

direction ; thus when reflection gives a polarized ray, the companion-ray is refracted polarized oppositely, along with a quantity of unpolarized light. And we must particularly notice *Sir D. Brewster's rule* for the *polarizing angle* of different bodies.

Malus^b had said that the angle of reflection from transparent bodies which most completely polarizes the reflected ray, does not follow any discoverable rule with regard to the order of refractive or dispersive powers of the substances. Yet the rule was in reality very simple. In 1815, Sir D. Brewster stated^c as the law, which in all cases determines this angle, that "the index of refraction is the tangent of the angle of polarization." It follows from this, that the polarization takes place when the reflected and refracted rays are at right angles to each other. This simple and elegant rule has been fully confirmed by all subsequent observations, as by those of MM. Biot and Seebeck ; and must be considered one of the happiest and most important discoveries of the laws of phenomena in Optics.

The rule for polarization by one reflection being thus discovered, tentative formulæ were proposed by Sir D. Brewster and M. Biot, for the cases in which several reflections or refractions take place. Fresnel also in 1817 and 1818, traced the effect of reflection in modifying the direction of polarization, which Malus had done inaccurately in 1810. But the complexity of the subject made all such attempts extremely precarious, till the theory of the phenomena was understood, a period which now comes under notice. The laws which we have spoken of were important materials for the establishment of the theory ; but in the mean time, its progress at first had been more forwarded by some other classes of facts, of a different kind, and of a longer standing notoriety, to which we must now turn our attention.

CHAPTER VII.

DISCOVERY OF THE LAWS OF THE COLOURS OF THIN PLATES.

THE facts which we have now to consider are remarkable, inasmuch as the colours are produced merely by the smallness of dimensions of the bodies employed. The light is not analysed by any peculiar

^b *Mém. Inst.* 1810.

^c *Phil. Trans.* 1815.