

20.
Mechanical
difference
between
light and
sound.

ments; and he applied his results for the purpose of gaining a new basis for the theory of light. His speculations were, however, not confined to this. He had started by studying sound and had shown its analogy with light; but when he ultimately ventured on the bold assumption of a lateral to-and-fro tremor, he showed where the nature of light differed from that of sound. It was in this: that the tremor of sound was that of an elastic fluid such as air, or of any substance in which the movement is carried forward by alternate compression and expansion. But the phenomena of light seemed to require for their explanation two seemingly incompatible assumptions: first, a substance more subtle than air, incapable of impeding the motion of matter in it; and, secondly, a substance having vibrations resembling the tremors of what we term solid bodies, *e.g.*, stretched strings. Young is one of the founders of the theory of elasticity.¹

¹ The history of the theories of elasticity has been written by Isaac Todhunter and continued by Professor Karl Pearson. A perusal of the earlier portion of the work shows how imperfect were the ideas which existed at the time when Fresnel approached the problem in the interest of the wave theory of light. The greatest mathematicians, like Euler, had handled the subject, and had damaged their reputation, especially in this country, by serious errors or by conclusions which agreed ill with experience. Young was one of the earliest writers on elasticity in the nineteenth century; having given considerable attention to the subject in his Lectures on Natural Philosophy (delivered in 1802, published in 1807). He there introduces the modulus of elasticity, a term which, with some

change of meaning, survives in modern treatises. His name, as well as that of Hooke ("Ut tensio sic vis"), appears accordingly at the portal of the science. Young, though Todhunter has a significant remark on his obscurity of style, stands out prominently, if compared with contemporary writers in this country, by his thorough knowledge of the labours of Continental mathematicians, among whom he assigns special merit to Coulomb. In general, Todhunter has little to say in praise of English science in this department during the earlier part of the century, and he considers the "perusal of English text-books on practical mechanics published in the first half of the century a dispiriting task," in consequence of a "want of clear thinking, of scientific accuracy, and of knowledge of the work ac-