

many valleys receding far into the Alps, were under water. He thought it impossible that the glacial detritus of the Rhone could ever have been carried to the Lake of Geneva, and beyond it by a glacier, or that so vast a body of ice issuing from one narrow valley could have spread its erratics over the low country of the Cantons of Vaud, Friburg, Berne, and Soleure, as well as the slopes of the Jura, comprising a region of about a hundred miles in breadth from south-west to north-east, as laid down in the map of Charpentier. He therefore imagined the granitic blocks to have been translated to the Jura by ice-floats when the intermediate country was submerged.\* It may be remarked that this theory, provided the water be assumed to have been salt or brackish, demands quite as great an oscillation in the level of the land as that on which Charpentier had speculated, the only difference being that the one hypothesis requires us to begin with a subsidence of 2,500 or 3,000 feet, and the other, with an elevation to the same amount. We should also remember that the crests or watersheds of the Alps and Jura are about eighty miles apart, and if once we suppose them to have been in movement during the glacial period, it is very probable that the movements at such a distance may not have been strictly uniform. If so, the Alps may have been relatively somewhat higher, which would greatly have facilitated the extension of Alpine glaciers to the flanks of the less elevated chain.

Five years before the publication of the memoir last mentioned, M. Guyot had brought forward a great body of new facts in support of the original doctrine of Charpentier, that the Alpine glaciers once reached as far as the Jura, and that they had deposited thereon a portion of their moraines.† The scope of his observations and argument was laid with

\* Quarterly Geological Journal, 1850, vol. vi. p. 65.

† Bulletin de la Société des Sciences Naturelles de Neuchâtel, 1845.