

He must have fully realised the difficulty of imagining a substance more subtle than air and yet endowed with the property of rigidity, known to us only in solid bodies. The elaboration of the theory of light pressed upon physicists and mathematicians a more careful study of the different states in which matter can exist. The different properties which this hypothetical substance called ether must possess had to be mathematically defined; and, further, it had to be shown whether it would be physically possible for a body, subject to the empirical laws of motion, to possess certain of the properties of what we term solids, and yet to be in other respects the very opposite of a solid. The solution of the first problem was a purely mathematical performance, in which many eminent mathematicians, such as Cauchy, Neumann, Green, M'Cullagh, and Stokes,¹ have been

21.
The properties of
the ether.

complished abroad" (vol. i. p. 105). "It is difficult to picture the remarkable scientific ignorance of practical men in England in the first quarter of the century. One can only trust that there may be a closer union of practice and theory in our own day" (p. 106). This passage was probably written in the 'seventies.

According to Todhunter, the true theory of elasticity was founded in France between the years 1820 and 1830, by Navier, Poisson, and Cauchy on the one side; by the experimental work of Savart on the other. It had been allied with theoretical acoustics since Euler's time. Chladni in Germany furthered that branch of the subject in three celebrated works: 'Theorie des Klanges' (1787), 'Akustik' (1802), 'Beiträge zur Akustik' (1817). Chladni influenced the

brothers Weber, whose 'Wellenlehre auf Experimente gegründet' appeared in 1825. In it wave-motion, such as the theories of sound and light had made specially interesting and important, was experimentally examined and illustrated. The theory of elasticity now received a new ally, viz., the elastic theory of light or of the ether. Though suggested by Fresnel, its real founder was Cauchy.

¹ The natural philosopher to whom we are most indebted for bringing clearness and definiteness into our ideas and our language in these very intricate subjects is Sir George Stokes. In two papers, published respectively in 1845 and 1849 (see 'Mathematical and Physical Papers,' vol. i. pp. 75-129, and vol. ii. pp. 8-13), he has done more than any other writer to fix for nearly half a century the conceptions and the