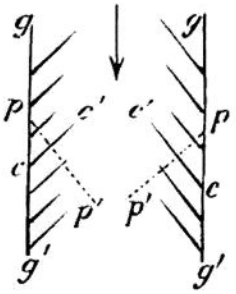
glacier along the under-glacier surface; (*f*) a local melting of ice, as a consequence of the accumulation of pressure, diminishing thereby resistance and facilitating motion.

(*a*) *Fragility of ice.* — Reaching a place of steep descent, great *transverse* blocks of a glacier drop in succession. Rounding a projecting angle in a valley, the ice is compressed at the side of the short turn, and drawn out on the opposite side, and in the latter great crevasses are opened. Forbes mentions one chasm 500 feet wide extending across the Mer de Glace. Passing narrows, the quickened motion causes irregular cross-fractures often in great numbers. Flowing along a valley the resistance of the sides (*gg'*, *gg'*, Fig. 213), together with the more rapid flow at the center, makes crevasses (*cc'*) pointing obliquely up stream at angles of about 45°. The direction of the pull tending to produce the fractures (or that of greatest tension) is oblique toward the center *down stream*. Hopkins has shown that this pull (*pp'*) is strongest theoretically when it makes an angle of 45° with the sides of the glacier, and therefore the crevasses are at 45° with the sides *up stream*. This angle would be modified by the form of the bottom, and by its pitch.

213.



After being extensively broken up, the glacier, on reaching a broader portion of the valley, of gentler pitch, becomes again solid by a general welding of the pieces. The welding process, called by Faraday *regelation*, requires only pressure, and takes place whether the surfaces are moist or dry. (Hungerford, 1882.) If a block of ice is supported at its two ends, and a fine wire is passed around it at middle and weighted below, the wire will slowly melt its way through; but when the cut is completed, the mass will be as solid as at the outset, regelation having gone forward above the wire. The multitudes of fractures made in a glacier on steep slopes hence disappear below where the motion is slow and the ice feels the pressure from above.

(*b*) *Permeating water.* — As already explained, the summer's heat produces water over a glacier, and through all its crevasses and smallest crevices, especially during the daytime. At night, when the source of heat is withdrawn, there may be much refreezing; but the days in summer are much longer than the nights. The chief source of the water largely fails in winter, and hence the difference in the summer and winter rates of movement. The melting from local pressure is an addition to the amount of water, and just where needed to meet special resistance. The pressure of one atmosphere lowers the melting-point of water 0·0042° F.

(*c*) *Plasticity.* — Ice may be made by pressure to copy a seal, like wax; or by forcing it through holes to take the form of a cylinder. Kane mentions, in his *Arctic Explorations*, the case of a table of ice, eight feet thick and 20 or more wide, supported only at the sides, which, in two months, had the center depressed by gravity five feet. The temperature during the interval was many degrees below 32° F. Guyot concluded, from the flow of the