particles of the ether. The length of one of those undulations which produce light, is a very small quantity, its mean value being 1-50,000th of an inch; but in the previous investigations of the consequences of the theory, it had been assumed that the distance from each other, of the particles of the ether, which, by their attractions or repulsions, caused the undulations to be propagated, is indefinitely less than this small quantity;—so that its amount might be neglected in the cases in which the length of the undulation was one of the quantities which determined the result. But this assumption was made arbitrarily, as a step of simplification, and because it was imagined that, in this way, a nearer approach was made to the case of a continuous fluid ether, which the supposition of distinct particles imperfectly represented. It was still free for mathematicians to proceed upon the opposite assumption, of particles of which the distances were finite, either as a mathematical basis of calculation, or as a physical hypothesis; and it remained to be seen if, when this was done, the velocity of light would still be the same for different lengths of undulation, that is, for different colors. M. Cauchy, calculating, upon the most general principles, the motion of such a collection of particles as would form an elastic medium, obtained results which included the new extension of the previous hypothesis. Professor Powell, of Oxford, applied himself to reduce to calculation, and to compare with experiment, the result of these researches. And it appeared that, on M. Cauchy's principles, a variation in the velocity of light is produced by a variation in the length of the wave, provided that the interval between the molecules of the ether bears a sensible ratio to the length of an undulation.[19] Professor Powell obtained also, from the general expressions, a formula expressing the relation between the refractive index of a ray, and the length of a wave, or the color of light.[20] It then became his task to ascertain whether this relation obtained experimentally; and he found a very close agreement between the numbers which resulted from the formula and those observed by Fraunhofer, for ten different kinds of media, namely, certain glasses and fluids.[21] To these he afterwards added ten other cases of crystals observed by M. Rudberg.[22] Mr. Kelland, of Cambridge, also calculated, in a manner somewhat different, the results of the same hypothesis of finite intervals;[23] and, obtaining

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[19] *Phil. Mag.* vol. vi. p. 266.
[20] Ib. vol. vii. 1835, p. 266.
[21] *Phil. Trans.* 1835, p. 249.
[22] Ib. 1836, p. 17.
[23] *Camb. Trans.* vol. vi. p. 153.