

From Huygens' objections to Newton's "New Theory of Light and Colours"

*(Philosophical Transactions of the Royal Society, 1673):*

*An Extract of a Letter lately written by an ingenious person from Paris, containing some Considerations upon Mr. Newtons Doctrine of Colors, as also upon the effects of the different Refractions of the Rays in Telescopical Glasses.*

I Have seen, how Mr. Newton endeavours to maintain his new Theory concerning Colours. He thinks, that the most important Objection, which is made against him by way of Quære, is that, Whether there be more than two sorts of Colours. For my part, I believe, that an Hypothesis, that should explain mechanically and by the nature of motion the Colours Jellow {sic} and Blew, would be sufficient for all the rest, in regard that those others, being only more deeply charged (as appears by the Prismes of Mr. Hook,) do produce the dark or deep-Red and Blew; and that of these four all the other colors may be compounded. Neither do I see, why Mr. Newton doth not content himself with the two Colors, Yellow and Blew; for it will be much more easy to find an Hypothesis by Motion, that may explicate these two differences, than for so many diversities as there are of others {sic} Colors. And till he hath found this Hypothesis, he hath not taught us, what it is wherein consists the nature and difference of Colours, but only this accident (which certainly is very considerable,) of their different Refrangibility.

As for the composition of White made by all the Colors together, it may possibly be, that Yellow and Blew might also be sufficient for that: Which is worth while to try; and it may be done by the Experiment, which Mr. Newton proposeth, by receiving against a wall of a darkn'd room the Colours of the Prisme, and to cast their reflected light upon white paper. Here you must hinder the Colors of the extremeties, viz. the Red and Purple, from striking against the wall, and leave only the intermediate Colors; yellow, green and blew, to see, whether the light of these alone would not make the paper appear white, as well as when they all give light. I even doubt, whether the lightest place of the yellow color may not all alone produce that effect, and I mean to try it at the first conveniency; for this thought never came into my mind but just now. Mean time you may see, that if these Experiments do succeed, it can no more be said, that all the Colors are necessary to compound White, and that 'tis very probable, that all the rest are nothing but degrees of Yellow and Blew, more or less charged.

Newton's reply to Huygens:

*Mr. Newtons Answer to the foregoing Letter further explaining his Theory of Light and Colors, and particularly that of Whiteness; together with his continued hopes of perfecting Telescopes by Reflections rather than Refractions.*

Concerning the business of Colors; in my saying that when Monsieur N. hath shewn how White may be produced out of two uncompounded colors, I will tell him, why he can conclude nothing from that; my meaning was, that such a White, (were there any such,) would have different properties from the White, which I had respect to, when I described my Theory, that is, from the White of the Sun's immediate light, of the ordinary objects of our senses, and of all white Phænomena that have hitherto faln under my observation. And those different properties would evince it to be of a different constitution: Insomuch that such a production of white would be so far from contradicting, that it would rather illustrate and confirm my Theory; because by the difference of that from other whites it would appear, that other Whites are not compounded of only two colours like that. And therefore if Monsieur N. would prove any thing, it is requisite that he do not only produce out of two primitive Colors a white which to the naked eye shall appear like other whites, but also shall agree with them in all other properties.