

the sea. By experiments made in 1836 it was found that in water 12 feet deep, waves 9 inches high and 4 or 5 feet long did not sensibly affect the water at the bottom: the effect of the strongest gales does not probably extend beyond the depth of 200 feet. The common saying of the waves running mountains high is a popular exaggeration. The highest rise noticed in the Mediterranean is 16 feet, and 20 feet off Australia. Off the Cape of Good Hope, notoriously the cape of storms, 40 feet is considered the extreme height of waves, or 20 feet above and below the general level of the ocean. The highest waves that I ever saw myself in the Atlantic were 86 feet.

The theory of tides, so far as it depends on astronomical causes, is based chiefly on the attraction of the moon, strengthened or weakened, however, by the influence of the sun, according to the relative position of the two planets. Twice every day, or in the interval between successive returns of the moon to the meridian of a given place, which is 24 hours 50½ minutes, the sea flows and ebbs, but much less towards the poles than within the tropics, the latter zone being more directly exposed to the attraction of the moon. The influence of the planets is also varied by their distance from the earth. The oceanic currents, permanent but of unequal force, are the effect of winds, of difference of temperature between different parts of the ocean, of the melting of polar ice, of variations of atmospheric pressure, and other minor circumstances. Drift currents are due to the action of permanent or prevailing winds upon the surface water by friction, impelling its course to leeward; until, meeting with some obstacle, such as land or sand banks, its progress is arrested, and an accumulation of the water produced. In such circumstances a drift current gives rise to a stream current, carrying off the collected waters to restore the equilibrium of the surface of the ocean. The velocity of a drift current is in general half a mile an hour, that of a stream current is usually greater, often amounting to five miles an hour.

The oceanic currents have exerted an important influence in the past history of the globe, and are necessary to its occupation by the human race. The productions of the vegetable kingdom have been widely diffused by the transport of seeds in the waters from one region to another. In like manner animals have been removed involuntarily to a fresh home on floating ice; and canoes of men and women, driven out to sea by the winds, have got