

The force of gravity might, so far as we can judge, have been different from what it now is. It depends upon the mass of the earth; and this mass is one of the elements of the solar system, which is not determined by any cosmical necessity of which we are aware. The masses of the several planets are very different, and do not appear to follow any determinate rule, except that upon the whole those nearer to the sun appear to be smaller, and those nearer the outskirts of the system to be larger. We cannot see any thing which would have prevented either the size or the density of the earth from being different, to a very great extent, from what they are.

Now, it will be very obvious that if the intensity of gravity were to be much increased, or much diminished, if every object were to become twice as heavy or only half as heavy as it now is, all the forces, both of involuntary and voluntary motion which produce the present orderly and suitable results by being properly proportioned to the resistance which they experience, would be thrown off their balance; they would produce motions too quick or too slow, wrong positions, jerks and stops, instead of steady, well conducted movements. The universe would be like a machine ill regulated; every thing would go wrong; repeated collisions and a rapid disorganization must be the consequence. We will, however, attempt to illustrate one or two of the cases in which this would take place, by pointing out forces which act in the organic world, and which are adjusted to the force of gravity.

1. The first instance we shall take, is the force manifested by the ascent of the sap in vegetables. It appears by a multitude of indisputable experiments, (among the rest, those of Hales, Mirbel, and Dutrochet,) that all plants imbibe moisture by their roots, and *pump it up*, by some internal force, into every part of their frame, distributing it into every leaf. It will be easily conceived that this operation must require a very considerable mechanical force; for the