

not make this law inadmissible, there are other circumstances which would do so. Under this law, the gravity of bodies at the earth's surface would cease to exist. Nothing would fall or weigh downwards. The greater action of the distant sun and planets would exactly neutralize the gravity of the earth: a ball thrown from the hand, however gently, would immediately become a satellite of the earth, and would for the future accompany it in its course, revolving about it in the space of one year. All terrestrial things would float about with no principle of coherence or stability: they would obey the general law of the system, but would acknowledge no particular relation to the earth. We can hardly pretend to judge of the abstract possibility of such a system of things; but it is clear that it could not exist without an utter subversion of all that we can conceive of the economy and structure of the world which we inhabit.

With any other direct law of force, we should in like manner lose gravity, without gaining the theoretical regularity of the planetary motions which we have described in the case just considered.

2. Among *inverse* laws of the distance, (that is, those according to which the force diminishes as the distance from the origin of force increases,) all which diminish the central force faster than the *cube* of the distance increases are inadmissible, because they are incompatible with the permanent revolution of a planet. Under such laws it would follow, that a planet would describe a spiral line about the sun, and would either approach nearer and nearer to him perpetually, or perpetually go further and further off: nearly as a stone at the end of a string, when the string is whirled round, and is allowed to wrap round the hand, or to unwrap from it, approaches to or recedes from the hand.

If we endeavour to compare the law of the inverse square of the distance, which really regulates the central force, with other laws, not obviously inad-