

forms a series of important geological operations before being again melted and relegated to the general mass of liquid terrestrial waters. Five conditions under which ice occurs on the land deserve notice, viz. frost, frozen rivers and lakes, hail, snow, and glaciers.

Frost.—Water, if perfectly still, may fall below the freezing-point without freezing, but when it is then moved, it at once freezes over. In freezing, water expands. If it be confined in such a way that expansion is impossible, it remains liquid even at temperatures below the freezing-point; but the instant that the pressure is removed this chilled water becomes ice. There is a constant effort on the part of the water to expand and become solid, very considerable pressure being needed to counterbalance this expansive power, which increases as the temperature sinks. At 30° Fahr. the pressure must amount to 146 atmospheres, or the weight of a column of ice a mile high, or 138 tons on the square foot. Consequently when the water freezes at a lower temperature, its pressure on the walls of its inclosing cavity must exceed 138 tons on the square foot. Bombshells and cannon filled with water and hermetically sealed have been burst in strong frosts by the expansion of the freezing water within them. In nature, the enormous pressures which can be obtained artificially occur rarely or not at all, because the spaces into which water penetrates can hardly ever be so securely closed as to permit the water to be cooled down considerably below 32° Fahr. before freezing. But ice forming in cavities at even two or three degrees below the freezing-point exerts an enormous disruptive force.

Soils and rocks, being all porous, and usually containing a good deal of moisture, have their particles pushed asunder