

the fall downwards of all bodies within our reach, and the pressure which they exert upon their supports when at rest. The identification of the latter forces with the former, and the discovery of the single law by which these forces are every where regulated, was the great discovery of Newton: and we wish to make it appear that this law is established by an intelligent and comprehensive selection.

The law of the sun's attraction upon the planets is, that this attraction varies *inversely* as the square of the distance; that is, it decreases as that square increases. If we take three points or planets of the solar system, the distances of which from the sun are in proper proportion one, two, three; the attractive force which the sun at these distances exercises, is as one, one-fourth, and one-ninth respectively. In the smaller variations of distance which occur in the elliptical motion of one planet, the variations of the force follow the same law. Moreover, not only does the sun attract the planets, but they attract each other according to the same law; the tendency to the earth which makes bodies heavy, is one of the effects of this law: and all these effects of the attractions of large masses may be traced to the attractions of the particles of which they are composed; so that the final generalization, including all the derivative laws, is, that every particle of matter in the universe attracts every other, according to the law of the inverse square of the distance.

Such is the law of universal gravitation. Now, the question is, why do either the attractions of masses, or those of their component particles, follow this law of the inverse square of the distance rather than any other? When the distance becomes one, two, and three, why should not the force also become one, two, and three?—or if it must be weaker at points more remote from the attracting body, why should it not be one, a half, a third? or one, an eighth, a twenty-seventh? Such laws could easily be expressed mathematically, and their consequences cal-