Poſtſcript.

JUſt upon the cloſe of the adjoyned Letter, I received from Mr. Gaſcoine, *yours of* May *the fourth; wherein you are pleaſed to favour us with an exact account of the famous Experiment of the coloured* Spectrum, *lately exhibited before the* Royal Society. *I was much rejoyced to ſee the Trials of that Illuſtrious Company, agree ſo exactly with ours here, though in ſomewhat ours diſagree from Mr.* Newton, *as you will underſtand by the incloſed impartial account from,*

Sir, &c.

Mr. Newton's *Anſwer to the precedent Letter, ſent to the Publiſher.*

Sir,

THe things oppoſed by Mr. *Line* being upon Trials found true and granted me; I begin with the new queſtion about the proportion of the length of the Image to its breadth. This I call a *new one*; for, though Mr. *Line* in his laſt Letter ſpake againſt ſo great a length as I aſſign, yet, as it ſeems to me, it was not to grant any tranſverſe length ſhorter than that aſſigned by me, (for in his firſt Letter he abſolutely denied that there would be any ſuch length;) but to lay the greater emphaſis upon his diſcourſe whilſt in defence of common Opticques he was diſputing in general againſt a tranſverſe Image: And therefore in my Anſwer I did not preſcribe the juſt quantity of the refracting Angle with which I would have the Experiment repeated: which would have been a neceſſary circumſtance, had the diſpute been about the juſt proportion of the length to the breadth. Yet I added,* this Note, that the bigger the angle of the Priſm is, the greater will be the length in proportion to the breadth; not imagining but that when he had found in any Priſm the length of the Image tranſverſe to the axis he would eaſily thence conclude, that a Priſm with a greater angle would make the Image longer, and conſequently that by uſing an angle great enough he might bring it to equal or exceed the length aſſigned by me; as indeed he might: for by taking an Angle of 70 or 75 degrees, or a little greater.

* *In my firſt Letter in* Phil. Tranſ. N. 1235 p. 5099. *Poſt.*

greater, he might have made the length not only five, but ſix or eight times the breadth and more. No wonder therefore, that Mr. *Lucas* found the Image ſhorter than I did, ſeeing he tried the Experiment with a leſs Angle.

The Angle indeed which I uſed was but about 63 degrees 12 minutes, and his is ſet down 60 degrees: the difference of which from mine, being but 3 degrees 12 minutes, is too little to reconcile us, but yet it will bring us conſiderably nearer together. And if his Angle was not exactly meaſured, but the round number of 60 degrees ſet down by gueſs or by a leſs accurate meaſure (as I ſuſpect by the conjectural meaſure of the refraction of his Priſm by the *ratio* of the ſigns 2 to 3, ſet down at the ſame time, inſtead of an Experimental one,) then might it be two or three degrees leſs than 60, if not ſtill leſs: and all this, if it ſhould be ſo, would take away the greateſt part of the difference between us.

But however it be, I am well aſſured, my own obſervation was exact enough. For I have repeated it divers times ſince the receipt of Mr. *Lucas*'s Letter, and that without any conſiderable difference of my Obſervations either from one another, or from what I wrote before. And that it might appear experimentally, how the increaſe of the Angle increaſes the length of the Image, and alſo that no body who has a mind to try the Experiment exactly, might be troubled to procure a Priſm which has an angle juſt of the bigneſs aſſigned by me; I tried the Experiment with divers Angles, and have ſet down my Trials in the following Table; where the firſt column expreſſes the ſix Angles of two Priſms which I uſed, which were meaſured as exactly as I could by applying them to the angle of a Sector; and the ſecond column expreſſes in inches the length of the Image made by each of thoſe Angles; its breadth being two inches, its diſtance from the Priſm 18 feet and four inches, and the breadth of the hole in the Window-ſhut $\frac{1}{4}$ of an inch.

	The Angles of		*The Lengths of*
	degr.	*min.*	*the Image.*
The firſt Priſm	56	10	$7\frac{3}{4}$
	60	24	$9\frac{1}{2}$
	63	26	$10\frac{1}{3}$

The

	The Angles of degr.	min.	*The Lengths of the Image.*
the ſecond Priſm.	54	0	$7\frac{1}{3}$
	62	12	$10\frac{1}{8}$
	63	48	$10\frac{3}{4}$

You may perceive, that the length of the Images in reſpect of the angles that made them, are ſomething greater in the ſecond Priſm than in the firſt; but that was becauſe the glaſs, of which the ſecond Priſm was made, had the greater refractive power.

The days in which I made theſe Trials were pretty clear, but not ſo clear as I deſired, and therefore afterwards meeting with a day as clear as I deſired, I repeated the Experiment with the ſecond Priſm, and found the lengths of the Image made by its ſeveral angles to be about $\frac{1}{4}$ of an inch greater than before, the meaſures being thoſe ſet down in this Table.

	The Angles of degr.	min.	*The Lengths of the Image.*
the ſecond Priſm	54	0	$7\frac{2}{3}$
	62	12	$10\frac{1}{2}$
	63	48	11

The reaſon of this difference I apprehend was, that in the cleareſt days the light of the white skies, which dilutes and renders inviſible the fainteſt Colours at the ends of the Image, is a little diminiſhed in a clear day, and ſo gives leave to the Colours to appear to a greater length; the Suns light at the ſame time becoming brisker, and ſo ſtrengthning the Colours and making the faint ones at the two ends more conſpicuous. For I have obſerved, that in days ſomething cloudy, whilſt the Priſm has ſtood unmoved at the window, the Image would grow a little longer or a little ſhorter, accordingly as the Sun was more or leſs obſcured by thin Clouds which paſſed over it; the Image being ſhorteſt when the Cloud was brighteſt and the Suns light fainteſt. Whence it is eaſie to apprehend, that, if the light of the Clouds could be quite taken away, ſo that the Sun

Sun might appear ſurrounded with darkneſs, or if the Suns light were much ſtronger than it is, the colours would ſtill appear to a greater length.

In all theſe Obſervations the breadth of the Image was juſt two inches. But obſerving, that the ſides of the two Priſms, I uſed, were not exactly plain, but a little convex, (the convexity being about ſo much as that of a double Convex-glaſs of a ſixteen or eighteen foot *Teleſcope*) I took a third Priſm, whoſe ſides were as much concave as thoſe of the other were convex; and this made the breadth of the Image to be two inches and a third part of an inch; the angles of this Priſm, and the lengths of the Image made by each of thoſe Angles being thoſe expreſt in this Table.

The Angles of the Priſm.	*The Lengths of the Image in inches.*
degr.	
58	$8\frac{1}{2}$
$59\frac{1}{2}$	9
$62\frac{1}{2}$	$10\frac{1}{4}$

In this caſe you ſee, the concave figure of the ſides of the Priſm by making the rays diverge a little, cauſes the breadth of the Image to be greater in proportion to its length than it would be otherwiſe. And this I thought fit to give you notice of, that Mr. *Lucas* may examine, whether his Priſm have not this fault. If a Priſm may be had with ſides exactly plain, it may do well to try the Experiment with that; but its better, if the ſides be about ſo much convex as thoſe of mine are, becauſe the Image will thereby become much better defined. For this convexity of the ſides does the ſame effect, as if you ſhould uſe a Priſm with ſides exactly plain, and between it and the hole in the Window-ſhut, place an Object-glaſs of an 18 foot *Teleſcope*, to make the round Image of the Sun appear diſtinctly defined on the wall when the Priſm is taken away, and conſequently the long Image made by the Priſm to be much more diſtinctly defined (eſpecially at its ſtreight ſides) than it would be otherwiſe.

One thing more I ſhall add: That the utmoſt length of the Image from the fainteſt Red at one end to the fainteſt Blew at the

the other, muſt be meaſured. For in my firſt Letter about Colours, where I ſet down the length to be five times the breadth, I called that length the utmoſt length of the image; and I meaſured the utmoſt length, becauſe I account all that length to be cauſed by the immediate light of the Sun, ſeeing the Colours (as I noted above) become viſible to the greateſt length in the cleareſt days, that is, when the light of the Sun tranſcends moſt the light of the Clouds. Sometimes there will happen to ſhoot out from both ends of the Image a glaring light a good way beyond theſe colours, but this is not to be regarded, as not appertaining to the Image. If the meaſures be taken right, the whole length will exceed the length of the ſtreight ſides by about the breadth of the Image.

By theſe things ſet down thus circumſtantially, I preſume Mr. *Lucas* will be enabled to accord his tryals of the Experiment with mine; ſo nearly, at leaſt, that there ſhall not remain any very conſiderable difference between us. For, if ſome little difference ſhould ſtill remain, that need not trouble us any further, ſeeing there may be many various circumſtances which may conduce to it; ſuch as are not only the different figures of priſms, but alſo the different refractive power of Glaſſes, the different diameters of the Sun at divers times of the year, and the little errors that may happen in meaſuring lines and angles, or in placing the priſm at the window; though, for my part, I took care to do theſe things as exactly as I could. However Mr. *Lucas* may make ſure to find the Image as long or longer than I have ſet down, if he take a priſm whoſe ſides are not hollow ground, but plain, or (which is better) a very little convex, and whoſe refracting angle is as much greater than that I uſed, as that he has hitherto tryed it with, is leſs; that is, whoſe angle is about 66 or 67 degrees, or (if he will) a little greater.

Concerning Mr. *Lucas*'s other Experiments, I am much obliged to him that he would take theſe things ſo far into conſideration, and be at ſo much pains for examining them; and I thank him ſo much the more, becauſe he is the firſt that has ſent me an experimental examination of them. By this I may preſume he really deſires to know what truth there is in theſe matters. But yet it will conduce to his more ſpeedy and full

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ſatisfaction if he a little change the method which he has propounded, and inſtead of a multitude of things try only the *Experimentum Caucis*. For it is not number of Experiments, but weight to be regarded; and where one will do, what need many?

Had I thought more requiſite, I could have added more: For before I wrote my firſt Letter to you about Colours, I had taken much pains in trying Experiments about them, and written a Tractate on that ſubject, wherin I had ſet down at large the principal of the Experiments I had tried; amongſt which there happened to be the principal of thoſe Experiments which Mr. *Lucas* has now ſent me. And as for the Experimeuts ſet down in my firſt Letter to you, they were only ſuch as I thought convenient to ſelect out of that Tractate.

But ſuppoſe thoſe had been my whole ſtore, yet Mr. *Lucas* ſhould not have grounded his diſcourſe upon a ſuppoſition of my want of Experiments, till he had examined thoſe few. For if any of thoſe be demonſtrative, they will need no aſſiſtants, nor leave room for further diſputing about what they demonſtrate.

The main thing he goes about to examine is, *the different refrangibility* of Light. And this I demonſtrated by the *Experimentum Crucis*. Now if this demonſtration be good, there needs no further examination of the thing; if not good, the fault of it is to be ſhewn: for the only way to examine a demonſtrated propoſition is, to examine the demonſtration. Let that Experiment therefore be examined in the firſt place, and that which it proves be acknowledged, and then if Mr. *Lucas* want my aſſiſtance to unfold the difficulties which he fancies to be in the Experiments he has propounded, he ſhall freely have it; for then I ſuppoſe a few words may make them plain to him: whereas, ſhould I be drawn from demonſtrative Experiment to begin with thoſe, it might create us both the trouble of a long diſpute, and by the multitude of words, cloud rather than clear up the truth. For if it has already coſt us ſo much trouble to agree upon the matter of fact in the firſt and plaineſt Experiment, and yet we are not fully agreed; what an endleſs trouble might it create us, if we ſhould give our ſelves up to diſpute upon every Argument that occurs, and what would become of Truth in ſuch a tedious diſpute?

The way therefore that I propound, being the ſhorteſt and cleareſt (not to ſay, the only proper way,) I queſtion not but Mr. *Lucas* will be glad that I have recommended it, ſeeing he profeſſes, that it is the knowledge of *truth* that he ſeeks after. And therefore at preſent I ſhall ſay nothing in anſwer to his Experimental diſcourſe, but this in general; that it has proceeded partly from ſome miſunderſtanding of what he writes againſt, and partly from want of due caution in trying Experiments; and that amongſt his Experiments there is one, which when duly tried, is, next to the *Experimentum Crucis*, the moſt conſpicuous Experiment, I know, for proving the different refrangibility of Light, which he brings it to prove againſt.

By the *Poſt-ſcript* of Mr. *Lucas*'s Letter, one not acquainted with what has paſſed, might think, that he quotes the Obſervation of the *R. Society* againſt me; whereas the relation of their Obſervation, which you ſent to *Liege*, contained nothing at all about the juſt proportion of the Length of the Image to its Breath according to the angle of the Priſm, nor any thing more (ſo far as I can perceive by your laſt) than what was pertinent to the things then in diſpute, *viz.* that they found them ſucceed as I had affirmed. And therefore ſince Mr. *Lucas* has found the ſame ſucceſs, I ſuppoſe, that when he expreſſed, that *he much rejoyced to ſee the Trials of the* R. Society *agree ſo exactly with his*, he meant only ſo far as his agreed with mine.

And becauſe I am again upon this firſt Experiment, I ſhall deſire, that Mr. *Lucas* will repeat it with all the exactneſs and caution that may be, regard being had to the information about it, ſet down in this Letter; and then I deſire ro have the *length* and *breadth* of the Image with its *diſtance* from the Priſm, ſet down exactly in feet and inches, and parts of an inch, that I may have an opportunity to conſider what relation its length and breadth have to the Suns diameter. For I know, that Mr. *Lucas* Obſervation cannot hold where the refracting angle of the Priſm is full 60 degrees, and the day is clear, and the full length of the Colours is meaſured, and the breadth of the Image anſwers to the Sun's diameter: And ſeeing I am well aſſured of the truth and exactneſs of my own Obſervations, I ſhall be unwilling to be diverted by any other Experiments, from having a fair end made of this in the firſt place. *Sir, I am, &c.*

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Poſtſcript.

I *Had like to have forgotten to adviſe, that the* Experimentum Crucis, *and ſuch others as ſhall be made for knowing the nature of Colours, be made with Priſms which refract ſo much, as to make the length of the Image five times its breadth, and rather more than leſs; for, otherwiſe Experiments will not ſucceed ſo plainly with others as they have done with me.*

An Account of two Books:

I. *Tractatus de* VENTRICULO *&* INTESTINIS, *cui præmittitur alius de* PARTIBUS CONTINENTIBUS *in genere, & in ſpecie de Partibus* ABDOMINIS; *Auth.* Franc. Gliſſonio, *M. D. &* Coll. Med. Lond. *Socio, nec non* Soc. Regalis *Collegâ.* Londini, 1676. *in quarto.*

THe eminently learned Author of this Anatomical Treatiſe, having preſuppoſed the general Diviſions of the parts of an Human Body, taken in their largeſt ſenſe, and their inadequate conceptions, upon the account of which they are in divers reſpects called Similar or Organical, proceeds directly in this work to the Inferiour and more Practical diviſions of the ſaid Body.

And having firſt of all divided the Lowermoſt *Venter* into its Regions, and deſigned the parts contained in each of them; he goes on to the diviſion of the *Cutaneous* parts, and conſiders the nature, ſtructure, origin, vitality, and uſes of the *Cuticula* and *Cutis vera*. Where we cannot but take notice, that the Author, as well here, as throughout this whole piece, builds much upon the grounds, he had laid in the Book, he publiſhed four years ago, *de Vita Naturæ*, wherein he aſcribes much to *Natural Perception*, which he holds to be an Operation anterior to, and more general and more ſimple than that of, *Senſe*; and in which Perception, accompanied with Appetition and Motion, he makes *Original Life* to conſiſt, which, to him, is nothing elſe but the Energetical or Operative nature of any Being ſubſiſting by it ſelf, not producible by any external power, motion, texture, figure, organization or proportion of parts, but by the ſole