unique conception of the communication of electric and magnetic phenomena, into connection with the mathematical theory which had been founded and worked out by Poisson and Green. Without attempting to give a physical explanation of Faraday's lines of force, he showed how they could be utilised in calculating the complicated action of magnetic push-and-pull forces; suggested that the newly discovered property called diamagnetism, in virtue of which bodies in the neighbourhood of powerful magnets appeared to be repelled, not attracted, could be explained as a differential[1] effect of

[1] It was in the year 1845 that Faraday, after having discovered the "magnetisation of light," and made visible the "magnetic lines of force" ('Exp. Res.,' Nos. 2146-2242), entered upon that remarkable series of experiments and speculations which led him to the discovery of diamagnetism and to the assertion of the "magnetic condition of all matter" (ibid., Nos. 2243, &c.) In 1847 Thomson wrote: "According to Mr Faraday's recent researches it appears that there are a great many substances susceptible of magnetic induction, of such a kind that for them the value of the coefficient i is negative. These he calls diamagnetic substances, and in describing the remarkable results to which his experiments conducted him with reference to induction in diamagnetic matter, he says, 'All the phenomena resolve themselves into this, that a portion of such matter, when under magnetic action, tends to move from stronger to weaker places or points of force.' This is entirely in accordance with the result obtained above: and it appears that the law of all the phenomena of induction discovered by Faraday with reference to diamagnetics may be expressed in the same terms as in the case of ordinary magnetic induction, by merely supposing the coefficient i to have a negative value" (Reprint, p. 502). In the Reprint (1854) of his early papers (1842) on the corresponding problems of magnetism and heat (Reprint, p. 18) he added a note to the effect that the "same demonstration is applicable to the influence of a piece of soft iron, or other paramagnetic, or to the reverse influence of a diamagnetic on the magnetic force in any locality near a magnet in which it can be placed, and shows that the lines of magnetic force will be altered by it precisely as the lines of motion of heat in corresponding thermal circumstances would be altered by introducing a body of greater or less conducting power of heat. Hence we see how strict is the foundation for an analogy on which the conducting power of a magnetic medium for lines of force may be spoken of, and we have a perfect explanation of the condensing action of a paramagnetic, and the repulsive effect of a diamagnetic upon the lines of force of a magnetic field, which have been described by Faraday" (Reprint, p. 33 note; cf. Faraday, 'Exp. Res.,' Nos. 2807, 2808).