

early age to the fossils of the Tertiary strata of the Hampshire Basin, of which he became a keen collector. He was employed for this purpose by the Marchioness of Hastings and by the Rev. Osmond Fisher, while in 1864 Professor Sedgwick appointed him Curator of the Woodwardian Museum, and this post he retained till his retirement in 1911. During these years he made frequent field expeditions and collected largely, not only from Tertiary strata, but also from other deposits, including the Olenellus beds of Shropshire. The magnificent collection of Tertiary fossils in the Sedgwick Museum owes much to his labours, and as a collector he was perhaps unrivalled.

But he was more than this. His eye for new species among the Tertiary fossils was unerring, and he contributed several papers to various scientific journals, chiefly on the Hampshire Basin, but also on Mesozoic deposits around Cambridge.

He was a sociable man and interested in many matters outside his own special domain. A few years ago he published a short autobiographical sketch entitled *Reminiscences of My Life*. This not only records the chief events of his career, but gives an insight into his character.

His son, Walter Keeping, who predeceased him by many years, was also a well-known geologist and palæontologist, and for some time was Professor of Geology at Aberystwyth.

Professor F. Omori.

BORN 1868.

DIED 8TH NOVEMBER, 1923.

For the last thirty years we have grown accustomed to the constant stream of papers from the full-stored mind of Professor F. Omori. Numerous as the papers were, there was not one of them that did not add to our knowledge of earthquakes and volcanic phenomena, and some of them have taken an honourable place among the contributions that seem likely to last for generations yet to come. Among these may be mentioned his memoirs on the after-shocks of earthquakes, a subject which he made his own, the distribution of Japanese earthquakes in time and space, and the remarkable eruptions of the Usu-san, Asama-yama, and Sakura-jima. In a country like Japan, and to one in his official position—he was Professor of Seismology and the leading member of the Imperial Earthquake Investigation Committee—it was only natural that he should give close attention to the vibrations of buildings and various engineering structures during earthquakes. One of his latest papers dealt with the effect of semi-destructive earthquakes on the new steel-brick buildings in Tokyo, and his conclusion that they might be trusted to withstand the fiercest shock was amply confirmed on 1st September last. On that day he was absent from Tokyo, but he returned shortly afterwards, and died on 8th November at the age of 55, after spending more

than half his life in the single-hearted pursuit of science and of kindly service to his fellow-men.

C. D.

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THE VOLCANIC GEOLOGY OF EAST FIFE.

SIR,—Mr. Balsillie is to be congratulated on his resolute tackling of the Carboniferous igneous rocks of Fifeshire. It may be permissible, however, at the same time, to express regret that in his latest paper¹ he has countenanced the idea of the Lower Carboniferous age of the East Fife vents on the basis of evidence obtained from one of the least typical of them.

Everyone must agree that the evidence Mr. Balsillie has marshalled is overwhelmingly in favour of the Lower Carboniferous age of the Largo Law vent. It is one of the largest of the Fife vents, very different in size from the small "greenhill" type of vent which appears to be characteristic of late-Carboniferous and Permian vulcanicity. It appears to resemble the great vent of the Heads of Ayr,² which is also demonstrably of Lower Carboniferous age, but which, unlike Largo Law, has not proceeded to eruption of lava. It is full of fragments of the subjacent Old Red Sandstone andesites, and not a single fragment of Lower Carboniferous lava has been found in spite of repeated search. Hence the small basic alkaline intrusions by which it is pierced are probably of much later age. There can hardly be any doubt but that the Heads of Ayr volcanic channel has been utilized by the recrudescing late-Carboniferous igneous activity. I would suggest that the similar intrusions in Largo Law are also possibly of later date than the main filling of the vent; and in this connexion it would be interesting to have a petrographical comparison of the unquestionably intercalated ash, agglomerate, and lava, with the material filling the volcanic orifice or orifices. Later agglomerate fillings may perhaps be distinguishable from earlier (e.g. the large blocks of earlier ash in the western vent of the Largo shore, Mr. Balsillie's paper, p. 541).

The argument for the late-Carboniferous or Permian age of many of the Fifeshire vents does not rest entirely on petrographical evidence; and the fact that analcite- and nepheline-bearing rocks occur in earlier stages of the Carboniferous igneous period has little bearing on the problem. Such rocks in similar age relations are found also in the Bathgate Hills and in the west, but clearly do not militate against the Permian age of the western vents of the Fife type. Many of the analcite-basalts and monchiquites, as well as teschenites, of East Lothian are stated in the East Lothian

¹ *GEOL. MAG.*, Vol. LX, 1923, pp. 530-42.

² *Trans. Geol. Soc. Glasgow*, vol. xvi, 1917-18, pt. iii, pp. 340-3.