

beyond all controversy that if we go twice the distance which we are from our earth's center, bodies will weigh two times two less than they weigh here. If we recede *thrice* our present distance, bodies will weigh three times three, or nine times less than if weighed here. At *ten* times the distance, the weight would be ten times ten less than here. At *sixty* times our distance from the earth's center (which is the distance of our satellite) bodies would weigh toward the earth, sixty times sixty less than they weigh here; but sixty times sixty are thirty-six hundred; that is, a pound would weigh thirty-six hundred times less if carried to the moon's orbit, than here.

In the language of mathematicians, "the intensity of the gravitating force varies inversely as the square of the distance between gravitating centers." This law is undoubtedly universal in its operations, extending to all the visible universe.

This law, combined with orbital movements, is necessary to the stability of worlds revolving in space. Without it, systems on systems would soon rush to ruin. If any other law of intensity than the one which now exists were assumed, irretrievable ruin would soon follow. Out of the infinity of laws of variable intensities depending on distances, the only one has been selected which alone can impart stability to all systems in space. Who made this all-wise selection? Did blind matter select its own laws? Or did an all-wise and an all-powerful Being impart these laws—selecting out of an infinity of force intensities, the only law of variable intensity, which would render stable the grand machinery of the universe?

This curious law some will tell us is merely a law of materials, that

God had nothing to do with it. But I dispute it. I say that God is the Author of this law; and were it not for this infinitely wise provision, there would not be such a thing as one particle of matter being drawn to another; and a stone, when loosened from the hand, would still remain where it is set free.

Again we see our world here—the earth on which we are permitted to live and have our being—sweeping round the great center of the solar system, once in 365 days and a fraction of a day: it has continued in this path, not only through a few centuries, but for thousands of years; or, in other words, it has followed this course according to some undeviating law. Whatever this law may be God has ordained it, for he has ordained the "law which is given to all things, by which they move in their times and their seasons."

This earth does not revolve around the sun, once a year, in a circular orbit, but in an oblong, elliptical orbit. Now, it is just as easy to cause a body to revolve around the sun, in an ellipse, as in a circle. For instance, if our Earth, when at its mean distance from the Sun, should be projected, with its present mean velocity, in a line at right angles to the lines joining the Earth and Sun—it would describe a perfect circle around that luminary. But let the projections deviate from a right angle, a little less than one degree, and it will take the very form of orbit it now has, provided it is projected with the same mean velocity that it now has. Again let this same earth be projected, at its mean distance from the Sun, in a line making an angle of 70 degrees, 31 minutes and 44 seconds of an arc, instead of 90 degrees, as in the instance just named, and the form of the orbit would be greatly changed: