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 demenſions, till the balls, and their diſtances from each other, and the connecting wires, all vaniſh from the ſight as diſcrete individual objects. All 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 the balls in par­ticular circumſtances to what will 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 all the rest. Thus through the whole extent of the hypothetical body, the ſprings are brought into action in a way and in a degree which ma­thematics can eaſily inveſtigate. We need not do this ; it is enough for our purpoſe that our imagination readily diſcovers that ſome ſprings are ſtretched, others are compreſſed, and that a preſſure is excited on the middle point of ſupport, and the ſupport exerts a reaction which preciſely ba­lances it ; and the other weight is, in like manner, in im­mediate equilibrio with the equivalent of the actions of all the ſprings which connect the laſt ball with its neighbours. Now take the analogical or reſembling caſe, an oblong piece of ſolid matter, reſting on a fulcrum, and loaded with two weights in equilibrio. For the actions of the connecting ſprings ſubſtitute the corpuſcular forces, and the reſult will reſemble that of the hypotheſis.

Now as there is ſomething that is at leaſt analogous to a change of diſtance of the particles, and a concomitant change of the intenſity of the connecting ; forces, we may expreſs this in the ſame way that we are accuſtomed to do in ſimilar caſes. Let A and B (fig. 1. @@) repreſent the cen­tres of two particles of a coherent elaſtic body in their quieſcent inactive ſtate, and let us conſider only the mecha­nical condition of B. The body may be ſtretched. In this caſe the diſtance A B of the particles may become A C. In this ſtate there is ſomething which makes it neceſſary to employ a force to keep the particles at this diſtance. C has a tendency towards A, or we may ſay that A attracts C. We may repreſent the magnitude of this tendency of C *to­wards* A, or this attraction of A, by a line C *c* perpendicu­lar to A C. Again, the body may be compreſſed, and the diſtance A B may become A D. Something obliges us to employ force to continue this compreſſion ; and D tends *from* A, or A appears to *repel* D. The intenſity of this tendency or repulsion may be repreſented by another per­pendicular D d; and, to repreſent the different directions of theſe tendencies, or the different nature of theſe actions, we may set D *d* on the oppoſite fide of A B. It is in this manner that the Abbé Boſcovich has repreſented the actions of corpuſcular forces in his celebrated Theory of Natural Philoſophy. Newton had ſaid, that, as the great movements of the ſolar ſyſtem were regulated by forces operating at a diſtance and varying with the diſtance, ſo he ſtrongly ſuſpected *(valde ſuſpicor)* that all the phenomena of coheſion, with all its modifications in the different ſenſible forms of aggregation, and in the phenomena of chemiſtry and phyſiology, reſulted from the ſimilar agency of forces varying with the diſtance of the particles. The learned Jeſuit purſued this thought ; and has ſhown, that if we ſuppoſe an ultimate atom of matter endowed with powers of attraction and repulſion, varying, both in kind and degree, with the diſtance, and if this force be the ſame in every atom, it may be regulated by ſuch a relation to the diſtance from the neighbouring atom, that a collection of ſuch atoms may have all the ſenſible appearances of bodies in their different forms of ſolids, liquids, and vapours, elaſtic or unelaſtic, and endowed with all the properties which we perceive, by whoſe immediate operation the phenomena of motion by impulſe, and all the phenomena of chemiſtry, and of animal and ve­getable economy, may be produced. He ſhows, that not- withſtanding a perfect ſameness, and even a great ſimplicity in this atomical conſtitution, there will reſult from this union all that unſpeakable variety of form and property which diversify and embelliſh the face of nature. We ſhall take another opportunity of giving ſuch an account of this cele­brated work as it deferves. We mention it only, by the by, as ſar as a general notion of it will be of ſome ſervice on the preſent occaſion. For this purpoſe, we just obſerve that Boſcovich conceives a particle of any individual species of matter to conſiſt of an unknown number of particles of ſimpler conſtitution ; each of which particles, in their turn, is compounded of particles ſtill more limply conſtituted, and ſo on through an unknown number of orders, till we arrive at the ſimpleſt poſſible conſtitution of a particle of tangible matter, suſceptible of length, breadth, and thickneſs, and neceſſarily conſiſting of four atoms of matter. And he ſhows that the more complex we ſuppoſe the conſtitution of a particle, the more must the ſenſible qualities of the aggre­gate resemble the obſerved qualities of tangible bodies. In particular, he ſhows how a particle may be ſo conſtituted, that although it act on one other particle of the ſame kind through a conſiderable interval, the interpoſition of a third particle of the ſame kind may render it totally, or almoſt totally, inactive; and therefore an aſſemblage of ſuch particles would form ſuch a fluid as air. All theſe curious inferences are made with uncontrovertible evidence ; and the greateſt encouragement is thus given to the mathematical philoſopher to hope, that by cautious and patient proceeding in this way, we may gradually approach to a knowledge of the laws of coheſion, that will not ſhun a compariſon even with the *Principia* of Newton. No ſtep can be made in this inveſtigation, but by obſerving with care, and generalizing with judgment, the phenomena, which are abundantly nu­merous, and much more at our command than thoſe of the great and ſenſible motions of bodies. Following this plan, we obſerve,

4thly, It is matter of fact, that every body has ſome degree of compreſſibility and dilatability ; and when the changes of dimension are ſo moderate that the body completely recovers

@@@[mu] Plate CCCCLXXXIV.