

times they produce several contrary effects. Winds that are light, but which, like the trade-winds, are continually acting on the whole of a zone, cause a real movement of transition, which we do not observe in the heaviest tempests, because these last are circumscribed within a small space. When, in a great mass of water, the particles at the surface acquire a different specific gravity, a superficial current is formed, which takes its direction towards the point where the water is coldest, or where it is most saturated with muriate of soda, sulphate of lime, and muriate or sulphate of magnesia. In the seas of the tropics we find, that at great depths the thermometer marks 7 or 8 centesimal degrees. Such is the result of the numerous experiments of commodore Ellis and of M. Peron. The temperature of the air in those latitudes being never below 19 or 20 degrees, it is not at the surface that the waters can have acquired a degree of cold so near the point of congelation, and of the maximum of the density of water. The existence of this cold stratum in the low latitudes is an evident proof of the existence of an under-current, which runs from the poles towards the equator: it also proves that the saline substances which alter the specific gravity of the water, are distributed in the ocean, so as not to annihilate the effect produced by the differences of temperature.

Considering the velocity of the molecules, which, on account of the rotatory motion of the globe, vary with the parallels, we may be tempted to admit that every current, in the direction from south to north, tends at the same time eastward, while the waters which run from the pole towards the equator, have a tendency to deviate westward. We may also be led to think that these tendencies diminish to a certain point the speed of the tropical current, in the same manner as they change the direction of the polar current, which in July and August, is regularly perceived during the melting of the ice, on the parallel of the bank of Newfoundland, and farther north. Very old nautical observations, which I have had occasion to confirm by comparing the longitude given by the chronometer with that which the pilots obtained by their reckoning, are, however, contrary to these theoretical ideas. In both hemispheres, the polar currents, when they are perceived, decline a little to the