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., &c. London: John Murray.

This volume may be regarded as supplementary to Mr. Darwin's work "On the Origin of Species." It deals with a subject closely related to the theme of that book, and yet differing from it in such a manner that the two could not have been blent together in one discussion without disadvantage. We cannot enter at length into the reasonings of the author, the treatment of the subject is far too scientific and technical to be disposed of in a short paragraph written for the eye of the general reader. Whilst we abstain from criticism on the logic of the treatise, we cannot, however, deny ourselves the pleasure of noticing the new world of observation and experiment it reveals to the lover of nature. Sir Charles Bell has scarcely discovered higher proofs of the exquisite adaptation of the animal organisation to its circumstances and conditions than has Mr. Darwin in the vegetable economy. It is a pity that our distinguished naturalists will persist in drawing marked distinctions between those who ascribe the adaptation of organs and organisations to the operation of secondary laws, and those who attribute every act of formative life to the direct interposition of the Creator. We venture to aver that it would be impossible to find anyone who thinks that the whole process of germination, growth, activity, nutrition, and reproduction constitutes a direct act of creation. All that is meant in general by the language of those who believe that God presides over the whole creation is that everything depends ultimately upon Him, whatever agency He may choose to employ, and that if His fingers have not literally moulded the wonders of structure which Mr. Darwin describes, their design proceeded from Him, and was carried into effect by secondary laws established by Him. The distinction, we apprehend, which Mr. Darwin hints at, though he hesitates to point it out, is that between persons who rest altogether in secondary causes, and wish to reject a first cause, who are satisfied with what is most negligently and vaguely called the laws of nature, and care nothing for the law-giver of nature. To such

as the latter Mr. Darwin's book will lose its chief significancy, the beautiful illustrations it contains of the provident care with which the Creator watches over the offspring of His power, will, in their contemplation, sink into mere examples of the blind impulses with which unconscious life thrusts and pushes itself, retracts, and shrinks until it is fitted for the circumstances in which it may chance to be placed. The plainly recorded intention in all the contrivances by which life is sustained and reproduced will be but so many additional examples of the manner in which dead matter can of itself become organised and fitted for life. This volume brings very vividly before the mind the correlation of two departments of creation which we have been taught to regard as marked off from each other by an impassable gulf. We could not imagine a wider chasm between reason in its highest manifestations and instinct than exists between instinct and the still life of the vegetable world. However, as Dr. Lankester has recently shown how dependent man is upon beasts, so now Mr. Darwin shows that a large and interesting section of the vegetable kingdom is dependent for its existence upon the instinct of certain insects. The theory of the book is that self-fertilising plants cannot continue reproductive indefinitely, that a cross is necessary to revive the impaired energy of reproduction, and that without it the race or species must in time perish and disappear. The orchids are preserved from this fate by the intervention of certain moths which carry the pollen from one flower to another, and in their efforts to drain the nectaries of the flowers deposit the pollen of the one upon the viscia stigmata of another. This is explained with a picturesque simplicity of style which is very charming, and the explanations are aided by carefully-executed engravings of the flowers and their parts in various views and sections. We cannot imagine a more delightful study for the young than that which Mr. Darwin proposes in this volume, nor one the results of which, if properly estimated, would more amply repay the time spent over it. Of course our author never omits an opportunity of enforcing his grand idea of the origin of species by natural selection in the struggle for life; and whether we can agree with him or not in the doctrine that true species may arise from the development of special adaptations to circumstances, we must admit that he has proved the power of circumstances to originate very distinct varieties of the same species. A remarkable proof of the action and reaction of the insect upon the vegetable world will be found in the fifth chapter of the volume before us, where the author investigates a most extraordinary contest between the proboscis of a certain large moth and the nectary of the Angraecum of Madagascar as to which should grow longest. Mr. Darwin assigns the palm of victory to the vegetable, but it seems to us that it is a drawn battle; for although the Angraecum flourishes and has immensely long nectaries, the moth flourishes also and robs these nectaries of the last drop of their treasure. Though the book is far too technical for popular use, it is written so modestly and with such evident love of nature that we doubt not it will, besides being a welcome addition to the library of the naturalist, induce many to take up the study for the first time.