

lombian theory. He finds that, from the supposition of a fluid and of particles of matter exercising such forces as that theory assumes (with the very allowable additional supposition that the particles are small compared with their distances), it follows that the particles would exert a force, repulsive at the smallest distances, a little further on vanishing, afterwards attractive, and at all sensible distances attracting in proportion to the inverse square of the distance. Thus there would be a position of stable equilibrium for the particles at a very small distance from each other, which may be, M. Mosotti suggests, that equilibrium on which their physical structure depends. According to this view, the resistance of bodies to compression and to extension, as well as the phenomena of statical electricity and the mutual gravitation of matter, are accounted for by the same hypothesis of a single fluid or ether. A theory which offers a prospect of such a generalization is worth attention; but a very clear and comprehensive view of the doctrines of several sciences is requisite to prepare us to estimate its value and probable success.

*Question of the Material Reality of the Electric Fluid.*—At first sight the beautiful accordance of the experiments with calculations founded upon the attractions and repulsions of the two hypothetical fluids, persuade us that the hypotheses must be the real state of things. But we have already learned that we must not trust to such evidence too readily. It is a curious instance of the mutual influence of the histories of two provinces of science, but I think it will be allowed to be just, to say that the discovery of the polarization of heat has done much to shake the theory of the electric fluids as a physical reality. For the doctrine of a material caloric appeared to be proved (from the laws of conduction and radiation) by the same kind of mathematical evidence (the agreement of laws respecting the elementary actions with those of fluids), which we have for the doctrine of material electricity. Yet we now seem to see that heat cannot be matter, since its rays have *sides*, in a manner in which a stream of particles of matter cannot have sides without inadmissible hypotheses. We see, then, that it will not be contrary to precedent, if our electrical theory, representing with perfect accuracy the *laws* of the actions, in all their forms, simple and complex, should yet be fallacious as a view of the *cause* of the actions.

Any true view of electricity must include, or at least be consistent with, the other classes of the phenomena, as well as this statical electrical action; such as the conditions of excitation and retention of