

start it from the many points of rest and resistance offered by the bottom, where it had been packed deep enough to touch it, the vast mass is set in motion by the whole hydraulic power of this gigantic stream. Proceeding onward with a truly terrific majesty, it piles up over every obstacle it encounters; and when forced into a narrow part of the channel, the lateral pressure it there exerts drives the *bordage* up the banks, where it sometimes accumulates to the height of forty or fifty feet. In front of the town of Montreal there has lately been built a magnificent revêtement wall of cut limestone to the height of twenty-three feet above the summer level of the river. This wall is now a great protection against the effects of the ice. Broken by it, the ice piles on the street or terrace surmounting it, and there stops; but before the wall was built, the sloping bank guided the moving mass up to those of gardens and houses in a very dangerous manner, and many accidents used to occur. It has been known to pile up against the side of a house more than 200 feet from the margin of the river, and there break in at the windows of the second floor. I have seen it mount a terraced garden twenty feet above the bank, and crossing the garden enter one of the principal streets of the town. A few years before the erection of the revêtement wall, a friend of mine, tempted by the commercial advantages of the position, ventured to build a large cut-stone warehouse, 180 feet long and four or five stories high, closer than usual upon the margin of the harbour. The cellar-floor was not more than eight feet above the summer level of the river. At the taking of the ice, the usual rise of the water of course inundated the lower story, and the whole building becoming surrounded by a frozen sheet a general expectation was entertained that it would be prostrated by the first movement. But the proprietor had taken a very simple and effectual precaution to prevent this. Just before the rise of the waters he securely laid against three sides of the building, at an angle of less than 45°, a number of stout oak logs a few feet asunder. When the movement came the sheet of ice was broken and pushed up the wooden inclined plane thus formed, at the top of which meeting the wall of the building, it was deflected into a vertical position, and fell back. In this manner such an enormous rampart of ice was in a few minutes placed in front of the warehouse as completely shielded it from all possible danger. In some years the ice has piled up nearly as high as the roof of this building. Another gentleman, encouraged by the security which this warehouse apparently enjoyed, erected one of great strength and equal magnitude on the next water lot, but he omitted to protect it in the same way. The result might

have been anticipated. A movement of the ice occurring, the great sheet struck the walls at right angles, and pushed over the building as if it had been a house of cards. Both positions are now secured by the revêtement wall.

Several movements of the grand order just mentioned occur before the final setting of the ice, and each is immediately preceded by a sudden rise of the river. Sometimes several days and occasionally but a few hours will intervene between them; and it is fortunate that there is a criterion by which the inhabitants are made aware when the ice may be considered at rest for the season, and when it has therefore become safe for them to enter their winter roads across its rough and pinnacled surface. This is never the case until a longitudinal opening of considerable extent appears in some part of St. Mary's Current. It has embarrassed many to give a satisfactory reason why this rule, derived from the experience of the peasantry, should be depended on. But the explanation is extremely simple. The opening is merely an indication that a free sub-glacial passage has been made for itself by the water, through the combined influence of erosion and temperature, the effect of which, where the current is strongest, has been sufficient to wear through to the surface. The formation of this passage shows the cessation of a supply of submerged ice, and a consequent security against any further rise of the river to loosen its covering for any further movement. The opening is thus a true mark of safety. It lasts the whole winter, never freezing over even when the temperature of the air reaches 30° below zero of Fahrenheit; and from its first appearance the waters of the inundation gradually subside, escaping through the channel of which it is the index. The waters seldom if ever however fall so low as to attain their summer level; but the subsidence is sufficiently great to demonstrate clearly the prodigious extent to which the ice has been packed, and to show that over great occasional areas it has reached to the very bottom of the river. For it will immediately occur to every one, that when the mass rests on the bottom its height will not be diminished by the subsidence of the water, and that as this proceeds, the ice, according to the thickness which it has in various parts attained, will present various elevations after it has found a resting-place beneath, until just so much is left supported by the stream as is sufficient to permit its free escape. When the subsidence has attained its maximum, the trough of the St. Lawrence therefore exhibits a glacial landscape, undulating into hills and valleys that run in various directions, and while some of the principal mounds stand upon a base of 500 yards in length, by a hundred or two in breadth, they present a height of ten to

fifteen feet support.

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