

let^s were as fourteen to nine; and the intermediate colors of course corresponded to intermediate thicknesses, and therefore, in his apparatus, consisting of two lenses pressed together, appeared as rings of intermediate sizes. His mode of confirming the rule, by throwing upon this apparatus differently colored homogeneous light, is striking and elegant. "It was very pleasant," he says, "to see the rings gradually swell and contract as the color of the light was changed."

It is not necessary to enter further into the detail of these phenomena, or to notice the rings seen by transmission, and other circumstances. The important step made by Newton in this matter was, the showing that the rays of light, in these experiments, as they pass onwards go periodically through certain cycles of modification, each period occupying nearly the small fraction of an inch mentioned above; and this interval being different for different colors. Although Newton did not correctly disentangle the conditions under which this periodical character is manifestly disclosed, the discovery that, under some circumstances, such a periodical character does exist, was likely to influence, and did influence, materially and beneficially, the subsequent progress of Optics towards a connected theory.

We must now trace this progress; but before we proceed to this task, we will briefly notice a number of optical phenomena which had been collected, and which waited for the touch of sound theory to introduce among them that rule and order which mere observation had sought for in vain.

CHAPTER VIII.

ATTEMPTS TO DISCOVER THE LAWS OF OTHER PHENOMENA.

THE phenomena which result from optical combinations, even of a comparatively simple nature, are extremely complex. The theory which is now known accounts for these results with the most curious exactness, and points out the laws which pervade the apparent confusion; but without this key to the appearances, it was scarcely possible that any rule or order should be detected. The undertaking was of

² *Opticks*, p. 184.