be the magnificent grounds by which the Palace will be surrounded, including capacious conservatories, in which the most attractive objects of the vegetable kingdom will be displayed. The promoters of the new Company have been singularly fortunate in obtaining possession of the Coburg Gardens, almost the only piece of ground within the city boundary suited for such a purpose. The progress of the city towards the south makes this situation peculiarly central and of easy access. The space available for the Palace and Grounds comprises an area of no less than sixteen acres.—(*Dublin Agricultural Review.*)

NEW BOOKS.

On the Various Contrivances by which British and Foreign Orchids are Fertilised by Insects, and on the Good Effects of Intercrossing. By CHARLES DARWIN, M.A., F.R.S., &c. London: Murray.

MANY people objected to Mr. Darwin's theory "on the origin of species," and "blamed him for propounding this doctrine" in the absence of sufficient facts to establish what he believes to be "apparently a universal law of nature, that organic beings require an occasional cross with another individual; or, which is almost the same thing, that no hermaphrodite fertilises itself for a perpetuity of generations." And this volume is written to prove that the learned author had not written what he could not have substantiated if he had had sufficient space in his first volume.

The reader, who takes an interest in this subject, may congratulate himself on the fortunate want of space in the first volume, for had Mr. Darwin attempted then to bring forward his authorities from the bosom of nature, he would probably have confined his matter to his own personal knowledge of how fertilisation is effected among our British Orchids only, a branch of the subject which, although highly interesting as a contribution to practical botany, would be of much less value to the gardener and garden amateur than that which "the force of circumstances" induced Mr. Darwin to place before them in this volume.

Mr. Darwin has included the whole order of Orchids in his marvellous grasp, and with his usual patience and research he has not only shown that all the species, with some few exceptions, through the complexity of their parts of fructification, must be artificially fertilised; but his examinations of these parts have enabled him to account satisfactorily for facts which had hitherto eluded all other botanists.

As an instance, we refer to our extract relative to Catasetum tridentatum. Mr. Darwin makes it self-evident that Orchids cannot be fertilised even by their own pollen without artificial assistance; that moths and other insects are the natural agents in the work; that few of the flowers can have their own pollen; and that the natural contrivances for assisting fertilisation, and for preventing self-fertility, so to speak, are of vast variety, and of the most complicated construction. Parts and processes which have been hitherto considered useless, or as stumbling-blocks to the student of botany, have been here explained by our author as necessary appendages for some share in the great aim and end of flowers—the fertility of the seeds.

Here another and a very different student will find abundance of fertilising matter for the mind—find the whole secret of the apparatus by which he can fertilise his Orchids under his own roof and eye, and learn more clearly the botanical construction of the parts, from the woodcuts in the book, than from any other source, or all the sources we know put together.

As a contribution of the very highest order to the practical attainment of seeding foreign Orchids, we would recommend the work, apart from all speculations about the origin and progress of the clothing of our planet.

"At Torquay I watched a number of these flowers (Spiranthes autumnalis) growing together for about half an hour, and saw three humble bees of two kinds visit them. I caught one and examined its proboscis; on the superior lamina, some little way from the tip, two perfect pollinia were attached, and three other boat-formed discs without pollen; so that this bee had removed the pollinia from five flowers, and had probably left the pollen of three of them on the stigmas of other flowers. The next day I watched the same flowers for a quarter of an hour, and caught another humble bee at work; one perfect pollinium and four boat-formed discs adhered to its proboscis, one on the top of the other, showing how exactly the same part had each time touched the rostellum.

"The bees always alighted at the bottom of the spike, and, crawling spirally up it, sucked one flower after the other. I believe humble bees generally act thus when visiting a dense spike of flowers, as it is most convenient for them; in the same manner as a woodpecker always climbs up a tree in search of insects. This seems a most insignificant observation; but see the result. In the early morning, when the bee starts on her rounds, let us suppose that she alighted on the summit of the spike; she would surely extract the pollinia from the uppermost and last-opened flowers; but when visiting the next succeeding flower, of which the labellum in all probability would not as yet have moved from the column (for this is slowly and very gradually effected), the pollen-masses would often be brushed off her proboscis and be wasted. But Nature suffers no such waste. The bee goes first to the lowest flower, and, crawling spirally up the spike, effects nothing on the first spike which she visits till she reaches the upper flowers, then she withdraws the pollinia; she soon flies to another plant, and, alighting on the lowest and oldest flower, into which there will be a wide passage from the greater reflexion of the labellum, the pollinia will strike the protuberant stigma; if the stigma of the lowest flower has already been fully fertilised, little or no pollen will be left on its dried surface; but on the next succeeding flower, of which the stigma is viscid, large sheets of pollen will be left. Then as soon as the bee arrives near the summit of the spike she will again withdraw fresh pollinia, will fly to the lower flowers on another plant, and fertilise them; and thus, as she goes her rounds and adds to her store of honey, she will continually fertilise fresh flowers and perpetuate the race of our autumnal Spiranthes, which will yield honey to future generations of bees."

"The position of the antennæ in Catasetum tridentatum may be compared with that of a man with his left arm raised and bent so that his hand stands in front of his chest, and with his right arm crossed lower down so that the fingers project just beyond his left side. In Catasetum callosum both arms are held lower down, and are extended symmetrically. In C. saccatum the left arm is bowed and held in front, as in the C. tridentatum, but rather lower down; whilst the right arm hangs down almost paralysed, with the hand turned a little outwards. In every case notice will be given in an admirable manner, when an insect visits the labellum, and the time has at last arrived for the ejection of the pollinium, and for its transportal to the female plant.

"Catasetum tridentatum is interesting under another point of view. Botanists were astonished when Sir R. Schomburgk* stated that he had seen three forms, believed to constitute three distinct genera—namely, Catasetum tridentatum, Monachanthus viridis, and Myanthus barbatus, all growing on the same plant. Lindley remarked† that "such cases shake to the foundation all our ideas of the stability of genera and species." Sir R. Schomburgk affirms that he has seen hundreds of plants of the C. tridentatum in Essequibo without ever finding one specimen with seeds,‡ but that he was surprised at the gigantic seed-vessels of the Monachanthus; and he correctly remarks that 'here we have traces of sexual difference in Orchideous flowers.'

"From these several facts—namely, the shortness, smoothness, and narrowness of the ovarium, the shortness of the ovule-bearing cords, the state of the ovules themselves, the stigmatic surface not being viscid, the empty condition of the utricali, and from Sir R. Schomburgk never having seen C. tridentatum producing seed in its native home, we may confidently look at this species, as well as the other two species of Catasetum, as male plants."

ENTOMOLOGICAL SOCIETY'S MEETING.

THE May Meeting of the Entomological Society was well attended, the President, F. Smith, Esq., being in the chair. George Robert Gray, Esq., the distinguished ornithologist of the British Museum, and Rev. Messrs. T. H. Browne and A. Haward were elected members of the Society. The President announced that the first part of the new series of the Society's "Transactions" was ready for distribution, and that it contained a general index to the previous series, a catalogue of which had been found to be a great desideratum. A vacancy in the Council, caused by the resignation of Dr. Knaggs, was announced, and that it was proposed to be filled up by the election of Mr. Stainton at the next meeting.

Professor Westwood exhibited a box containing an extensive series of illustrations of the natural history of various species of British insects which had been formed and recently presented to the University Museum of Oxford by Mr. S. Stone, of Brighthampton. Amongst them were beautiful specimens of Acronycta Alui, one of which had been reared in February last; several species of Beetles belonging to the genera Malachius, Dasytes, and Anaspis, reared from mined twigs, as well as various fossorial Hymenoptera obtained from similar situations; the eggs, pupæ, and imago of Volucella pellucens, reared as parasites in the nest of the common Wasp, as well as specimens of the Anomalon Vesparum from the comb of the Wasp, some of which had remained three years before arriving at perfection; likewise several

* "Transactions of the Linnæan Society," vol. xvii., p. 522. Another account by Dr. Lindley has appeared in the "Botanical Register," fol. 1951, of a distinct species of Myanthus and Monachanthus appearing in the same scape: he alludes also to other cases. Some of the flowers were in an intermediate condition, which is not surprising, seeing that in dioecious plants we sometimes have a partial resumption of the characters of both sexes. Mr. Rodgers, of Riverhill, informs me that he imported from Demerara a Myanthus, but that when it flowered a second time it was metamorphosed into a Catasetum. Dr. Carpenter ("Comparative Physiology," 4th edit., p. 633), alludes to an analogous case which occurred at Bristol.

† The "Vegetable Kingdom," 1853, p. 176.

‡ Brongniart states ("Bull. de la Soc. Bot. de France," tom. ii., 1855, p. 20) that M. Neumann, a skilful fertiliser of Orchids, could never succeed in fertilising Catasetum.