could indeed be a reason for ignoring the lines, for (i) Newton did not place great confidence in his own ability to see correctly the extent of the different colors, and (ii) he was so predisposed by his conviction that, after the analogy of the musical scale, there should be seven colors that he was able to interpret the observations of a friend (a more “critical” observer) as indicating that the positions of the colors correspond closely to the positions of the notes of the octave. It is interesting that so good an observer as Newton could have made so wrong an observation, one in line with his predilection.

The relevant account is not in the Opticks but is quoted by Thomas Birch [History of the Royal Society of London (1757), vol. 3, p. 262 ff.]:

And perhaps colour may be distinguished into its principal degrees, red, orange, yellow, green, blue, indigo, and deep violet, on the same ground, that sound within an eighth is graduated into tones. For, some years past, the prismatic colours being in a well darkened room cast perpendicularly upon a paper about two and twenty feet distant from the prism, I desired a friend to draw with a pencil lines cross the image, or pillar of colours, where every one of the seven aforesaid colours was most full and brisk, and also where he judged the truest confines of them to be, whilst I held the paper so, that the said image might fall within a certain compass marked on it. And this I did, partly because my own eyes are not very critical in distinguishing colours, partly because another, to whom I had not communicated my thoughts about this matter, could have nothing but his eyes to determine his fancy in making those marks. This observation we repeated divers times, both in the same and divers days, to see how the marks on several papers would agree; and comparing the observations, though the just confines of the colours are hard to be assigned, because they pass into one another by insensible gradation; yet the differences of the observations were but little, especially towards the red end, and taking means between those differences, that were, the length of the image (reckoned not by the distance of the verges of the semicircular ends, but by the distance of the centres of those semicircles, or length of the straight sides as it ought to be) was divided in about the same proportion that a string is, between the end and the middle, to sound the tones in the eighth.

Newton may have believed that he had not communicated his thoughts about this matter to his friend; nevertheless he had told him to look out for seven colors and to bound them. To the observing scientist, hypothesis is both friend and enemy.

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