we ask, why have the two sexes been developed? Mr. Darwin finds the answer in the fact that the offspring of two distinct parents, especially if descended from stocks exposed to somewhat dissimilar conditions, have an advantage in vigour over the progeny of a single self-fertilised individual. But if, as appears probable, the sexes were primordially separate, why did they become blended into hermaphrodite forms, and why—in all the higher animals and in some plants—have the sexes again been separated? The bilateral structure of animals, as Mr. Darwin suggests, perhaps indicates that they were aboriginally formed by the fusion of two individuals. In connection with this subject we have had occasion to refer to certain curious cases of bilateral hermaphroditism found among moths, where one wing, antenna, &c., bear the characters of the male, whilst the other side is as plainly female. But we have vainly sought for any analogous instance either among other insects or among birds and mammals.

The whole tendency of these researches, when calmly and impartially weighed, must be to shake the confidence commonly felt in the primordially distinct character of "species" as compared with mere varieties. The difference in the affinities of the sexual elements of different species, on which their mutual incapacity for breeding together depends, is caused by their having been habituated for a very long period each to its own conditions and to the sexual elements having thus acquired firmly fixed affinities."

The Various Contrivances by which Orchids are Fertilised by Insects. By CHARLES DARWIN, F.R.S. Second Edition, Revised. London: John Murray.

THIS work is already too widely and too favourably known to require examination or comment. The present edition has been, as the author informs us, enriched with many new and curious facts communicated by correspondents in different parts of the world, among whom especial mention is made of Dr. Fritz Müller. A few errors have also been corrected. We cannot help regarding it as a somewhat unfortunate omission that the author has not given a list of the additions and modifications introduced into the present edition. It must, however, be distinctly understood that the alterations thus made are far from invalidating the conclusions reached in the former edition. A list is appended of all the memoirs and books bearing on the fertilisation of the Orchideæ which have appeared since the first appearance of the present work, in 1862. It is somewhat singular that, whilst the botanists of England, America, Germany, and Italy have laboured diligently in the investigation of this

interesting question, those of France still hold aloof, and contribute nothing towards the solution of the problems here stated or suggested. For instance, it may well be asked why, in spite of all the wonderful contrivances for fertilisation which we are compelled to recognise, so few of the seeds of the Orchids are really productive? According to Mr. Scott a single plant of an *Acropera* may sometimes yield seventy-four millions of seeds. In a single capsule of a *Maxillaria* Fritz Müller found 1,756,440 seeds. Yet some unknown cause checks their multiplication, so that, despite the astonishing number of their seeds, they are as a rule sparingly distributed. In no country is the number of individuals of any one species nearly so great as that of very many other and far less prolific plants.

The following fact deserves to be seriously considered by all who are engaged in experimenting on the part played by insects in the fertilisation of plants. According, namely, to Mr. Moggridge, "*Ophrys scolopax* fertilises itself freely in one district of Southern France without the aid of insects, and is completely sterile without such aid in another district."

The seventh chapter of the book, treating of the fertilisation of the *Catasetidæ*, is strangely suggestive. The flowers of the male plant, if touched at certain definite points by an insect, shoot forth their pollinia, which, being furnished with excessively adhesive points, cling to the intruder, and are by him carried to a female plant. If this is mere automatism, where in the organic world are we to draw a sharp boundary line between such mere mechanical action and the "instinctive" performances of the lower animals, or even of man? But if there be nothing automatic in the latter, can we venture to deny that the plant may also have its instincts, and even its dim self-consciousness? What if the old myth of the hamadryads foreshadowed a great truth?