

Tyrolese and Carinthian Alps were likewise buried under an icy covering which sent a huge glacier eastward down the valley of the Dran. On the south side of the Alps, the glaciers advanced for some way out into the plains of Lombardy, where they threw down enormous moraines, which sometimes reach a height of more than 2000 feet (Ivrea). These vast accumulations, to which there is no parallel elsewhere in Europe, rise into conspicuous hills and crescent-shaped ridges round the lower ends of the upper Italian lakes. At some of these localities the moraine stuff rests on marine Pliocene beds. It is possible that the glaciers actually reached the sea-level.³⁸ There appears to be no doubt, at least, that they descended to a lower level on that side than on the northern side of the Alps.

By tracing the distribution of the transported blocks, the movements of the ancient glaciers can be satisfactorily followed. These blocks are not dispersed at random over the glaciated area. Each glacier carried the blocks of its own basin, and, where these are of a peculiar kind, they serve as an excellent guide in following the march of the ice. Not only were the blocks in each drainage area kept separate from those of adjoining basins, but those on the left sides of the valleys do not, except along the junction lines, mingle with those of the right sides. As a rule, the blocks lie along the slopes of the valleys rather than on the bottoms, and are often disposed there in groups or lines. In the Arve valley, near Sallanches, for example, a zone comprising several thousand granitic boulders runs for a distance of more than three miles. The blocks of Monthey have long been famous. On the flanks of the Jura near Solothurn, the boulders of Riedholz, stranded there by the ancient Rhone glacier, still number 228, though they have been reduced by the quarrying operations now happily interdicted (see Figs. 151, 152, 153).³⁹

That the Ice Age in the Alps, as in northern Europe, was interrupted by at least one warmer interglacial period, when the ice retreating from the valleys allowed an abundant vegetation to flourish there, is shown by the lignites of Dürnten (Canton Zurich), Utnach (St. Gall), Hotting (near Inns-

³⁸ The surface of the Lago di Garda, round the lower end of which glacier moraines extend, is little more than 200 feet above the sea-level.

³⁹ Favre, Arch. Sci. Phys. Nat. Genève, xii. 1884, p. 399. Penck, "Vergletscherung der Deutschen Alpen," believes that he can trace evidence of at least three distinct periods of glaciation in the Alps.