

late fall and early winter, and is telescoped and piled into heavy masses during the shifting gales, and, secondly, that which forms in the late winter and early spring in the spaces left by the old ice moving. This solid ice probably does not extend to the southward of St. Matthew island, while the ice below it as far as the southern limit is made up of the newer ice and detached floes of well-broken ice.

All the ice seen in the vicinity of the Pribyloff islands is broken floe ice that is influenced continually by the wind and tides. Vessels forcing their way north in the spring enter this new ice readily, if it is well broken, steamers forcing through it and running when necessary; and sailing vessels, when they have a fair wind, lashing their helms and letting the ship find her own way through it under easy sail. The heavy winter ice is always avoided, and the newer ice, when in large floes, is also very dangerous on account of their weight being sufficient to sink a ship should they come together.

A case of this occurred May 25, 1885, when the ship *Gazelle* tried to run out a gale between two ice floes and was crushed and sunk. Or a ship may be detained in this ice, as in the case of the steamer *Belvidere*, which was nipped and drifted forty-three days in the ice in the western part of Bering sea.

The heaviest patches of ice in Bering sea are met in the spring by vessels off cape Navarin or north of St. Lawrence island; and it is the ice that forms in the gulf of Anadir, where the strong northeast gales drive against the current and keep piling, grinding and telescoping the ice into heavy masses.

Southern limit of the ice.—Although there is a tradition existing in Ounalaska that one winter, years ago, the ice came down on the island in heavy masses; and in January, 1878, it was down on Akoutan island and in Onnimak pass, when several native boats were lost in it. The southern limit can safely be said to be in latitude 56° N., about 35 miles south of St. George island. Occasionally, as in 1886, no ice is seen at the Pribyloff islands, but generally after three weeks of northeasterly winds it comes down from the mouth of the Koskovine river in very much broken floes, and remains in sight, moving to the eastward and westward with the winds, until the spring, when a southerly wind soon drives it north. This generally occurs in the latter part of April, although in 1880 it remained so late that an iron steamer, the Alaska Commercial Company's steamer *St. Paul*, unfitted for encountering ice, was unable to effect a landing until June 1.

Whaling vessels, which are sheathed and fitted for ice work, take the ice about April 7-15, although a few do so as early as March 25. Those