

uninterruptedly from the north-east, with an occasional storm from the south; and he was willing to admit that these storms might possibly account for the slight African element in the fauna; but the large number of Mediterranean types could not, in his opinion, have originated from atmospheric causes. Floating timber, and human agency, especially the introduction of plants from Europe, and from one island into another, no doubt played a not inconsiderable part both in the character of the fauna as a whole and in its details.

A lengthened discussion followed the reading of this paper, in which the President, Mr. Bates and Mr. Murray, who was present as a visitor, took part.

Mr. Bates considered that Mr. Wollaston had adduced no new facts calculated to convert those who do not believe that the present community of species in these islands is to be explained by former land-connection, *inter se*, and with south-western Europe. Mr. Wollaston had not endeavoured to meet the objection to his theory, raised by Sir C. Lyell in his 'Principles of Geology,' *viz.*, that the Atlantic Islands, and especially the Azores, are separated from the continent of Europe by a sea of from 10,000 to 15,000 feet in depth. It was pretty generally acknowledged that all great geological changes were extremely slow in their operation, and this being the case, a land-depression of that magnitude must have occupied a length of time that could only be measured by geological epochs; in fact, would throw back the operation to a period probably prior to the origin of the now existing insect fauna of the islands. It was not in accordance with the present state of Science to call to our aid the idea of "great catastrophes," or if that course be adopted, we should be prepared with facts in support of the theory.

Mr. Murray agreed with Mr. Bates with regard to his remarks on "great catastrophes," and thought Mr. Wollaston in that respect had chosen a wrong position; but he did not agree with him in his estimate of the length of time necessary for the operation of great geological changes. Fossil shells, &c., from Solenhofen were referrible to recent genera, and Prof. Heer had identified the fossil plants of the miocene of Madeira with genera now existing there. Furthermore, it was known that *Cardium edule* was found in a fossil state in the Aralo-Caspian region and in the Sahara, and he thought the elevation demonstrated by this fact was not opposed to the idea of a corresponding depression in the Atlantic. The great objection to his mind, to the theory of population by atmospheric means, was the remarkable homogeneity of form in the fauna of the various groups. If the fauna were derived from atmospheric agencies there would not be this community of form. As a proof of this he would cite Keeling Island, which has an insect-fauna of nineteen species, belonging to almost as many orders.

Mr. Bates could not consider the argument of the existence of *Cardium edule* in the Aralo-Caspian basin as of much weight, it not proving the operation of great elevation within a comparatively recent period, the district in question being still eighty-three feet below the sea-level.

The President said it was impossible with him to overcome the geological difficulty in the way of a supposed former land-connection; for though he could readily believe in great elevation or depression, either continuous or alternate, yet it was a generally received opinion that the great depths between these islands and the continent of Europe had existed since the secondary period. The example of Keeling Island, as noticed by Mr. Murray, was of little importance, because, being a coral island, it was of very recent date, and, as there was little variety of vegetation, it was impossible for the insects to show great increase; but, let the island become more elevated, and its flora more varied, then its few involuntary insect immigrants would each become the nucleus of a group of generic forms. Mr. Murray had not explained the greatest objection to Mr. Wollaston's theory, the wonderful absence in the Atlantic Islands of indigenous mammals and reptiles, which, if the islands be the remnants of a once-existing continent, ought certainly to be represented; neither did he account for the absence of the apterous groups of bulky European heteromerous beetles, such as *Pimelia*, &c., an absence the more remarkable in the face of the fact that genera, and even species, of other families, become apterous in the islands, though they are winged in Europe.

In connection with the absence of mammals, Mr. Bates alluded to the almost total want of coprophagous beetles, a group very numerous in species in those parts of Europe that approach nearest to the Atlantic islands.

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3 April, 1871.

A. R. WALLACE, Esq., President, in the chair.

*Donations to the Library.*

The following donations were announced, and thanks voted to the donors:—‘Proceedings of the Royal Society,’ No. 126; presented by the Society. ‘The Zoologist’ for April; by the Editor. ‘The Entomologist’s Monthly Magazine’ for April; by the Editors. ‘Report of the Fruit-growers’ Association of Ontario for the year 1870;’ by the Association. ‘Exotic Butterflies,’ part 78; by W. W. Saunders, Esq. ‘Lepidoptera Exotica,’ part viii.; by Mr. Janson. ‘Die Alpenkäfer und die Eiszeit,’ by P. V. Gredler; by Mr. Müller.