

of the Alps, and not before the upheaval, as Agassiz had assumed. The particular distribution of the transported blocks upon the slopes of the valleys, often in long lines, affords, in Charpentier's opinion, clear proof that river-valleys had already been eroded in the mountain-system before the glaciers made their descent to the plain. Neither does he agree with Agassiz that the Ice Age was the result of a universal fall of temperature over the earth associated with astronomical causes, but regards the climatic variations in the Alps, and the advance and greater dimensions of the glaciers, as local phenomena.

Although Agassiz and Charpentier differed in their general conclusions, both followed the true inductive method, and the leading principles which they established by their study of the Swiss glaciers have held their place in geological literature. The moraines and appearances produced by them had been treated by Agassiz with the fullest detail and the most brilliant results. But between 1840 and 1845 the glaciers themselves were made the chief subject of his investigation.

Provided with physical instruments and a boring apparatus, he went in 1840 to the Grimsel Hospice; on the median moraines of the Lower Aar Glacier he erected a primitive hut, the "Hôtel des Neuchâtelois," which he occupied together with his companions, E. Desor, C. Vogt, F. von Pourtalès, C. Nicolet, and H. de Coulon. Agassiz and Pourtalès undertook the meteorological observations and the investigations on the inner structure and movement of the glaciers. Vogt studied the microscopical fauna of the red snow, Nicolet the flora of the neighbourhood, Desor and Coulon the glacier appearances and the moraines. In the following years, Escher von der Linth, the Scotsman J. D. Forbes, the artist Burckhardt, and others, took part for a time in the work on the Aar glacier, and in the ascents of the Jungfrau, which were made under the care of the guide Leuthold.

The researches made from the hut were the first systematic observations on the movement of ice in the different parts of a glacier under the various diurnal and seasonal conditions, and on the temperature of the ice at different seasons, while the first facts regarding the thickness and internal structure of the ice were secured by means of borings.

While Agassiz and his band of enthusiastic workers were busy in the high levels, the lower valleys at the north and