

electrical action the theory was justified. But in order to give it full confirmation, it was to be considered whether any other facts, not immediately assumed in the foundation of the theory, were explained by it; a circumstance which, as we have seen, gave the final stamp of truth to the theories of astronomy and optics. Now we appear to have such confirmation, in the effect of points, and in the phenomena of the electrical discharge. The theory of neither of these was fully understood by Cavendish, but he made an approach to the true view of them. If one part of a conducting body be a sphere of small radius, the electric fluid upon the surface of this sphere will, it appears by calculation, be more dense, and tend to escape more energetically, in proportion as the radius of the sphere is smaller; and, therefore, if we consider a point as part of the surface of a sphere of imperceptible radius, it follows from the theory that the effort of the fluid to escape at that place will be enormous; so that it may easily be supposed to overcome the resisting causes. And the discharge may be explained in nearly the same manner; for when a conductor is brought nearer and nearer to an electrized body, the opposite electricity is more and more accumulated by attraction on the side next to the electrized body; its tension becomes greater by the increase of its quantity and the diminution of the distance, and at last it is too strong to be contained, and leaps out in the form of a spark.

The light, sound, and mechanical effects produced by the electric discharge, made the electric *fluid* to be not merely considered as a mathematical hypothesis, useful for reducing phenomena to formulæ (as for a long time the magnetic fluid was), but caused it to be at once and universally accepted as a physical reality, of which we learn the existence by the common use of the senses, and of which measures and calculations are only wanted to teach us the laws.

The applications of the theory of electricity which I have principally considered above, are those which belong to conductors, in which the electric fluid is perfectly moveable, and can take that distribution which the forces require. In non-conducting or electric bodies, the conditions to which the fluid is subject are less easy to determine; but by supposing that the fluid moves with great difficulty among the particles of such bodies,—that nevertheless it may be dislodged and accumulated in parts of the surface of such bodies, by friction and other modes of excitement; and that the earth is an inexhaustible reservoir of electric matter,—the principal facts of excitation and the like receive a tolerably satisfactory explanation.