is the joint operation of strong adhesion and softness. When a rod of perfectly soft glass is suddenly stretched a little, it does not at once take the shape which it acquires after some little time. It is owing to this that, in taking the impres­sion of a seal, if we take off the seal while the wax is yet very hot, the sharpness of the impression is immediately destroyed. Each part drawing its neighbour, and each part yielding, the prominent parts are pulled down and blunted, and the sharp hollows are pulled upwards and also blunted. The seal must be kept on till the wax has become not only stiff, but hard.

This viscidity is to be observed in all plastic bodies which are homogeneous. It is not observed in clay, because clay is not homogeneous, but consists of hard particles of argil­laceous earth sticking together by their attraction for water. Something like it might be made of finely powdered glass and a clammy fluid such as turpentine. Viscidity has all de­grees of softness, till it degenerates to ropy fluidity like that of olive oil. Perhaps something of it may be found even in the most perfect fluid with which we are acquainted, as we observed in the experiments for ascertaining specific gravity.

When ductility and elasticity are combined in different proportions, an immense variety of sensible modes of aggre­gation may be produced. Some degree of both are proba­bly to be observed in all bodies of complex constitution ; that is, which consist of particles made up of many differ­ent kinds of atoms. Such a constitution of a body must afford many situations permanent, but easily deranged.

In all these changes of disposition which take place among the particles of a ductile body, the particles are at such distance that they still cohere. The body may be stretched a little ; and on removing the extending force, the body shrinks into its first form. ■ It also resists mode­rate compressions ; and when the compressing force is re­moved, the body again swells out. Now the corpuscular *fact* here is, that the particles are acted on by attractions and repulsions, which balance each other when no external force is acting on the body, and which augment as the par­ticles are made, by any external cause, to recede from this situation of mutual inactivity ; for since force is requisite to produce either the dilatation or the compression, and to maintain it, we are obliged, by the constitution of our minds, to infer that it is opposed by a force accompanying or inherent in every particle of dilatable or compressible matter ; and as this necessity of employing force to produce a change indicates the agency of these corpuscular forces, and marks their kind, according as the tendencies of the particles appear to be toward each other in dilatation, or from each other in compression ; so it also measures the de­grees of their intensity. Should it require three times the force to produce a double compression, we must reckon the mutual repulsions triple when the compression is doubled ; and so in other instances. We see from all this that the phenomena of cohesion indicate some relation between the centres of the particles. To discover this relation is the great problem in corpuscular mechanism, as it was in the Newtonian investigation of the force of gravitation. Could we discover this law of action between the corpuscles with the same certainty and distinctness, we might with equal confidence say what will be the result of any position which we give to the particles of bodies ; but this is beyond our hopes. The law of gravitation is so simple, that the dis­covery or detection of it amid the variety of celestial phe­nomena required but one step ; and in its own nature its possible combinations still do not greatly exceed the pow­ers of human research. One is almost disposed to say that the Supreme Being has exhibited it to our reasoning pow­ers as sufficient to employ with success our utmost efforts, but not so abstruse as to discourage us from the noble at­tempt. It seems to be otherwise with respect to cohesion. Mathematics informs us, that if it deviates sensibly from the

law of gravitation, the simplest combinations will make the joint action of several particles an almost impenetrable mys­tery. We must therefore content ourselves, for a long time to come, with a careful observation of the simplest cases that we can propose, and with the discovery of secondary laws of action, in which many particles combine their influ­ence. In pursuance of this plan, we observe,

3. That whatever is the situation of the particles of a body with respect to each other, when in a quiescent state, they are kept in these situations by the balance of opposite forces. This cannot be refused, nor can we form to our­selves any other notion of the state of the particles of a body. Whether we suppose the ultimate particles to be of certain magnitudes and shapes, touching each other in sin­gle points of cohesion ; or whether, with Boscovich, we con­sider them as at a distance from each other, and acting on each other by attractions and repulsions, we must acknow­ledge, in the first place, that the centres of the particles (by whose mutual distances we must estimate the distance of the particles) may and do vary their distances from each other. What else can we say when we observe a body in­crease in length, in breadth, and thickness, by heating it, or when we see it diminish in all these dimensions by an external compression ? A particle, therefore, situated in the midst of many others, and remaining in that situation, must be conceived as maintained in it by the mutual ba­lancing of all the forces which connect it with its neigh­bours. It is like a ball kept in its place by the opposite action of two springs. This illustration merits a more par­ticular application. Suppose a number of balls ranged on the table in the angles of equilateral triangles, and that each ball is connected with the six which lie around it by means of an elastic wire curled like a cork-screw; suppose such another stratum of balls above this, and parallel to it, and so placed that each ball of the upper stratum is perpendi­cularly over the centre of the equilateral triangle below, and let these be connected with the balls of the under stratum by similar spiral wires. Let there be a third and a fourth, and any number of such strata, all connected in the same manner. It is plain that this may extend to any size, and fill any space. Now let this assemblage of balls be firmly contemplated by the imagination, and be sup­posed to shrink continually in all its dimensions, till the balls, and their distances from each other, and the con­necting wires, all vanish from the sight as discrete indivi­dual objects. AH this is very conceivable. It will now ap­pear like a solid body, having length, breadth, and thick­ness ; it may be compressed, and will again resume its di­mensions ; it may be stretched, and will again shrink ; it will move away when struck ; in short, it will not differ in its sensible appearance from a solid elastic body. Now when this body is in a state of compression, for instance, it is evident that any one of the balls is at rest, in consequence of the mutual balancing of the actions of all the spiral wires which connect it with those around it. It will greatly con­duce to the full understanding of all that follows to recur to this illustration. The analogy or resemblance between the effects of this constitution of things and the effects of the corpuscular forces is very great ; and wherever it ob­tains, we may safely draw conclusions from what we know would be the condition of a body of common tangible mat­ter. We shall just give one instructive example, and then have done with this hypothetical body. We can suppose it of a long shape, resting on one point ; we can suppose two weights A, B. suspended at the extremities, and the whole in equilibrio. We commonly express this state of things by saying that A and B are in equilibrio. This is very inaccu­rate. A is in fact in equilibrio with the united action of all the springs which connect the ball to which it is appli­ed with the adjoining balls. These springs are brought in­to action, and each is in equilibrio with the joint action of