

pebbles to fall down and cover the cone. Prof. Agassiz describes some of these cones in the Alps 13 feet high, and 13 feet broad.

As glaciers advance they break off masses of rocks from the sides and bottoms of the valleys, and crowd along whatever is movable, so as to form large accumulations of detritus in front and along their sides. When the glacier melts away, these ridges remain, and are called *moraines*. Agassiz describes three kinds: 1. The *terminal moraine*, or that at the extremity of the glacier; 2. *Lateral moraines*, or those ridges of detritus formed along the flanks of the glacier; 3. *Medial moraines*, or those longitudinal trains of blocks which sometimes accumulate upon the top of the glacier, especially where glaciers unite from two valleys, and crowd the detritus between them upon their tops. The moraines are sometimes 30 or 40 feet high.

At the lower extremity of the glacier there is a vault from which issues, especially in the summer, a stream of water, which ramifies upward beneath the ice like rivers in general. This stream, continuing from generation to generation, wears out a channel in the rocks as it descends from the glacier.

Fig. 75 shows the lower extremity of the glacier of Viesch, with a distinct terminal moraine, which at the sides is connected with lateral moraines. A stream of water is seen issuing from the glacier, which has worn a channel in the rocks. On Fig. 74 are shown both lateral and medial moraines; the latter considerably scattered. Fig. 78 exhibits a fine example of a medial moraine.

Although the inferior surface of the glacier is pure smooth ice, yet it is usually thickly set with fragments of rock, pebbles, and coarse sand, firmly frozen into it, which makes it a huge rasp; and when it moves forward, these projecting masses, pressed down by the enormous weight of the glacier, wear down and scratch the solid rocks; or when the materials in the ice are very fine, they smooth and even polish the surface beneath. The movable materials beneath the ice are crushed and rounded, and often worn into sand or mud. The rocks in place, against which the glacier presses, are also smoothed and striated upon their sides. These striæ, wherever found, are perfectly parallel to one another, because the materials producing them are fixed in the bottom of the ice. But as the glacier advances from year to year, new sets of scratches will be produced, which sometimes cross those previously made, at a small angle.