

transmission described above?" Several of the other queries imply the same persuasion, of the necessity for the assumption of an ether and its vibrations. And it might have been asked, whether any good reason could be given for the hypothesis of an ether as a *part* of the mechanism of light, which would not be equally valid in favor of this being the *whole* of the mechanism, especially if it could be shown that nothing more was wanted to produce the results.

The emission theory was, however, embraced in the most strenuous manner by the disciples of Newton. That proposition existed in the *Principia* which proceeded on this hypothesis, was, with many of these persons, ground enough for adopting the doctrine; and it had also the advantage of being more ready of conception, for though the propagation of a wave is not very difficult to conceive, at least by a mathematician, the motion of a particle is still easier.

On the other hand, the undulation theory was maintained by no less a person than Euler; and the war between the two opinions was carried on with great earnestness. The arguments on one side and on the other soon became trite and familiar, for no person explained any new class of facts by either theory. Thus it was urged by Euler against the system of emission,¹²—that the perpetual emanation of light from the sun must have diminished the mass;—that the stream of matter thus constantly flowing must affect the motions of the planets and comets; that the rays must disturb each other;—that the passage of light through transparent bodies is, on this system, inconceivable: all such arguments were answered by representations of the exceeding minuteness and velocity of the matter of light. On the other hand, there was urged against the theory of waves, the favorite Newtonian argument, that on this theory the light passing through an aperture ought to be diffused, as sound is. It is curious that Euler does not make to this argument the reply which Huyghens had made before. The fact really was, that he was not aware of the true ground of the difference of the result in the cases of sound and light; namely, that any ordinary aperture bears an immense ratio to the length of an undulation of light, but does not bear a very great ratio to the length of an undulation of sound. The demonstrable consequence of this difference is, that light darts through such an orifice in straight rays, while sound is diffused in all directions. Euler, not perceiving this difference, rested his answer mainly upon a circumstance by no means

¹² Fischer, iv. 449.