

be briefly summed up as follows :—(1.) Investigations with regard to the origin of coal, which resulted in a much clearer understanding of the subject than had been current before his time. (2.) The establishment of the Laurentian system as a great series of crystalline rocks, divided into several groups, and containing at certain horizons evidences of organic life. (3.) The proof of the existence of a second series of crystalline stratified rocks (the Huronian) resting unconformably upon the Laurentian. (4.) The identification of the various formations of Canada younger than the Huronian, and the establishment of the fact that the inferior rocks of the Paleozoic series rest unconformably upon the Laurentian and Huronian. (5.) The production of a number of admirable geological maps, giving not only the results of his own explorations and those of his staff in Canada, but including the work accomplished by various geologists in the other British Provinces and in parts of the United States.¹

“Earnestness and singleness of purpose were amongst the most marked features of Sir William’s character. From the time that he began the Geological Survey until the day of his death, the great aim which was perpetually referred to, we would say that the perusal of the record of such a well-spent life ought to stimulate many to become desirous of emulating so noble a man. Of one thing we are sure, that out in the wilds, in many a distant and lonely spot, Logan’s memory is still warmly cherished by hundreds of Canada’s rough but warm-hearted children.”

We have to thank Professor Harrington for the interesting volume he has produced. If biographies were read more, but we fear that they are not frequently referred to, we would say that the perusal of the record of such a well-spent life ought to stimulate many to become desirous of emulating so noble a man. Of one thing we are sure, that out in the wilds, in many a distant and lonely spot, Logan’s memory is still warmly cherished by hundreds of Canada’s rough but warm-hearted children.

CORRESPONDENCE.

THE SCHISTS OF THE LIZARD DISTRICT.

SIR,—In Professor Lapworth’s third part of “The Secret of the Highlands,” he refers to an illustration in my paper on the Hornblendic and other Schists of the Lizard District (*Quart Journ. Geol. Soc.* 1883, pl. i. fig. 2,—the reference is incorrectly given by him) as evidencing a form of dislocation liable to be mistaken for false bedding. I feel bound, therefore (as it is implied that I have so mistaken it), to state that the specimen there figured (rather badly) was only a fragment broken off from a much larger surface of rock, and that I do not think it possible that the structure could be explained by any kind of corrugation or shifting whatever, but that it must be a record of original stratification. Corroborative instances could be found by the dozen in the Lizard district. I am perfectly well aware of the simulative structures referred to by Professor Lapworth, but can assure him, as the result of a rather extensive experience

¹ See obituary of Logan, *GEOLOGICAL MAGAZINE*, 1875, Decade II. Vol. II. p. 382.

among metamorphic rocks. that various structures, which can only be due to the deposition of the original materials, are by no means unfrequent, especially among the higher groups. But while thus defending myself from an implied charge of error, I am glad to take the opportunity of expressing my full concurrence in the general conclusions of these valuable papers. They contain a very lucid exposition of the principles on which mountain chains have been produced, and I expect that in the main the 'Secret of the Highlands' has been discovered. The analogies between the Highlands and the Alps are in many respects close; but their 'mountain making' belongs to very different epochs of geological time, so that they are in very different stages of their history. In each we have a great nucleus of Archæan rocks containing more than one group. In the Alps the next great period of deposit on record (I do not forget the Carboniferous strata of the west) was throughout the Mesozoic, continuing to the earlier Kainozoic. In the Highlands the corresponding period was the earlier Palæozoic. As the Alps became a mountain-chain in Pre-Miocene days, so did the Highlands in Pre-Devonian. There is also a close analogy between the Old Red Sandstone of the latter and the Nagelflue and Molasse of the former. Possibly we may even extend our comparison to the marginal volcanic deposits of the two; but be this as it may, there is I think little doubt that to interpret the Highlands as a greatly denuded mountain-chain is the most hopeful way out of the puzzles which their rocks afford.

T. G. BONNEY.

MR. WALLACE'S REPLY TO MR. T. MELLARD READE ON THE AGE OF THE EARTH.

SIR,—I have just received from Mr. T. Mellard Reade, F.G.S., a copy of his paper on the "Age of the Earth" (which appeared in your MAGAZINE of July last), in which I am asked to put that gentleman right as regards what he calls his "analysis" of some figures and estimates given in my "Island Life"; and I gladly seize the first opportunity of doing so. To avoid the necessity of repeating my own statements as well as those of Mr. Reade, I must ask the reader who is interested in this matter to refer back to the above-mentioned article.

The first statement of Mr. Reade's which I have to "put right" is the following:—"It is evident, if the figures mean anything at all, that three millions of square miles 177,200 feet thick represent the whole of the rock removed by denudation in all forms since the geological history of the earth began. Spread this over 57 million square miles of land and we get a deposit 9326 feet thick deposited in all geological time." This is not quite an accurate representation of my statements. The figures quoted represent, not the whole matter denuded, but only that portion of which a record still exists in the rocks; and this matter has been deposited, not "in all geological time," but only in that portion of geological time indicated by the known series of stratified rocks; unconformities and other breaks representing unknown intervals of which we have no