

thin crystalline plates, the plane of polarization undergoes an oscillation which carries it backwards and forwards through a certain angle, namely, twice the angle contained between the original plane of polarization and the principal section of the crystal. The intervals which this oscillation occupies are lengths of the path of the ray, very minute, and different for different colors, like Newton's fits of easy transmission; on which model, indeed, the new theory was evidently framed." The colors produced in the phenomena of dipolarization really do depend, in a periodical manner, on the length of the path of the light through the crystal, and a theory such as M. Biot's was capable of being modified, and was modified, so as to include the leading features of the facts as then known; but many of its conditions being founded on special circumstances in the experiments, and not on the real conditions of nature, there were in it several incongruities, as well as the general defect of its being an arbitrary and unconnected hypothesis.

Young's mode of accounting for the brilliant phenomena of dipolarization appeared in the *Quarterly Review* for 1814. After noticing the discoveries of MM. Arago, Brewster, and Biot, he adds, "We have no doubt that the surprise of these gentlemen will be as great as our own satisfaction in finding that they are perfectly reducible, like other causes of recurrent colors, to the general laws of the interference of light which have been established in this country;" giving a reference to his former statements. The results are then explained by the interference of the ordinary and extraordinary ray. But, as M. Arago properly observes, in his account of this matter,¹⁸ "It must, however, be added that Dr. Young had not explained either in what circumstances the interference of the rays can take place, nor why we see no colors unless the crystallized plates are exposed to light previously polarized." The explanation of these circumstances depends on the laws of interference of polarized light which MM. Arago and Fresnel established in 1816. They then proved, by direct experiment, that when polarized light was treated so as to bring into view the most marked phenomena of interference, namely, the bands of shadows; pencils of light which have a common origin, and which are polarized in the parallel planes, interfere completely, while those which are

¹⁷ See MM. Arago and Biot's *Memoirs*, *Mém. Inst.* for 1811; the whole volume for 1812 is a *Memoir* of M. Biot's (published 1814); also *Mém. Inst.* for 1817; M. Biot's *Mem.* read in 1818, published in 1819 and for 1818.

¹⁸ *Enc. Brit.* Supp. art. *Polarization*.