plane of polarization rotated in the same direction; that is, all to the right or all to the left; but when a ray passes through the heavy glass, the power of rotation exists only in a plane perpendicular to the magnetic line, and its direction as right or left-handed is reversed by reversing the magnetic polarity.

In this case, we have optical properties, which do not depend on crystalline form, affected by the magnetic force. But it has also been found that crystalline form, which is so fertile a source of optical properties, affords indications of magnetic forces. In 1847, M. Plücker,[10] of the University of Bonn, using a powerful magnetic apparatus, similar to Faraday's, found that crystals in general are magnetic, in this sense, that the axes of crystalline form tend to assume a certain position with reference to the magnetic lines of force. The possession of one optic axis or of two is one of the broad distinctions of the different crystalline forms: and using this distinction, M. Plücker found that a crystal having a single optic axis tends to place itself with this axis transverse to the magnetic line of force, as if its optic axis were repelled by each magnetic pole; and crystals with two axes act as if each of these axes were repelled by the magnetic poles. This force is independent of the magnetic or diamagnetic character of the crystal; and is a directive, more properly than an attractive or repulsive force.

Soon afterwards (in 1848) Faraday also discovered[11] an effect of magnetism depending on crystalline form, which at first sight appeared to be different from the effects observed by M. Plücker. He found that a crystal of bismuth, of which the form is nearly a cube, but more truly a rhombohedron with one diagonal a little longer than the others, tends to place itself with this diagonal in the direction of the lines of magnetic force. At first he conceived[12] the properties thus detected to be different from those observed by M. Plücker; since in this case the force of a crystalline axis is axial, whereas in those, it was equatorial. But a further consideration of the subject, led him[13] to a conviction that these forces must be fundamentally identical: for it was easy to conceive a combination of bismuth crystals which would behave in the magnetic field as a crystal of calcspar does; or a combination of calcspar crystals which would behave as a crystal of bismuth does.

And thus we have fresh examples to show that the Connexion of coexistent Polarities is a thought deeply seated in the minds of the pro-

---

[10] Taylor's *Scientific Memoirs*, vol. v.

[11] *Researches*, Art. 2454, &c.

[12] Art. 2469.

[13] Art. 2593, 2601.