

an "adequate *vis a tergo*," and says: "That such a *vis a tergo* can only, in the case of such ice-sheets, be obtained by postulating a considerable slope to the ice surface is equally plain and equally admitted." Will Sir Henry H. Howorth kindly express the necessary slope to produce motion in degrees, and give the *yield-point* of ice by which this slope is controlled?

I would have answered Sir Henry H. Howorth before, but have been for a short tour in Switzerland with Mr. G. Fletcher, F.G.S. Shortly we hope to be able to put together some notes we then made on the structure of glacier ice. During our stay I was able to examine many of the larger glaciers, and also to reach the summit of Mont Blanc and compare true *névé* with true glacier ice.

R. M. DEELEY.

CHANGES IN OLD LAND-SURFACES AND COAST-LINES IN THE GLACIAL PERIOD.

SIR,—For some time past I have been attempting to represent, by coloured diagrams, the gradual changes of the level of the land above the sea, and the relative altitude of the Hills in the British Islands in Pleistocene times, and up to the present period. It was, in my opinion, a great and prolonged denudation which took place during the first Glacial epoch, and after the maximum of glaciation was reached, a period of land submergence was also effected, and then commenced a gradual emergence, in which a wearing away in depressed areas progressed by action of the sea, leaving high-level drifts on the surface of Chalk and other rock formations; but the channels which now divide the French and English coasts, and the Isle of Wight from the mainland of Hampshire, had not been cut, and did not prevent the migration of the terrestrial inhabitants, the temperature reverting to a condition similar to that now prevailing. The inter-Glacial period, which we now designate as Palæolithic and Prehistoric, ensued. It was a mild climate which then prevailed, and continued for about 15,000 years duration, when there existed a fauna composed of Elephants, Rhinoceroses, Hippopotami, Bison, Musk-Ox, Irish Deer, Elks, Red Deer, Beavers, Wild Boars, Bears, Cave Lions, Hyænas, and other Carnivora. These creatures ranged through vast forests of Oaks, Elms, Yews, Fir Trees, with peat-mosses separating Arctic plants beneath from a flora of warmer times above.

At this time a race of men appeared whose intelligence was sufficient to enable them to provide for their wants and to engrave figures of animals and make weapons of stone and bone. We find their relics in caves and under the shelter of rocks, which have resisted destruction during the subsequent submergence to which they were exposed, and which must have continued for a period of about 15,000 years.

An ice-sheet covered the land, whilst it was submerged, to the depth of many hundred feet, and of this we have records in Scandinavia, in Canada, and also on Snowdon.

A question here arises, whether the vast thickness and weight of such an incumbent mass of ice, was not the true cause of the submergence. A change in the centre of gravity of the globe's surface will explain this. The subsidence of the land may well be referred to, as it is by Professor Prestwich, as that of the cause of the Traditional Deluge. This Glacial epoch seems gradually to have ceased and then again commenced a gradual elevation of the surface of the land above the sea, its outline becoming changed and modified accordingly, as its submarine rock-formations would have been subject to it, until its condition eventually became such as we now see it, with marine channels separating the British Islands, the Isle of Wight, and others from the Continent of Europe.

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MISCELLANEOUS.

MANUAL OF THE GEOLOGY OF INDIA.—In the GEOLOGICAL MAGAZINE for August (*ante*, p. 375) attention was called to the omission of the names of Messrs. H. B. Medicott and W. T. Blanford, the authors of the Manual of the Geology of India, from the title-page of the new edition. We are gratified to learn that, the circumstance having been brought to the notice of the Government of India, orders have been given by the Government for a new title-page, with the names inserted to be substituted for that first issued.

INTERNATIONAL GEOLOGICAL CONGRESS, ZURICH.—At the instance of Captain Marshall Hall, the Geological Congress at Zurich decided upon appointing an International Committee to report upon existing glaciers. As soon as the constitution of this committee is completed we hope to give details of the work it is to be charged with and its members.

THE GEOLOGY OF SOUTH SHROPSHIRE.—Fifty-nine pages of the August Number of the Proceedings of the Geologists' Association are devoted to an admirable description of "The Geology of South Shropshire," by Prof. C. Lapworth, LL.D., F.R.S., and W. W. Watts, M.A., F.G.S., illustrated by twenty-three woodcuts and two plates. On this historic ground so many eminent geologists have laboured and so much has been published, that it is no small boon to Associates to be able to obtain, in so small a space, so excellent an epitome of this interesting and important British area. The illustrations embrace a good Map and a large number of sections, a capital table of the Lower Palæozoic rocks of Shropshire, with the subdivisions proposed by various authors from 1830 to 1894, viz.: Sedgwick, Murchison, the Geological Survey, Barrande, Lyell, Geikie, Barrois, Bigot, de Lapparent, Lapworth, Callaway, Hicks, Nicholson, etc. The Geologists' Association are to be congratulated upon securing for their Proceedings so valuable a contribution, which is also descriptive of the area that has formed the object of their long excursion this summer, from July 29th to August 4th.