is also interesting. Thus there are 304 endemic species, 232 Mascarene species, *i.e.*, plants confined to Bourbon, Mauritius, Madagascar, and the Comoros; 66 African but not Asian, 86 Asian but not African; 145 common to Asia and Africa; and 225 common to the Old and New World. If we take the percentages we have the following results:—29 per cent. endemic, 22 per cent. Mascarene, 21 per cent. common to the Old and New World, 14 per cent. common to Asia and Africa, 8 per cent. Asian but not African, and 6 per cent. African but not Asian. From this it is evident that one-half of the wild plants of the flora are restricted to the Mascarene Archipelago.

The orders containing the greatest number of species are the following:—Orchidaceæ, 79; Gramineæ, 69; Cyperaceæ, 62; Rubiaceæ, 57; Euphorbiaceæ, 45; Compositæ, 43; Leguminosæ, 41; Myrtaceæ, 20. There also 168 species of Filices, but it is rather unfair to consider the Filices as an order equivalent say to the Euphorbiaceæ or Myrtaceæ in the above enumeration.

The descriptive part of the flora is elaborated in the same manner as the colonial floras already published, and is, as already mentioned, almost entirely the work of Mr. Baker, with the exception of the Orchids, Palms, and Pandani. Any one acquainted with Mr. Baker's work will know that any detailed notice of the descriptive part of the present volume is superfluous.

W. R. McNAB

OUR BOOK SHELF

Die Geologie. Franz Ritter von Hauer. (Vienna: A Holder, 1877.)

IT is a good sign both of the progress of geological study in Austria and of the value of this manual by the director of the Austrian Geological Survey, that a second edition of the work has been called for within three years of the date of its publication. A sample of the revised issue which has been sent to us fully bears out the description on its title-page that it is enlarged and improved. The original work, besides its clearly-expressed introductory chapters on general dynamical and mineralogical geology, is especially a valuable repertory of information regarding the structure and palæontology of the Austro-Hungarian monarchy. In the new edition, Ritter von Hauer is evidently doing his best to keep his manual abreast of the time. The book is well-printed, but the author is still in the hands of a very poor wood-engraver. The new cuts are as rude and feeble as ever.

LETTERS TO THE EDITOR

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts. No notice is taken of anonymous communications.*

The Editor urgently requests correspondents to keep their letters as short as possible. The pressure on his space is so great that it is impossible otherwise to ensure the appearance even of communications containing interesting and novel facts.]

Fritz Müller on Flowers and Insects

THE enclosed letter from that excellent observer, Fritz Müller, contains some miscellaneous observations on certain plants and insects of South Brazil, which are so new and curious that they will probably interest your naturalist readers. With respect to his case of bees getting their abdomens dusted with pollen while gnawing the glands on the calyx of one of the Malpighiaceæ, and thus effecting the cross-fertilisation of the flowers, I will remark that this case is closely analogous to that of Coronilla recorded by Mr. Farrer in your journal some years ago, in which parts of the flowers have been greatly modified, so that bees may act as fertilisers while sucking the secretion on the outside of the calyx. The case is interesting in another way. My son Francis has shown that the food-bodies of the Bull's-horn Acacia, which are consumed by the ants that protect the tree from its enemies (as described by Mr. Belt), consist of modified glands; and he suggests that aboriginally the ants licked a secretion from the glands, but that at a subsequent period the glands were rendered more nutritious and attractive by the retention of the secretion and other changes, and that they were then devoured by the ants. But my son could advance no case of glands being thus gnawed or devoured by insects, and here we have an example.

With respect to *Solanum palinacanthum*, which bears two kinds of flowers on the same plant, one with a long style and large stigma, the other with a short style and small stigma, I think more evidence is requisite before this species can be considered as truly heterostyled, for I find that the pollen-grains from the two forms do not differ in diameter. Theoretically it would be a great anomaly if flowers on the same plant were functionally heterostyled, for this structure is evidently adapted to insure the cross-fertilisation of distinct plants. Is it not more probable that the case is merely one of the same plant bearing male flowers through partial abortion, together with the original hermaphrodite flowers? Fritz Müller justly expresses surprise at Mr. Leggett's suspicion that the difference in length of the pistil in the flowers of *Pontederia cordata* of the United States is due to difference of age; but since the publication of my book Mr. Leggett has fully admitted, in the *Bulletin* of the Torrey Botanical Club, that this species is truly heterostyled and trimorphic. The last point on which I wish to remark is the difference between the males and females of certain butterflies in the neuration of the wings, and in the presence of tufts of peculiarly-formed scales. An American naturalist has recently advanced this case as one that cannot possibly be accounted for by sexual selection. Consequently, Fritz Müller's observations which have been published in full in a recent number of *Kosmos*, are to me highly interesting, and in themselves highly remarkable.

CHARLES DARWIN

Down, Beckenham, Kent, November 21

YOU mention ("Different Forms of Flowers," page 331), the deficiency of glands on the calyx of the cleistogamic flowers of several Malpighiaceæ, suggesting, in accordance with Kerner's views, that this deficiency may be accounted for by the cleistogamic flowers not requiring any protection from crawling insects. Now I have some doubt whether the glands of the calyx of the Malpighiaceæ serve at all as a protection. At least, in the one species, the fertilisation of which I have very often witnessed, they do not. This species, *Bunchosia gaudichaudiana*, is regularly visited by several bees belonging to the genera Tetrapedia and Epicharis. These bees sit down on the flowers gnawing the glands on the outside of the calyx, and in doing so the under side of their body is dusted with pollen, by which, afterwards, other flowers are fertilised.

There are here some species of Solanum (for instance *S. palinacanthum*) bearing on the same plant long-styled and short-styled flowers. The short-styled have papillæ on the stigma and apparently normal ovules in the ovary, but notwithstanding they are male in function, for they are exclusively visited by pollen-gathering bees (Melipona, Euglossa, Augochlora, Megacilissa, Eophila, n. g., and others), and these would probably never insert their proboscis between the stamens.

In a few months I hope to be able to send you seeds of our white-flowered violet with subterranean cleistogamic flowers. I was surprised at finding that on the Sèrra (about 1,100 metres above the sea) this violet produced abundant normal fruits as well as subterranean ones, while at the foot of the Sèrra, though