pistil, or when the short-styled pistil was fertilised by the long filamented anthers, whilst the fertilisation of the short pistil with the long stamen, or of the long pistil with the short stamen, resulted in complete fertility. Similar phenomena are presented by other species of the Primulacæ, and it may be remarked that the Primulacæ generally have produced a large number of hybrid forms; the oxlip, for example, being a hybrid between the cowslip and the primrose, which are both good and true species. Mr. Darwin enumerates the following points, as being those by which

the hybrid origin of a plant in a state of nature can be recognised: first by its occurrence only where both its presumed parent species exist, or have recently existed; secondly, the supposed hybrid plant being nearly intermediate in character between the two parent species, and especially by its resembling hybrids artificially made between the same two species; thirdly, by the supposed hybrids being more or less sterile when crossed *inter se*; and, lastly, by the supposed hybrids being much more fertile when crossed with either pure parent species than when crossed *inter se*, but still not so fully fertile as the parent species. The remarkable arrangements by which the flowers of the heterostyled dimorphic plant, *Linum perenne*, are constructed to facilitate fertilisation are next described, and Mr. Darwin takes occasion to point out the special adaptations that favour fertilisation by the wind instead of by insects, though the two agents are often mentioned together as equivalent in their action. "We see adaptation to the wind," he says, "in the incoherence of the pollen, in the inordinate quantity produced (as in the *Conferæ*, spinach, &c.), in the dangling anthers, well filled to shake out the pollen, in the absence or small size of the perianth, in the protrusion of the stigmas at the period of fertilisation, in the flowers being produced before they are hidden by the leaves, and in the stigmas being downy or plumose (as in the *Gramineæ*, docks, &c.) so as to secure the chance-blown grains. In plants which are fertilised by the wind the flowers do not secrete nectar; their pollen is too incoherent to be easily collected by insects; they have not bright-coloured corollas to serve as guides; and thus are not, as far as I have seen, visited by insects."

Other heterostyled dimorphic plants, the forms of the flowers of which are carefully described, and in many instances illustrated, by Mr. Darwin, are *Pulmonaria officinalis* and *angustifolia*, *Polygonum fagopyrum*, *Mitchella repens*, *Borreria*, and *Faramea*; and there are many mentioned less fully. The most remarkable peculiarities are, however, presented by certain members of the *Lythraceæ*, *Oxalidaceæ*, and *Pontederiaceæ*. In *Lythrum salicaria* there are no less than three different forms of females or female organs, and three sets of male organs, all as distinct from one another as if they belonged to different species. "Two of the three hermaphrodites must coexist, and pollen must be carried by insects reciprocally from one to the other, in order that either of the two should be fully fertile; but unless all these forms coexist, two sets of stamens will be wasted, and the organisation of the species as a whole will be incomplete. On the other hand, when all three hermaphrodites coexist, and pollen is carried from one to the other, the scheme is perfect; there is no waste of pollen and no false coaptation. In short, nature has ordained a most complex marriage arrangement—namely, a triple union between three hermaphrodites, each hermaphrodite being in its female organ quite distinct from the other two hermaphrodites, and partially distinct in its male organs, and each furnished with two sets of males." Very carefully-made drawings and details of observations made on specimens of the purple loosestrife follow.

It will be seen from the nature of this work that it is scarcely open to criticism, except such as may result from the repetition and modification of the experiments and observations made and detailed. We can only say that the results Mr. Darwin has obtained are, in many points of view, perfectly novel, and they are placed before the reader in a very attractive form. The present volume yields to none of its predecessors in the interest it will excite, not only amongst botanists, but amongst all those who are engaged in biological studies.