shire. Mr. Carruthers has pronounced many of them to be forms which, though known on the Continent, had been hitherto almost unknown in this country.[1]]

(*To be concluded in our next Number.*)

NOTICES OF MEMOIRS.

ON THE GEOLOGY OF THE FÆRÖE ISLANDS. By JAMES GEIKIE, LL.D., F.R.S., ETC. [Trans. Roy. Soc. Edin. 1882, vol. xxx. part 1.]

IN this Memoir the author gives an account of observations made in company with Mr. Amund Helland of Christiania, during the year 1879; while at the same time he reviews the work done previously by other geologists and travellers. The islands are essentially volcanic; only two of them, Myggenæs and Suderöe, containing layers of clay, shale, and coal, intercalated with the basalts, which are the principal rocks. The coal (probably of Miocene age) occurs as more or less lenticular layers in beds of dark indurated clay and shale. The seams, therefore, are very inconstant, and thicken and thin out in the most irregular manner. Indeed, Dr. Geikie observes that it is not difficult to trace the passage from coal into shale—an appearance which, taken in connexion with the general aspect of the beds, is strongly suggestive of the aqueous formation of the coal-seams. He saw no traces of a true underclay, and nothing resembling rootlets.

The volcanic rocks consist of bedded basalts (chiefly anamesite) with layers of tuff, among which are sometimes intruded veins and sheets of basalt. This is the case in Suderöe, where the coal-bearing beds appear to have been lines of weakness, yielding more readily to the assaults of the intrusive basalt than the harder and less easily divided anamesites with which they are associated, for nowhere else in the island do such intrusive sheets occur.

Discussing the origin of the volcanic rocks, the author comes to the conclusion that they must have been erupted from a centre or centres, removed some distance from the site of the present islands—a conclusion which explains the absence of breccias and agglomerates, of lapilli and bombs.

The great series of basalt beds and tuffs (13,000 or 14,000 feet in thickness) most probably accumulated on the outskirts of an old volcanic area. They represent the heavier and more fluid lavas, derived from foci which most likely ejected other materials unable to reach distances attained by basalts.

There seems no reason to doubt that these igneous rocks belong to the same great series of which the basalt plateaux of Iceland, Greenland, Spitzbergen, and the Scottish Islands form separate portions, and which are referred to the Miocene period. The author gives an interesting sketch of the physical conditions under which the rocks of the Færöe Islands would seem to have been accumulated.

The principal object of his journey, however, was to examine the

[1] *Vide Midland Naturalist*, vol. iv. p. 122.

Glacial phenomena of the islands. Reminiscences of the "Great Ice Age" were met with on every island visited. Sometimes the striæ were finely preserved, at other times they were faint, and only the deeper ruts were conspicuous upon the smoothed faces; while in very many cases all the more delicate ice-markings had disappeared, and only the characteristic rounded and dome-shaped outlines remained.

The Till or Boulder-clay, not often so much as 15 feet in thickness, closely resembled the similar deposit which occurs in the hilly and mountainous districts of Scotland. It lay either upon low undulating grounds, or was closely packed together behind rocks, whose abraded and ice-worn faces were quite destitute of any such covering. All the stones and boulders in the Till were of local origin, and in the many exposures which were examined, no fragment which might not have been derived from the islands themselves was found. All consisted of basalt rocks and tuff, and chiefly of the former. This Till, in the author's opinion, represents the ground-moraine of the old ice-sheet that covered the islands.

All the little lakes, with one or two exceptions, were found to occupy true rock-basins, excavated by ice-action under varying conditions.

To many interesting matters we must but briefly allude under the headings of the "Origin of the Valleys and Fiords," "Atmospheric Erosion," "Former Greater Rainfall," "Marine Erosion," and lastly "Peat and Buried Trees"—all of which, besides other subjects, are treated more or less fully, according to the information he could gather, and always in the lucid and graphic style so characteristic of the author.

The memoir is illustrated by a map and three plates of sections.

REVIEWS.

The Swiss Palæontographical Society.

Monographie Paléontologique des Couches de la Zone à *Ammonites tenuilobatus* d'Oberbuchsitten et de Wangen (Soleure). Mem. de la Soc. Pal. Suisse, vol. vii. 1881.

THE indefatigable M. de Loriol has recently completed the above monograph, though it is not quite four years since there appeared a notice in the Geol. Mag. (Aug. 1878, p. 354) of a similar monograph by the same author of these very "Badener Schichten" as they occur in the adjoining Canton of Argovie.

At the risk of being charged with forcing an open door, M. de Loriol is not satisfied with a simple comparison of the zone in the two localities, such as mere statements or lists of fossils might convey; but he devotes a full palæontographical memoir to the subject, embracing about 87 species, many of which were amply figured and described in the previous monograph.

Fourteen fine quarto plates of fossils with text are given in the best style of the Swiss Palæontographical Society for the benefit of those who are not satisfied by a simple examination of the table