Sect. 4.—*Explanation of Polarization by the Undulatory Theory.*

Even while the only phenomena of *polarization* which were known were those which affect the two images in Iceland spar, the difficulty which these facts seemed at first to throw in the way of the undulatory theory was felt and acknowledged by Young. Malus's discovery of polarization by reflection increased the difficulty, and this Young did not attempt to conceal. In his review of the papers containing this discovery[9] he says, "The discovery related in these papers appears to us to be by far the most important and interesting which has been made in France concerning the properties of light, at least since the time of Huyghens; and it is so much the more deserving of notice, as it greatly influences the general balance of evidence in the comparison of the undulatory and projectile theories of the nature of light." He then proceeds to point out the main features in this comparison, claiming justly a great advantage for the theory of undulations on the two points we have been considering, the phenomena of diffraction and of double refraction. And he adds, with reference to the embarrassment introduced by polarization, that we are not to expect the course of scientific discovery to run smooth and uninterrupted; but that we are to lay our account with partial obscurity and seeming contradiction, which we may hope that time and enlarged research will dissipate. And thus he steadfastly held, with no blind prejudice, but with unshaken confidence, his great philosophical trust, the fortunes of the undulatory theory. It is here, after the difficulties of polarization had come into view, and before their solution had been discovered, that we may place the darkest time of the history of the theory; and at this period Young was alone in the field.

It does not appear that the light dawned upon him for some years. In the mean time, Young found that his theory would explain dipolarized colors; and he had the satisfaction to see Fresnel re-discover, and M. Arago adopt, his views on diffraction. He became engaged in friendly intercourse with the latter philosopher, who visited him in England in 1816. On January the 12th, 1817, in writing to this gentleman, among other remarks on the subject of optics, he says, "I have also been reflecting on the possibility of giving an imperfect explanation of the affection of light which constitutes polarization, with-

[9] *Quart. Rev.* May, 1810.