

Grimaldi's experiments on fringes, of which we have spoken a little while ago. And the great authority of the period, Newton, adopted the opposite hypothesis, that of emission, and gave it a currency among his followers which kept down the sounder theory for above a century.

Newton's first disposition appears to have been by no means averse to the assumption of an ether as the vehicle of luminiferous undulations. When Hooke brought against his prismatic analysis of light some objections, founded on his own hypothetical notions, Newton, in his reply, said,<sup>9</sup> "The hypothesis has a much greater affinity with his own hypothesis than he seems to be aware of; the vibrations of the ether being as useful and necessary in this as in his." This was in 1672; and we might produce, from Newton's writing, passages of the same kind, of a much later date. Indeed it would seem that, to the last, Newton considered the assumption of an ether as highly probable, and its vibrations important parts of the phenomena of light; but he also introduced into his system the hypothesis of emission, and having followed this hypothesis into mathematical detail, while he has left all that concerns the ether in the form of queries and conjectures, the emission theory has naturally been treated as the leading part of his optical doctrines.

The principal propositions of the *Principia* which bear upon the question of optical theory are those of the fourteenth Section of the first Book,<sup>9</sup> in which the law of the sines in refraction is proved on the hypothesis that the particles of bodies act on light only at very small distances; and the proposition of the eighth Section of the second Book;<sup>10</sup> in which it is pretended to be demonstrated that the motion propagated in a fluid must diverge when it has passed through an aperture. The former proposition shows that the law of refraction, an optical truth which mainly affected the choice of a theory, (for about reflection there is no difficulty on any mechanical hypothesis,) follows from the theory of emission: the latter proposition was intended to prove the inadmissibility of the rival hypothesis, that of undulations. As to the former point,—the hypothetical explanation of refraction, on the assumptions there made,—the conclusion is quite satisfactory; but the reasoning in the latter case, (respecting the propagation of undulations,) is certainly inconclusive and vague; and something better might the more reasonably have been expected, since Huyghens had at least

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<sup>9</sup> *Phil. Trans.* vii. 5087. · <sup>9</sup> *Principia*, Prop. 94, *et seq.* · <sup>10</sup> *Ib.* Prop. 42.