theory, merely to show that there are no evident inconsistencies between this theory and observation. The mechanical explanation of natural phenomena must depend to a great extent upon the advances to be made in hydrodynamics and its cognate sciences.

We shall now show that potential energy can be predicated of a system of bodies only in a few instances.

(1.) One case is that in which there are only two bodies in the system, whatever be the law of attraction, provided it be a function of the distance. The distance between the bodies at any instant is that due to their potential energy. Thus in a falling body, its distance at any instant above the earth's surface is that due to its potential energy.

(2.) When there are any number of bodies in the system, provided that the law of attraction is that of the direct distance. In this case, the point to which potential energy can be referred is the common centre of gravity of the system.

Besides these two general cases, there are many what may be called solitary cases, in which a system may have potential energy, but which cannot be classed under any general head.

To illustrate this still further. Suppose a system of say six bodies attracting according to the law of gravitation, and let them move from rest at a given instant. Will they fall together? No; in such a system there is no point, line or surface to which potential energy can be referred. If such a system has no potential energy, can the principle of conservation be affirmed of its actual energy? No; its actual energy is constantly changing. Can it even be asserted that the actual energy will periodically go through the same changes? No; to assert this we should have to calculate the motions, and the problem is so complex in its general form, that it is beyond the power of mathematical analysis to solve it. What assertion can be made then with regard to its energy? We can only say that the chances are almost infinite against a periodic restoration of energy.

Again, there are no instances of case two in nature, as far as we know, nor of case one. We know of no instances in nature of a system of two bodies entirely unaffected by the presence of other bodies; that is to say, all systems of two bodies really form parts of a larger system, and thus cannot have a common point to which potential energy can be referred. All the instances which we have of potential energy, are instances in which the word is used in an approximate