

parably greater than that of the moon, it has a much less effect. But still it is necessary to take its influence into consideration; and as the subject is one of the most interesting and important connected with the phenomena observed upon the ocean, it will be necessary to examine it with some degree of particularity.

It may not be very clear to a reader why the waters should rise on that side of the earth most distant from the moon, though he may perfectly understand why they are elevated on the side near to her. If it be borne in mind that the water is drawn towards the body by the difference of her attractive power at the surface and the centre, the whole matter will appear distinct. The ocean on that side the earth near to the moon is drawn towards it, because it is more attracted than the centre; and the ocean on the opposite side rises up, because the centre is more attracted than it, and the water acts as though it receded from the earth's centre, being less operated upon by the attractive force.

Without entering with any minuteness into a consideration of all the important questions connected with the origin and inequalities of tides, there are two subjects worthy attention; the origin of high and low, neap and spring, tides.

The moon crosses the meridian of any place on the earth's surface once in twenty-four hours fifty minutes, in consequence of the diurnal revolution of the earth. There must, therefore, be a high tide at every place once in twenty-four hours fifty minutes, that is to say, when the moon crosses its meridian. But the time of high tide does not coincide with the time when the moon is on the meridian of the place, and the cause of this is evident; for the water, having received motion, continues to rise after the moon has passed from its meridian; and although the moon's greatest power is afterward exerted upon other spots, yet it continues to attract the waters at this place, though in a smaller degree. But we have already seen that a high tide also happens at that place most distant from the moon, and therefore there are two high tides during one revolution; and it follows there must be two low tides, which nappen when the place is removed ninety degrees from those relative aspects in which it suffered high tide.

In this explanation we have omitted to consider the influence of the sun; but although this body is at so much greater