

NOTICES OF MEMOIRS.

JAMES THOMSON, F.G.S., ON A FOSSIL CORAL ATOLL ON THE SHORE LINE AT ARBIGLAND, NEAR DUMFRIES, SCOTLAND.

Abstract of paper read before the British Association, Southport Meeting, 1883.
(Section C, Geology.)

THE author briefly described the stratigraphical position of the rocks on either side of the Solway Frith, and stated that the centre of the Solway was a line of depression or fault, that the series of rocks to which he wished to refer belonged to the lower members of the marine series of the Carboniferous system. In all the sections that he had visited he found the beds dipping at various angles inwards and downward on either side of the Frith, and referred to the abundance of the coralline remains in many of the sections he had examined along the shore-line.

The rocks on the shore at Arbigland consist of Limestone bands belonging to the lower members of the Carboniferous Limestone Series. The lower bed is exposed along the shore-line as a linear reef for about two miles, and is largely composed of corals of several genera and species. The Limestone along the inner margin becomes more or less arenaceous, and passes into a calcareous shale, largely composed of marine exuviae. Imbedded in this shale are a series of dome-shaped masses of *Lithostrotion* of varied species. These beds are overlaid by another band of limestone, which is also composed of species of corals around the inner margin, the conditions are similar to those of the former beds, the dome-shaped masses also belong to the genus *Lithostrotion*, but belong to different species, and the matrix is largely composed of similar forms of coralline remains. The next reef becomes more or less circular, and is overlaid by a series of reefs, all more or less composed of coralline remains; the outer margins of the reefs recurve and present an open face to the south. Here the domes of coral assume gigantic proportions. While around the inner portion of this reef the domes are smaller on the whole, they vary from an inch up to eleven feet in diameter, and consist of many species. The series from this, inwards to the centre, consists of twelve successive reefs, all circular in outline, and composed of limestone with interstratified shale, all more or less made up of corals of varied genera and species. The inner of these reefs is circular and more conspicuous, and 240 feet in diameter, it passes from a compact limestone, made up of coralline remains, into an arenaceous shale, in which are imbedded numerous domes of corals and other marine exuviae, the centre of this circular reef is filled up with calcareous sandstone. The entire series of these semicircular and circular reefs is 2976 feet in diameter, and dipping at angles varying from 12° to 15° inwards and downwards, which, from calculation, implies that the water inside the original reef was about four hundred feet deep. A mile to the east there is another series of circular reefs; these, however, dip outwards, fold round and clasp a central mass. On the whole we thus have exposed

a series of conditions similar to the conditions of linear, and semi-circular reefs and Atolls of more recent times, and have reason to believe that the Atoll at Arbigland is unique. A more fully detailed description, with a list of both genera and species, will at no distant date be published.

REVIEWS.

EARTHQUAKE-PREDICTIONS.

- (1) M. J. Delauney. Nouveau principe de Météorologie fourni par l'examen des tremblements de terre. Comptes Rendus (Nov. 17, 1879), vol. lxxxix. pp. 844-5.
- (2) M. J. Delauney. Note relative aux indications formulées par lui, il y a quelques années, sur les époques probables des grands tremblements de terre. Comptes Rendus (Sept. 10, 1883), vol. xcvi. p. 609.
- (3) M. Faye. Sur certaines prédictions relatives aux tremblements de terre. Comptes Rendus (Sept. 17, 1883), vol. xcvi. pp. 620-3.
- (4) M. J. Delauney. Note sur les époques probables des tremblements de terre. Comptes Rendus (Sept. 24, 1883), vol. xcvi. pp. 699-700.
- (5) M. Daubrée. Sur l'insuffisance des relevés statistiques des tremblements de terre pour en tirer des prédictions. Comptes Rendus (Oct. 1, 1883), vol. xcvi. pp. 728-9.

“THE power of prediction,” says Prof. Judd, “is alike the crucial test and the crowning triumph of a scientific theory.” It may even, as in the case of eclipses, precede the accurate knowledge of the theory. M. Delauney has recently attempted another example of this curious inversion in his endeavour to point out certain years as more especially liable to seismic disturbances.

Towards the close of 1879, he presented a memoir to the French Academy, published in abstract as the first of the above-mentioned papers. His calculations were founded on the tables of earthquakes between 1750 and 1842, compiled by M. Alexis Perrey, and he points out that there are certain groups of years recurring at regular periods which are more than usually fruitful in earthquakes. Two of these groups have a period of 12 years each, one commencing in 1759, and the other in 1756. Two other groups have a period of 28 years each, the first commencing in 1756, the second in 1773. M. Delauney notices the approximate equality of these two periods with those of Jupiter and Saturn, which are about 11.9 and 29.5 years respectively, and remarks that the epochs of the maxima of the first two groups coincide with those when the planet Jupiter attains the mean longitudes of 265° and of 135° , whilst the epochs of the last two groups coincide with those when the planet Saturn attains the same mean longitudes. He concludes that “earthquakes appear to pass through a maximum when Jupiter and Saturn are found in the neighbourhoods of the mean longitudes of 265° and