in such circumstances, an amount of obstruction equal to the impulse is not to be found.

When a body revolves on a centre, the outer parts of course acquire motion. The tendency of the motion of these parts is, in reality, to go in a straight line. They are only kept within the circle of revolution because they are fixed. If any piece of the revolving body were suddenly detached or let loose, it would be seen to fly off in a straight line, being forced or impelled to do so by the motive power or force already exerted upon it. We may observe this law operating when we whirl a stone round in a sling. The stone is then felt to have an inclination to start away, and if we suddenly let slip the string, it does start away with great speed. For the same reason, when a mop is twirled, we see each of the threads flying straight out, and they only cease to do so when the twirling is stopped. Motion thus produced is called *centrifugal* (that is, centre-flying) *force*, in distinction from the power of attraction, which is sometimes called *centripetal* (centre-seeking) *force*.

In consequence of centrifugal force, the planets, in wheeling round the sun, have a tendency to fly away into space; and they would fly away if they were not retained in a particular path or orbit by the attractive power. Thrown outwards by one power, and drawn inwards by another, they have settled into paths where the two forces balance each other, so that they can neither go farther from the sun nor come nearer to him than they do. In each case the size of the planet, the rate of its speed, and its distance from the sun are circumstances exactly suiting each other; and were there the least change in one, the rest would need to be changed to preserve the economy of the planet. Were the earth, for instance, made a little larger, and its attraction to the sun thus increased, it would require either to move quicker or to remove to a greater distance, in order to keep from falling into the sun. Or were the distance of the earth from the sun to be lessened, the earth would equally require to move quicker in order to keep itself away from the sun. In fact, the earth is, at one time of the year, a little nearer the sun than at another time, and, when nearer, it does move more quickly, and thus maintains itself in its appointed course.

There are many other equally nice arrangements in the planetary system, which show that it must have originated in accordance with fixed laws in nature, and that by these laws it is still sustained. It is supposed that the planets and the sun were originally one soft mass; and that the planets were portions disengaged from the mass,