

scopes, both with reference to spherical and to *chromatic* aberrations.

According to Dollond's discovery, the colored spectra produced by prisms of two substances, as flint-glass and crown-glass, would be of the same length when the refraction was different. But a question then occurred: When the whole distance from the red to the violet in one spectrum was the same as the whole distance in the other, were the intermediate colors, yellow, green, &c., in corresponding places in the two? This point also could not be determined any otherwise than by experiment. It appeared that such a correspondence did not exist; and, therefore, when the extreme colors were corrected by combinations of the different media, there still remained an uncorrected residue of color arising from the rest of the spectrum. This defect was a consequence of the property, that the spectra belonging to different media were not divided in the *same ratio* by the same colors, and was hence termed the *irrationality* of the spectrum. By using three prisms, or three lenses, three colors may be made to coincide instead of two, and the effects of this irrationality greatly diminished.

For the reasons already mentioned, we do not pursue this subject further,<sup>5</sup> but turn to those optical facts which finally led to a great and comprehensive theory.

[2nd Ed.] [Mr. Chester More Hall, of More Hall, in Essex, is said to have been led by the study of the human eye, which he conceived to be achromatic, to construct achromatic telescopes as early as 1729. Mr. Hall, however, kept his invention a secret. David Gregory, in his *Catoptrics* (1713), had suggested that it would perhaps be an improvement of telescopes, if, in imitation of the human eye, the object-glass were composed of different media. *Encyc. Brit.* art. *Optics*.

It is said that Clairaut first discovered the irrationality of the colored spaces in the spectrum. In consequence of this irrationality, it follows that when two refracting media are so combined as to correct each other's extreme dispersion, (the separation of the red and violet rays,) this first step of correction still leaves a residue of color-

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<sup>5</sup> The discovery of the *fixed lines* in the spectrum, by Wollaston and Fraunhofer, has more recently supplied the means of determining, with extreme accuracy, the corresponding portions of the spectrum in different refracting substances.