

7.
Undulatory
theory
prepared by
acoustics.

and of magnetism. On the other side there was the highly developed theory of sound, which had succeeded in explaining and analysing the properties of sounding bodies by studying experimentally and mathematically the vibrations of sounding strings, membranes and plates, and also of the air in organ-pipes and other musical instruments. Acoustics, the branch of science which treats of these phenomena, was, next to physical astronomy, the furthest developed and best founded of the physical sciences. By following up the elementary and primitive experience, known already to the ancients, that sound is everywhere to be traced to the vibrations or the tremor of some body which has been struck or otherwise excited, a very complete theory, substantiated by many experiments, had been built up. Common-sense and everyday experience had originally suggested this line of inquiry and explanation.¹ No other physical science was so early in possession of the right road of inquiry. In astronomy and optics the suggestion of common-sense, which regards the earth as stationary and light as an emission travelling in straight lines, had indeed allowed a certain amount of definite knowledge, based upon measurement and cal-

¹ Acoustics is probably the only physical science where this has been the case; as is well remarked by Whewell in his 'History of the Inductive Sciences.' He there contrasts acoustics with astronomy and optics. He might have added dynamics, where Galileo's principle of inertia similarly reversed the dicta of common-sense. Whewell says (vol. ii. p. 237) of acoustics: "Instead of having to travel gradually towards a great dis-

covery, like universal gravitation, or luminiferous undulations, we take our stand upon acknowledged truths, the production and propagation of sound by the motion of bodies and of air; and we connect these with other truths, the laws of motion, and the known properties of bodies, as for instance their elasticity. Instead of epochs of discovery, we have solutions of problems."