crystal, on which the velocity of propagation of the luminiferous undulation depends, to be different, in the direction of the crystallographic axis, and in the direction of the planes at right angles to this axis; and from such a difference, he deduces the existence of spheroidal undulations. This suggestion appeared in the *Quarterly Review* for November, 1809, in a critique upon an attempt of Laplace to account for the same phenomena. Laplace had proposed to reduce the double refraction of such crystals as Iceland spar, to his favorite machinery of forces which are sensible at small distances only. The peculiar forces which produce the effect in this case, he conceives to emanate from the crystallographic axis: so that the velocity of light within the crystal will depend only on the situation of the ray with respect to this axis. But the establishment of this condition is, as Young observes, the main difficulty of the problem. How are we to conceive refracting forces, independent of the surface of the refracting medium, and regulated only by a certain internal line? Moreover, the law of force which Laplace was obliged to assume, namely, that it varied as the square of the sine of the angle which the ray made with the axis, could hardly be reconciled with mechanical principles. In the critique just mentioned, Young appears to feel that the undulatory theory, and perhaps he himself, had not received justice at the hands of men of science; he complains that a person so eminent in the world of science as Laplace then was, should employ his influence in propagating error, and should disregard the extraordinary confirmations which the Huyghenian theory had recently received.

The extension of this view, of the different elasticity of crystals in different directions, to other than uniaxal crystals, was a more complex and difficult problem. The general notion was perhaps obvious, after what Young had done; but its application and verification involved mathematical calculations of great generality, and required also very exact experiments. In fact, this application was not made till Fresnel, a pupil of the Polytechnic School, brought the resources of the modern analysis to bear upon the problem;—till the phenomena of dipolarized light presented the properties of biaxal crystals in a vast variety of forms;—and till the theory received its grand impulse by the combination of the explanation of polarization with the explanation of double refraction. To the history of this last-mentioned great step we now proceed.