

If there be a system of say two particles revolving about each other, under their mutual attraction they have a definite amount of energy, actual and potential. Now, let a third particle come within the sphere of attraction of either particle, it will increase the energy of the system; there is no limit to the number of particles which might not become similarly incorporated with the system. Thus energy would be continually created by the chance proximity of other particles. We may perhaps get out of this difficulty by supposing the spheres of attraction of every particle to include all other particles, but we shall hereafter see that a supposition of this kind, which as far as our observation goes can only be made in the case of the attraction of gravitation, will be of no service.

Sir John Herschel, although a believer in action at a distance, shows very clearly, in a lecture on the "*Origin of Force*," that the principle of conservation, regarded merely as asserting the periodic restorations of actual or dynamic energy, cannot, from the very nature of the case, be proved—that, in fact, it is almost inconceivable that it should express a law of nature. He could be led to no other result, holding as he did the theory of action at a distance.

We now come to the theory of action by contact. The first question naturally asked is, what is understood by the term contact. Contact is to be taken in the same sense as in geometry. Two geometrical figures are in contact when adjacent surfaces, lines, or points, as the case may be, are coincident, and there is at the same time no space of three dimensions common to both. What is force according to this theory? This question may be answered thus: when two atoms are in motion, so that each would occupy a certain space at a certain time if the other did not exist, they will come in contact; and on account of their impenetrability, or, in other words, since two bodies cannot occupy the same space at the same time, their motions must be changed, and to this action the name force is given. It is simply collision or impact. It is measured in the usual way by the changes of momentum and direction, referred to certain space considered fixed.

Sir John Herschel, in the same lecture referred to above, shows most conclusively that the dynamic energy of a system constituted thus must infallibly diminish, and that at length a state will be reached when all relative motion will be destroyed; or that, where it does exist, the moving parts will fly off into space, never to meet