are great currents, particularly a cold current setting out from Cape Horn, which continues along the coast to Central America, then crosses the Pacific towards Borneo, and loses itself southwesterly in the Antarctic regions.

A constant current sets into the Mediterranean through the Straits of Gibraltar, at less than half a mile per hour. It has been conjectured, but not proved, that an under current sets outwards through the same strait, at the bottom of the ocean. Lyell also suggests that the constant evaporation going on in that sea may so concentrate the waters holding chloride of sodium in solution, that a deposit may now be forming at the bottom. But the deepest soundings yet made there, (5,880 feet), brought up only mud, sand, and shells. Numerous other currents of less extent exist in the ocean, which it is unnecessary to describe. They form, in fact, vast rivers in the ocean, whose velocity is usually greater than that of the larger streams upon the lands.

The ordinary velocity of the great oceanic currents is from one to three miles per hour; but when they are driven through narrow straits, especially with converging shores, and the tides conspire with the current, the velocity becomes much greater, rising to eight, ten, and even in one instance, to fourteen miles per hour. The depth to which currents extend has not been accurately determined. Experiments indicate that they may sometimes reach to the depth of more than 500 feet. It ought to be remembered, however, that the friction of water against the bottom greatly retards the lower portion of the current; so that the actual denuding and transporting power in these currents is far less than the velocity at the surface would indicate.

Alike uncertain are the data yet obtained for determining what velocities of water at the bottom are requisite for removing mud, sand, gravel, and bowlders. It has been stated, however, (and these are the best results yet obtained,) that 6 inches per second will raise fine sand on a horizontal surface; 8 inches, sand as coarse as linseed; 12 inches, fine gravel; 24 inches per second, will roll along rounded gravel an inch in diameter; and 36 inches will move angular fragments of the size of an egg. The velocity necessary for the removal of large bowlders has not been measured. A velocity of 6 feet per second would be 4 miles per hour; of 8 feet per second, 5.4 miles per hour; of 12 feet per second, 8.2 miles per hour; of 24 inches per second, 16.4 miles per hour; of 36 feet per second, 24.6 miles per hour. Fine mud will remain suspended in water that has a very slight velocity, and often will not sink more than a foot in an hour; so that before it reached the depth of 500 feet it might be transported, by a current of 3 miles per hour, to the distance of 1,500 miles.

It hence appears that most rivers, in some part of their course, especially when swollen by rains, possess velocity of current sufficient to remove sand and pebbles; as do also some tidal currents around particular coasts; but large rivers, and most oceanic cur-