that the same is the case with the *Ceratium*? We have, however, at present, nothing more to put forward by way of argument in support of this hypothesis. The ovoid spores of the *Ceratium* increase very much in size, and become nearly spherical in germination; the germs themselves are thick, very obtuse, and send out little branches very rapidly.

Kerleano near Auray (Morbihan), December 1870.

Notes on a Species of *Disperis* found on the Kagaberg, South Africa. By J. P. Mansel Weale, B.A. Oxon. (Communicated by C. Darwin, Esq., F.R. & L.SS.)*

[Read November 3, 1870.]

This pretty little white and green flower is found in boggy places at the mouths of springs on the Kagaberg, in the months of February and March. As far as I am aware, no descriptions have been as yet published of the mode of fertilization of either the genus *Disperis* or *Corycium*; and as their structure offers many peculiarities strikingly divergent from the better-known genera of Orchideæ, I shall endeavour to describe the curious contrivances exhibited in this plant.

Each spike contains from 1 to 8 blossoms. The back sepal is adnate to the petals, and forms a very inflated dome-like galea having a very distinct keel-like crest. The two petals spread outwardly about halfway from their base, and are marked with green glandular ridges. They then lap forwards and taper upwards to a point like the opening to a tent. The two lateral sepals have each a short nectary about the centre of the blade, in front of, and at each side of the column.

The column forms, with the adnate labellum, a broad fluted pillar surmounted by a cup, whose long lip tapers upwards between the adhering apices of the two petals. On each side of the labellum project the two step-like processes of the rostellum considerably in front of the face of the flower.

Having thus described the general aspect of the flower, a more

* [This and the three following papers by Mr. Weale were accompanied by drawings, which remain in the keeping of the Society, and which may be consulted by any one who may wish to make a special study of the subjects referred to.—Sec. L.S.]

minute account of its separate parts will be requisite for a complete understanding of its structure and the adaptation of its parts. Viewed laterally, the labellum presents in its front part a deep cup, the lip of which curves upwards at almost a right angle to the posterior portion, in such a manner that no insect could possibly reach its interior from the front—a difficulty which is increased by the outspread edges of the middle portion of the petals. Behind, the two sides of the cup rise backwards to a level with the top of the lip, and then spread behind and over the anther in an elongated somewhat oval appendage. On each side of the centre of the labellum two large membranous shield-like expansions, convex anteriorly and concave posteriorly, spread out and completely envelope the pollinia. The two narrow transverse divaricate stigmas, close to, immediately behind and on each side of the cup of the labellum, lie on the fleshy base of these expansions, while immediately in front of them project the legs of the step-like rostellar processes.

I will describe the relative situation of the anther and rostellum, on the supposition that the face of the flower is placed vertically—a position, however, which it does not assume in nature. The two steps of the rostellum would then lie in a plane parallel to the face of the flower, and nearly at right angles to the legs. The legs, again, would be placed at right angles to the pollen-masses; and as the long slender caudicle follows the direction of the leg-like processes, it is evident that in its natural position it is doubly bent, somewhat like a reversed S or a Z. The foot or step of the rostellum is broad in front and tapers behind, somewhat like an isosceles triangle with rounded angles. The membranous edges curve slightly inwards, and resemble a lady's stirrup with very broad toes.

Each is curved slightly outwards; and the edges of its membrane are also curled in, to retain the caudicle in its place. The viscid disk is an elongated thin membrane of nearly the same shape as the stirrup or step, and viscid on its upper surface; the caudicle arises from its narrow inner edge.

I examined this flower for some time before I could make out how it could possibly be fertilized by an insect; and the difficulty was increased by my holding the flower vertically as above described. In nature the flower is bent down in a nearly horizontal position; the blades of the two sepals extend, on the contrary, in nearly opposite planes.

Let us suppose an insect to visit these flowers, as is proved by the fact of their producing numerous fertile capsules. It would most probably alight on the lateral sepals and suck some nectar from their little nectaries. It would then probably try to reach the cup-like labellum in the interior of the flower, in order to drink the more copious supply of nectar which lies in the cup.

If it crawled up towards the base of the sepals, it would probably, unless very small, find no footing on the narrow blade, nor could it enter the galea at this point, as the petals, as before stated, taper away to their junction with the broad fluted column and labellum which fill up the whole of the centre of the galea.

The stirrup-like processes of the rostellum, however, stand out; and their broad feet would form a convenient landing-place especially suitable for a small Hymenopter or Dipter. In trying to enter thence the two chambers which open on either side of the labellum, its feet would stick to the viscid disk, and the long elastic caudicle would prevent its forward progress. In trying to rid itself of the incumbrance it would doubless withdraw the pollinium or pollinia; and were it again to attempt an entrance, their projecting faces would strike against the column and prevent ingress. Under these circumstances the insect would probably fly away to another flower, and whilst doing so, the pollinia would assume another position. In about a minute after removal the caudicle bends backwards, so that the pollen-mass lies above and behind the front part of the long viscid disk. Were the insect to alight then on a plant whose pollinia had already been withdrawn, it could easily enter the lateral chambers already mentioned, and could thence reach the nectar through the hollowed sides of the cup. In turning round to do this, the pollen-grains would almost certainly become attached to the stigma; or, as they adhere together but slightly, some would be knocked off against the dome, and would almost certainly fall on the stigma.

I tried to fertilize this plant artificially by inserting a needle; but it was only by a good deal of awkward twisting that its fertilization could thus be effected; and the utility of the movement of the caudicle was not apparent, as it was almost as easy to do it before the contraction had taken place. At the same time it was evident that no insect of considerable size could enter the side chamber; and I presume the fertilization is

effected by some of the small bees or beetles which frequent flowers.

The position of the two viscid disks (which are so prominently situated, and which have their upper surface viscid, instead of the under surface as is usually the case in Orchids) shows plainly their office as steps to the forum of the galeatic chamber, one to each receptacle.

This is the only instance that I know of amongst Orchideæ in which the adaptation suggests that the tarsi of insects are the agents of fertilization, although in Asclepiads this would appear to be in some instances the normal method.

Some Observations on the Fertilization of *Disa macrantha*.

By J. P. Mansel Weale, B.A. Oxon. (Communicated by C. Darwin, Esq., F.R. & L.SS.)

[Read November 23, 1870.]

The diminution in size and simplicity of structure of the labellum in some species of the genus *Disa* would seem to indicate its little service as an attractor of insects and as a necessary appendage to the fertilization of the flowers, its office being replaced by the large and often gaily-coloured posterior sepal.

In the adjoining genus *Brownleea*, this reduction is so considerable, that it may be said to be in a merely rudimentary condition, and to have altogether lost the important function it usually holds in the order. Compared with some species of *Disa*, it is comparatively large in *D. macrantha*; certainly it is in relative proportions to *D. grandiflora*.

The back spurred sepal is, on the other hand, proportionally large.

The two lateral sepals, the petals, and labellum spread outwardly from the column, so as to form a salver-like opening to the funnel-shaped posterior sepal.

The colour of the blossom varies much, from nearly pure white with a few pale mauve spots on the petals and labellum, to a bright rich purple; sometimes the spots are small and indistinct, sometimes in large blotches, scarlet and almost orange.

It emits, especially towards night, an overpowering, heavy perfume, almost too strong to be agreeable.