

Author: Isaac Newton

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<38r>

Sir

I esteem my self much obliged to M^r Lucas for his case in making the Experimentum Crucis: but his reasoning I still forbear to meddle with becaus I will not run into any other dispute till I see a full end of what relates to M^r Linus. For if this running from one thing to another be allowed we shall never come to a conclusion in any thing. M^r Lucas would represent the question about the length of the Image improper if not preposterous to spend time on till the different refrangibility of rays differently coloured be agreed on. That is he would wholly decline it. For by his asserting demonstrations against me it's plain he thinks the different refrangibility will never be agreed on. But however he represents it others may think it more preposterous to run from one thing to another before we come to a conclusion & esteem the question as materiall now as when twas Started & thought worthy of being put upon M^r Linus's account. The examining my Theory is but a new attempted digression. 'Tis the truth of my experiments which is the business in hand. On this my Theory depends, & which is of more consequence, the credit of my being wary, accurate and faithfull in the reports I have made or shall make of experiments in any subject, seeing that a trip in any one will bring all the rest into suspicion. And besides the full truth of what I have said in my first letter of colours about the impossibility of promoting much further Catadioptrical Telescopes depends on the length of the Image, and is of great moment, be the Theory true {or} or fal{se} Wherefore though I was willing to let pass any way of concluding M^r Linus's proper objection; presuming that he would have concluded himself as much to his own honour as to my satisfaction had he lived to see the expert duely tried: yet I cannot admit to have the remainder of the business wholly jostled out by a new Subject. Let what relates to M^r Linus be made an end of & then M^r Lucas may begin upon his own scor{e} as soon as he pleases.

And becaus I hope his next letter will grant me what remains of the contended expert, that there be no further delays, I desire him to send me word which of his experiments he would have me begin with. For though whilst he urged his experiments but as exceptions which he hoped would not be unwelcome, I esteemed <38v> esteemed them not so proper to be considered in competition with a Demonstration, yet now he adds weight to their number presenting them for Demonstrations, & one Demonstration deserves to be considered as well as another: I intend to take into consideration one or two of them which he shall recommend for the best: & when there appears to be no weight in those let others judge what there may be in the numbers of the rest. But I shall consider but one at a time, that neither of us may have room to run up and down in till we are agreed. You know how weary I have profest myself of this subject even before M^r Linus's first letter came to me; & as much might be gathered by my deferring to meddle with that business for a year together till I was urged to it, & also by some expressions in my last letter. And therefore I hope M^r Lucas will not press me beyond one, or two of his objections though afterwards I may say something of the rest.

But becaus we stick at the Question about the length of the Image, to prevent unnecessary demurrs I cannot but say something more of {that}. M^r Lucas tells you when convenience of weather, and Prisms shall serve he shall be glad to see how farr the length of the Spectrum made by Prisms of different angle. sett down in my last letter will agree with observations at Liege: but yet that he thinks it improper to spend time on that precise length of the Spectrum by severall Prisms before the different refrangibility of rays be agreed on. That is he still turns off the Quæstion in hand to a new one, as if the business now was onely to examin my last Letter. The length made by several angles I sent not to create new unnecessary disputes but only to accommodate my Observations to the Prisms of men abroad to try and judge between us, and therefore though M^r Lucas may try them also for his private satisfaction, yet I think it as improper as he does to spend time on preciseness of all those The Question in hand is this. Whether the Image in the Experiment set down set down in my first letter about colours printed in the Transactions Num 80 could be five times longer than

broad as I have there exprest it, or but three or at most three and a half as M^r Lucas has <39r> has represented it. To this I desire a direct answer: which I hope will be so free as (without putting me to any further waies of justifying myself) may take off all suspicion of my misrepresenting matter of fact. If M^r Lucas hath not yet procured a Prism with an angle about the bigness of mine there used, & with sides not at all concave, but plain or onely a very little convex, let him onely upon the receipt of this signify without any insinuation of suspicion that he sees no reason to oppose or question me further upon the experiments they have hitherto made and proceeded on, & I shall acquiesce and begin with his Objections; & this I think he need not stick at seeing he is now to seek for a due Prism to try the Experiment with, & in his former letter where he started the Question he set down the angle of his Prism less than that in my experiment he wrote against: not attending to this Principle that the greater angle makes the greater length of the Image. Yet I cannot but say that I had rather have my experiment confirm'd by his assent than the suspicion only taken of. But yet I leave it to him to conclude the buisness any way, so it be but concluded before any thing els be urged upon me. So I am

Your humble Servant

Is. Newton.

In the last clause of M^r Lucas's Letter where he says that I calculated the length of the Spectrum by divers Prisms: the word calculate misrepresents what I sent him; the force of which lay in their being not calculated but measured. I desire M^r Lucas would be very exact in measuring the angle of the Prism he tries the Experiment with: for I must confess I cannot but suspect that the angle he Set down before (I imagin by guess) for 60 degrees, was nearer to 50. I could wish we knew the just measure of that angle. If it be as I conjecture it would end the Question. The way to examin whether an angle be justly measured is to measure all the three angles of the Prism by the same method & see if their summ be 180 degrees.

Cambridge. Nov. 28. 1676.

Yours about Planting I received, & am obliged to you & your Friends for making our way to M^r Austin. He whom I should communicate your letter to is at present out of town, so that at present I can say nothing to it in particular.

<39v>

For Henry Oldenburg Esq
at his house about the middle of the old Pal-mail in
Westminster

London

Of this I sent a copy to Mr Lucas Decemb. 4. 76.