

by the freezing of this interstitial water. Stones, stumps of trees, or other objects imbedded in the ground, are squeezed out of it. When a thaw comes, the soil seems as if it had been ground down in a mortar. Water, freezing in the innumerable joints and fissures of rocks, exerts great pressure upon the walls between which it lies, pushing them asunder as if a wedge were driven between them. When this ice melts, the separated masses do not return to their original position. Their centre of gravity in successive winters becomes more and more displaced, until the sundered masses fall apart. In mountainous districts, where the winters are severe, and in high latitudes, much waste is thus produced on exposed cliffs and loose blocks of rock. Some measure of its magnitude may be seen in the heaps of angular rubbish which in these regions so frequently lie at the foot of crags and steep slopes. At Spitzbergen, and on the coast of Greenland, the observed amount of destruction caused by frost is enormous. The short warm summer, melting the snow, fills the pores and joints of the rocks with water, which when it freezes splits off large blocks, launching them to the base of the declivities, where they are further broken up by the same cause. In some countries, where the winters are severe, the soil-cap has been observed to be pushed or to creep downhill from the action of frost.²¹⁴

Frozen Rivers and Lakes.—In countries such as Canada, the lakes and rivers are frozen over in winter with a cake of ice $1\frac{1}{2}$ to $2\frac{1}{2}$ feet thick. This cake as it forms expands and presses against the shores. A continuance of frost leads to a contraction of the ice already formed and to the consequent opening of vertical fissures, into which the water

²¹⁴ Kerr, Amer. Journ. Sci. xxi. 1881, p. 345; C. Davidson, Geol. Mag. 1889, p. 255.