either exceedingly small or this force is propagated instantaneously through the greatest cosmical distances which come under our notice. Then, again, light and radiated heat spend themselves as they meet with reflecting or absorbing bodies, whereas gravitation does not seem to be affected by intervening or screening bodies.[1]

[1] It is now known that this screening effect exists likewise in magnetic and electric action. In the formula which expresses the action at a distance of magnetic, electrical, and ponderable masses, *viz.*, $f=\mu \frac{m.m'}{r^2}$, the older view—previous to Faraday's researches—considered m and m' the masses (ponderable or imponderable), and the distance r to be variable, μ a constant, corresponding to the gravitation constant. As stated above, the gravitation constant is, so far as we know, a real constant—*i.e.*, it is not affected by the nature of the medium which fills the space intervening between m and m', the attractive masses. Faraday doubted this; but leaving gravitation—"as a relation by some higher quality"—aside, he directed his efforts to the testing of the validity of this view as regards electric and magnetic action. He found that μ is not a real constant, but dependent on the nature of the medium and the objects which intervene between the magnetic and electric masses. These researches, which are probably the first step in the direction of gaining by observation some notion of the mechanical manner in which action at a distance is brought about, begin with the year 1837 (see 11th series of 'Experimental Researches in Electricity,' No. 1252). The result was that the "specific electric induction for different bodies" was established, contrary to the ideas of Poisson and others ('Exper. Res.,' No. 1167), and the word "dielectric" invented to denote the "action of the contiguous particles of the insulating medium" (No. 1168). From this point he was led a step farther, to "expect that all polar forces act in the same general manner"—*viz.*, by contiguous particles. Faraday, however, is careful to remark that by contiguous particles he means those "which are next to each other, not that there is *no* space between them" (No. 1665).

In 1838 Faraday was still doubtful whether magnetic action was similar in this respect to statical electric action; but he thought it probable that it was "communicated by the action of the intervening particles" (No. 1729), and in pursuing this line of thought, in spite of many unsuccessful trials, he at last saw his ideas realised, discovered the magnetisation of light, and invented the term "diamagnetic" to describe "a body through which lines of magnetic force are passing, and which does not by their action assume the usual magnetic state" (1845, 'Exper. Res.,' No. 2149). At the end of the 19th series of researches he says: "In former papers (1838) I proposed a theory of electrical induction founded on the action of contiguous particles, . . . and I then ventured to suggest that probably . . . magnetic action was also conveyed onward in a similar manner. At that time I could discover