

the undermining of bluffs, and consequently large falls of rock and other debris. (b) It works with greater results through impact or forward thrust of its bottom, sides, and front; for it thus tears off angular stones, slate, and great rocks, from rifted, laminated, and jointed terranes that are alongside or extend up in ledges into the glacier, and takes them into its mass; it also plows into weakly consolidated deposits, such as fragile sandstones, and gathers other supplies, though not able deeply to abrade the harder rocks; and in its movement up the under-glacier slope of a ridge or peak, it bears along stones and other materials from low levels to high. (c) Further, it works by corrosion, in its ever-shifting and crevassing movements, grinding stone against stone or grain against grain, rounding angles and making the finest of earth called *rock-flour*, which may become clayey by partial decomposition of the feldspar present.

The material gathered by the ice is called *moraine* material. The larger part in ordinary glaciers lies along or near the borders and constitutes the *lateral moraine*; that occurring along the bottom, in the glacier and that pushed along by it, is the *ground moraine*; and the deposit accumulated at the extremity of the glacier, the melting place, is the *terminal moraine*. The moraine material thus deposited is not stratified; but it has a linear order; for it lies in lines which point upward to the summits from which its materials were gathered. The terminal moraine is a low ridge, belt, or mound of stones and earth transverse to the valley. Agassiz observes (1840) that on the retreat of a glacier, a new moraine may form each year. He also mentions the fact that the stones over the surface of a glacier outside of the lateral moraine gradually move obliquely toward the latter, owing to the greater velocity at the center.

When two glaciers join, the lateral moraines of the two uniting sides become one *medial moraine*. The number of moraines on a glacier, therefore, can never exceed the number of coalesced glaciers by more than one. An isolated peak rising above a glacier will send off its stones and earth all in a single line or moraine. In the view of the G6rner Glacier on page 237, the nearest moraine is that of the Riffelhorn; the second is a union of moraines of the G6rnerhorn and Porte Blanche; the third, a union of two moraines from two Monte Rosa glaciers; the fourth, the great moraine of the Breithorn, the summit in the middle of the view. Other moraines may be seen in the distant part of the glacier. Fig. 209 shows the moraines of the Mer de Glace and of the glaciers above it.

The transported masses of rock sometimes have great magnitude. One among those of the Alps contained 200,000 cubic feet. In the lower part of the Glacier of the Aar, after the junction of the great glaciers of the Finsteraar and Lauteraar, the medial moraine is 100 to 250 yards wide and has a height of 100 to 140 feet above the general surface of the ice either side. The wasting of the ice of a glacier by melting often leaves the broader stones perched up on ice-columns (like the perched stones in Figs. 158, 159), the stones having protected the ice beneath it from the sun.