

INTRODUCTION.

Formal and Physical Optics.

THE history of the science of Optics, written at length, would be very voluminous ; but we shall not need to make our history so ; since our main object is to illustrate the nature of science and the conditions of its progress. In this way Optics is peculiarly instructive ; the more so, as its history has followed a course in some respects different from both the sciences previously reviewed. Astronomy, as we have seen, advanced with a steady and continuous movement from one generation to another, from the earliest time, till her career was crowned by the great unforeseen discovery of Newton ; Acoustics had her extreme generalization in view from the first, and her history consists in the correct application of it to successive problems ; Optics advanced through a scale of generalizations as remarkable as those of Astronomy ; but for a long period she was almost stationary ; and, at last, was rapidly impelled through all those stages by the energy of two or three discoverers. The highest point of generality which Optics has reached is little different from that which Acoustics occupied at once ; but in the older and earlier science we still want that palpable and pointed confirmation of the general principle, which the undulatory theory receives from optical phenomena. Astronomy has amassed her vast fortune by long-continued industry and labor ; Optics has obtained hers in a few years by sagacious and happy speculations ; Acoustics, having early acquired a competence, has since been employed rather in improving and adorning than in extending her estate.

The successive inductions by which Optics made her advances, might, of course, be treated in the same manner as those of Astronomy, each having its prelude and its sequel. But most of the discoveries in Optics are of a smaller character, and have less employed the minds of men, than those of Astronomy ; and it will not be necessary to exhibit them in this detailed manner, till we come to the great generalization by which the theory was established. I shall, therefore, now pass rapidly in review the earlier optical discoveries, without any such division of the series.