shallowness and convergence of the shores between which it moves, it gains at the same time force and rapidity. No longer a mere oscillation or pulsation of the great ocean, the tide acquires a true movement of translation, and gives rise to currents which rush past headlands and through narrows in powerful streams and eddies.

The rocky and intricate navigation of the west of Scotland and Scandinavia furnishes many admirable illustrations of the rapidity of these tidal currents. The famous whirlpool of Corryvreckan, the lurking eddies in the Kyles of Skye, the breakers at the Bore of Duncansby, and the tumultuous tideway, grimly named by the northern fishermen "the Merry Men of Mey," in the Pentland Firth, bear witness to the strength of these sea rivers. At the lastmentioned strait, the current or "race" at its strongest runs at the rate of 10 miles an hour, which is fully three times the speed of most of our large rivers.

(2) Currents.—Recent researches in ocean-temperature have disclosed the remarkable fact that, beneath the surface-layer of water affected by the temperature of the latitude, there lies a vast mass of cold water, the bottom-temperature of every ocean in free communication with the poles being little above, and sometimes actually below, the freezing-point of fresh water.<sup>251</sup> In the North Atlantic, a temperature of  $40^{\circ}$  Fahr. is reached at an average depth of about 800 fathoms, all beneath that depth being progressively colder. In the equatorial parts of that ocean, the same temperature comes to within 300 fathoms of the surface. In the South Atlantic, off Cape of Good Hope, the mass of cold water (below  $40^{\circ}$ ) rises likewise to about 300

<sup>&</sup>lt;sup>251</sup> See, in particular, memoirs by Carpenter and Wyville Thomson, Proc. Roy. Soc. xvii. 1868; Brit. Assoc. xli. et seq.; Proc. Roy. Geograph. Soc. xv. Reports to the Admiralty of the "Challenger" Exploring Expedition. Wyville Thomson's "Depths of the Sea," 1873, and "Atlantic," 1877. Narrative volume of "Challenger" Report. Prince of Monaco, Brit. Assoc. 1892.