

these hypothetical currents being in non-conducting diamagnetic, as in magnetic bodies, not in the mass, but round the particles of the matter.

Magneto-optic Effects and Magnecrystallic Polarity.

Not even yet have we terminated the enumeration of the co-existent polarities which in this province of nature have been brought into view. Light has polar properties; the very term *polarization* is the record of the discovery of these. The forces which determine the crystalline forms of bodies are of a polar nature: crystalline forms, when complete, may be defined as those forms which have a certain degree of symmetry in reference to opposite poles. Now has this optical and crystalline polarity any relation to the electrical polarity of which we have been speaking?

However much we might be disposed beforehand to conjecture that there is some relation between these two groups of polar properties, yet in this as in the other parts of this history of discoveries respecting polarities, no conjecture hits the nature of the relation, such as experiment showed it to be. In November, 1846, Faraday announced the discovery of what he then called "the action of magnets on light." But this action was manifested, not on light directly, but on light passing through certain kinds of glass.⁸ When this glass, subjected to the action of the powerful magnets which he used, transmitted a ray of light parallel to the line of magnetic force, an effect was produced upon the light. But of what nature was this effect? When light was ordinary light, no change in its condition was discoverable. But if the light were light polarized in any plane, the plane of polarization was turned round through a certain angle while the ray passed through the glass:—a greater angle, in proportion as the magnetic force was greater, and the thickness of the glass greater.

A power in some respects of this kind, namely, a power to rotate the plane of polarization of a ray passing through them, is possessed by some bodies in their natural state; for instance, quartz crystals, and oil of turpentine. But yet, as Dr. Faraday remarks,⁹ there is a great difference in the two cases. When polarized rays pass through oil of turpentine, in whatever direction they pass, they all of them have their

⁸ Silicated borate of lead. See *Researches*, § 2151, &c. Also flint glass, rock salt, water (2215).

⁹ *Researches*, Art. 2231.