

II.—A MONOGRAPH OF CHRISTMAS ISLAND (INDIAN OCEAN): PHYSICAL FEATURES AND GEOLOGY. By C. W. ANDREWS. With descriptions of the Fauna and Flora by numerous contributors. 8vo; pp. xiii, 337, 22 plates, 1 map, text illustrated. (London: printed by order of the Trustees of the British Museum, 1900.)

THE present work is the first monograph issued by the Trustees of the Natural History Branch of the British Museum dealing with the fauna and flora, the geology and palæontology, of a single geographical unit of the globe, and owes its inception to the advocacy of the Assistant-Secretary, Mr. Charles E. Fagan, F.R.G.S., who has, we learn, greatly interested himself in its publication.

The little island that forms the subject of this monograph lies to the south of Java, 190 miles from its shores, and must not be confused with its namesake in the Pacific Ocean.

This almost undisturbed little spot of land, 12 miles by 9, is now being opened up for commercial purposes, and it seemed desirable that before its primitive fauna and flora were ousted by man, a careful record of them should be made, whilst at the same time it appeared likely that its geological investigation would throw light on the origin of coral islands, of which it was manifestly one. Accordingly, Sir John Murray having agreed to provide the requisite funds, the Trustees of the British Museum granted the necessary leave of absence to Dr. C. W. Andrews, whose selection for the purpose of carrying out the investigation is seen by the present volume to have been most amply justified.¹

With the zoological and botanical results of the expedition, interesting and important though they be, we have nothing to do in these pages. The facts ascertained concerning the geological structure of the island show that it presents some important peculiarities, differentiating it from other oceanic islands, and difficult to explain. It is, in fact, the flat summit of a submarine mountain, whose steep slopes sink rapidly to a depth of over 14,000 feet below the sea. The summit of this mountain peak is formed of a succession of tertiary limestones ranging in age from the Eocene (or Oligocene) up to recent reef-deposits, with intercalations in the older beds of volcanic rocks.

The tertiary beds, especially the Miocene orbitoidal limestones, end abruptly on the coast in vertical cliffs, sometimes 250 feet high: they must therefore at one time have covered a far wider area, and have been reduced by peripheral faulting.

The principal volcanic rocks are the basalts and basic tuffs at the base of the Miocene limestone, separating it from the Eocene (or Oligocene) beds below, and the basalts and trachytes underlying the latter. These older eruptive rocks form the basis of the island, which basis Dr. Andrews considers "is almost certainly a volcanic

¹ We published some Notes of an expedition to Christmas Island by C. W. Andrews (reprinted from the author's paper read before the Royal Geographical Society, November 28, 1898) in the *GEOLOGICAL MAGAZINE*, Dec. IV, Vol. VI (1899), pp. 19-27.

peak." We venture to think, however, that this assertion, qualified though it be, is still rather stronger than the evidence.

Owing to the dolomitization and phosphatization of the limestones the palæontological collections were not rich. The few Molluscan remains obtained are described by Mr. R. B. Newton. The corals, which were more abundant, but still not in so satisfactory a condition as could be desired, were carefully worked out by Dr. Gregory, and include representatives of nineteen determinable species, of which eight are new. Their general character is typically Indo-Pacific.

The Foraminifera, of which the limestones, especially the Miocene (orbitoidal), are largely composed, had mainly to be studied from sections, and are reported on by those past masters of the subject, Professor T. Rupert Jones and Mr. F. Chapman, who have made their work as comprehensive as possible in the time, and hope at some future date to furnish further details. Unfortunately, beyond a "list of species of Orbitoides" there is no summary of the results set forth in the thirty-nine pages to which their report extends.

A "note on the composition of some dolomitic and other limestones" from the island, by Mr. E. W. Skeats, completes the geological matter in the monograph.

As regards the get-up of the work, we are glad to note that the print is better than in many Government publications with which we are acquainted, whilst the plates, although somewhat closely cut, are of the quality which we have become accustomed to expect in the publications of the British Museum. Concerning the views reproduced in the text, however, we prefer to be silent: our remarks might be considered libellous.

B. B. W.

III. — REPORT ON THE GREAT EARTHQUAKE OF JUNE 12TH, 1897.

By R. D. OLDHAM, A.R.S.M., F.G.S., Superintendent, Geological Survey of India. Mem. Geol. Survey of India, vol. xxix. (Calcutta, 1899.)

PHYSICAL geologists will with one accord be grateful to Mr. Oldham for his admirable report on the Indian earthquake of 1897. Chief among modern shocks, if not among all recorded shocks, the wonderful phenomena which it presented, and the wide area over which they were observed, combined to render the earthquake in every way remarkable and deserving of the most careful study. Fortunately, it was possible to give to it the attention which its exceptional character demanded. Four officers of the Indian Geological Survey were despatched to different parts of the area chiefly affected, and, about six months later, Mr. Oldham made as thorough an examination of the epicentral tract as his limited time and the impracticable nature of the country would allow. The results of all this labour are as important as they are novel and interesting; and those who have been engaged in similar work will be the first to recognize that we are here presented with a record report as well as a record earthquake.

The study of such an earthquake must have been an almost unalloyed pleasure to its investigator. There was no need to spend