towards perfection as a theory; and this task we have now nearly executed as far as our abilities allow.

We have been desirous of showing that the *type* of this progress, in the histories of the two great sciences, Physical Astronomy and Physical Optics, is the same. In both we have many *Laws of Phenomena* detected and accumulated by acute and inventive men; we have *Preludial* guesses which touch the true theory, but which remain for a time imperfect, undeveloped, unconfirmed: finally we have the *Epoch* when this true theory, clearly apprehended by great philosophical geniuses, is recommended by its fully explaining what it was first meant to explain, and confirmed by its explaining what it was *not* meant to explain. We have then its *Progress* struggling for a little while with adverse prepossessions and difficulties; finally overcoming all these, and moving onwards, while its triumphal procession is joined by all the younger and more vigorous men of science.

It would, perhaps, be too fanciful to attempt to establish a parallelism between the prominent persons who figure in these two histories. If we were to do this, we must consider Huyghens and Hooke as standing in the place of Copernicus, since, like him, they announced the true theory, but left it to a future age to give it development and mechanical confirmation; Malus and Brewster, grouping them together, correspond to Tycho Brahe and Kepler, laborious in accumulating observations, inventive and happy in discovering laws of phenomena; and Young and Fresnel combined, make up the Newton of optical science.

[2nd Ed.] [In the *Report on Physical Optics*, (*Brit. Ass. Reports*, 1834,) by Prof. Lloyd, the progress of the mathematical theory after Fresnel's labors is stated more distinctly than I have stated it, to the following effect. Ampère, in 1828, proved Fresnel's mathematical results directly, which Fresnel had only proved indirectly, and derived from his proof Fresnel's beautiful geometrical construction. Prof. Mac Cullagh not long after gave a concise demonstration of the same theorem, and of the other principal points of Fresnel's theory. He represents the elastic force by means of an ellipsoid whose axes are inversely proportional to those of Fresnel's generating ellipsoid, and deduces Fresnel's construction geometrically. In the third Supplement to his *Essay on the Theory of Systems of Rays* (*Trans. R. I. Acad.* vol. xvii.), Sir W. Hamilton has presented that portion of Fresnel's theory which relates to the fundamental problem of the determination of the velocity and polarization of a plane wave, in a very elegant and analytical form. This he does by means of what he calls the