

rapidly towards the south than he could advance to the north. It is quite possible that the action we have already described in reference to the atmosphere may be going on in all collections of water; and there may be an upper and an under current, a stream of cold water rushing to the equator, and streams of heated water towards the poles. But the water of the arctic regions is urged to the tropics, not only by its lower temperature, but also by its being less attracted by the heavenly bodies. Now, as this mass of water advances towards the equator, it comes under the influence of a greater centrifugal force; but, being unable at once to acquire the increasing motion of the earth, it is left behind, if we may so speak, by the earth, which is turning from west to east, and it has consequently the appearance of a general movement from east to west. But this effect is aided by two causes; the motion of the wind, and the tides. The tradewinds have, as we have already seen, a general westerly direction; and it has been observed by all navigators, that when the wind acts for any considerable time upon a body of water, it never fails to form a superficial current, moving in the same direction. But the tides also, where uninfluenced by the land, have the same direction; so that there are three causes acting in concert, all assisting to produce a westerly current. But this effect is modified by the conformation of coasts, and by the other obstacles thrown into its path by the channels in which it flows. By this general westerly movement, the waters of the Atlantic are thrown from the coasts of Europe and Africa towards the eastern coast of America. Without attempting to trace the course of the Gulf Stream here produced, or the geographical formation that alters its direction, it may be stated, that, entering the Gulf of Mexico, it passes along the Mexican coast to the southern extremity of Florida, where it changes its path, flowing northward with great impetuosity through the Gulf of Florida, and, after some variations of course, is brought to the southern extremity of Newfoundland. It then turns to the eastward, and, successively passes the Azores, the Straits of Gibraltar, Madeira, and the Canaries, completing its course by a union with the westerly tropical currents.

There are many other permanent currents of great importance to the navigator; and those that are periodical are not less worthy his attention, and might be properly referred to