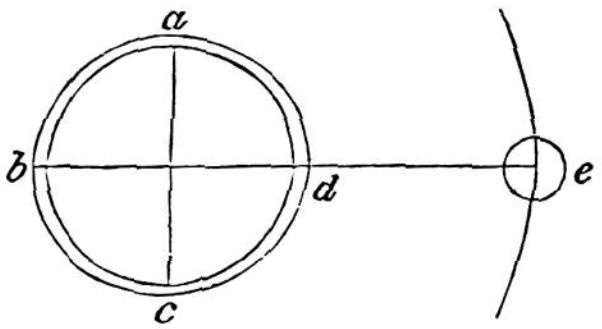
constant oscillation, ebbing and flowing alternately. In six hours it rises from its lowest to its highest level, and, after remaining stationary for a few minutes, descends in the same period of time to the level it had at low water. The total period that intervenes between the times when the sea at any place has the same level, is twelve hours and fifty minutes; but the time of high water is fifty minutes later every day than it was the day previous; which answers to the motion of the moon rising later on every day than on the preceding, and performing her revolution in about thirty days. The cause stated generally is the diminution of the gravity of the water.




Let *a b c d* be the earth, and *e* the moon. That part of the earth nearest to the body of the moon must necessarily feel most of its attractive force, for the power of gravity increases as the square of the distance decreases. The waters at *d*, that is, the side of the earth near the moon, will be more attracted than the central parts *a c*, and these more than the opposite side *b*. It must also be taken into consideration, that the force of attraction acts in right lines, and when it operates upon the edges of a body, as at *a* and *c*, it must depress rather than raise the fluid, for it draws it away as far as possible to the point nearest the attractive body. But at the same time the water will rise on the side of the earth distant from the moon,—the ocean, therefore, assumes a spheroidal form in both hemispheres, and there will be high tide at places situated opposite to each other. But the moon is not the only body that exerts an attractive force upon the ocean: the sun is also active, and, in fact, all the planetary bodies, for every particle of matter has an influence upon every other particle. The sun being greatly superior in size to the moon, it might be supposed that it would have the greater effect upon the waters of our planet; but, as its distance is incom-