

Water is, to some extent, a bond or link between the atmosphere and the solid earth. In fact, it frequently changes its physical condition, and approximates one or the other of two extreme forms: it is reduced into vapour, and rising towards the sky, accumulates in clouds; or it solidifies into ice, and in this state hems in the continents, whose extent it increases.

The quantity of water which exists on the earth is not known to us with any degree of certainty. Notwithstanding recent experiments, we have not ascertained the greatest depth of the ocean; for there are points, as in the Southern Ocean, where it has been impossible to reach the bottom, although soundings have been carried down to 46,236 feet (in lat. $36^{\circ} 49'$ S., and long. $37^{\circ} 6'$ W.) We shall enter into details upon this subject in another chapter.

It is generally admitted that the vertical height of the stratum of air which surrounds the earth, and which follows it in all its movements through space, is about 45 miles. But there is nothing precise in this estimate. All that we can with safety affirm is, that it is impossible to rise in a balloon higher than six or seven miles.*

The thickness of the earth's crust is about 73,000 yards. The ratio of this thickness to its entire diameter is that of the yolk to the mean diameter of the egg. The greatest depth to which man can penetrate does not exceed 3000 feet; that is, about a one-hundred-thousandth part of the terrestrial radius. What we really know of the planet of which we call ourselves the lords is only equivalent on an artificial globe of four and a half feet in diameter to .00393707904 of an inch,—that is, to the thickness of a sheet of paper. Earth, therefore, is known to us very imperfectly. Let us add, nevertheless, that the rocks vomited by volcanoes are projected from very considerable depths, and that these erupted products afford us indisputable specimens of strata of the globe lying very near its central nucleus.

* [One of the most remarkable balloon ascents was that accomplished by Messrs. Coxwell and Glaisher, September 5, 1862, when they reached the elevation of $5\frac{1}{2}$ miles. Both of the daring aeronauts nearly perished. Gay Lussac, September 15, 1804, ascended to the height of 22,977 feet. Perhaps the greatest distance ever traversed by a balloon was the journey of 1150 miles, achieved by Mr. Wise, an American, in June 1859]