PHILOSOPHICAL
TRANSACTIONS:

A Letter of Mr. Isaac Newton, Professor of the Mathematicks in the University of Cambridge; Containing His New Theory about Light and Colors: Sent by the Author to the Publisher from Cambridge, Febr. 6. 1671/72; In Order to be Communicated to the R. Society

Isaac Newton

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The CONTENTS.

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SIR,

TO perform my late promise to you, I shall without further ceremony acquaint you, that in the beginning of the Year 1666 (at which time I applyed my self to the grinding of Optick glasses of other figures than *Spherical,*) I procured me a Triangular glass-Prisme, to try therewith the celebrated *Phænomena* of

Colours. And in order thereto having darkened my chamber, and made a ſmall hole in my window-ſhuts, to let in a convenient quantity of the Suns light, I placed my Priſme at his entrance, that it might be thereby refracted to the oppoſite wall. It was at firſt a very pleaſing divertiſement, to view the vivid and intenſe colours produced thereby; but after a while applying my ſelf to conſider them more circumſpectly, I became ſurpriſed to ſee them in an *oblong* form; which, according to the received laws of Refraction, I expected ſhould have been *circular*.

They were terminated at the ſides with ſtreight lines, but at the ends, the decay of light was ſo gradual, that it was difficult to determine juſtly, what was their figure; yet they ſeemed *ſemicircular*.

Comparing the length of this coloured *Spectrum* with its breadth, I found it about five times greater; a diſproportion ſo extravagant, that it excited me to a more then ordinary curioſity of examining, from whence it might proceed. I could ſcarce think, that the various *Thickneſs* of the glaſs, or the termination with ſhadow or darkneſs, could have any Influence on light to produce ſuch an effect; yet I thought it not amiſs, firſt to examine thoſe circumſtances, and ſo tryed, what would happen by tranſmitting light through parts of the glaſs of divers thickneſſes, or through holes in the window of divers bigneſſes, or by ſetting the Priſme without ſo, that the light might paſs through it, and be refracted before it was terminated by the hole: But I found none of thoſe circumſtances material The faſhion of the colours was in all theſe caſes the ſame.

Then I ſuſpected, whether by any *unevenneſs* in the glaſs, or other contingent irregularity, theſe colours might be thus dilated. And to try this, I took another Priſme like the former, and ſo placed it, that the light, paſſing through them both, might be refracted contrary ways, and ſo by the latter returned into that courſe, from which the former had diverted it. For, by this means I thought, the *regular* effects of the firſt Priſme would be deſtroyed by the ſecond Priſme, but the *irregular* ones more augmented, by the multiplicity of refractions. The event was, that the light, which by the firſt Priſme was diffuſed into an *oblong* form, was by the ſecond reduced into an *orbicular* one with as much regularity, as when it did not at all paſs through them. So that, what ever was the cauſe of that length, 'twas not any contingent irregularity.

I then proceeded to examin more critically, what might be effected by the difference of the incidence of Rays coming from divers parts of the Sun; and to that end, measured the several lines and angles, belonging to the Image. Its distance from the hole or Prisme was 22 foot; its utmost length $13\frac{1}{4}$ inches; its breadth $2\frac{1}{8}$; the diameter of the hole $\frac{1}{4}$ of an inch; the angle, with the Rays, tending towards the middle of the image, made with those lines, in which they would have proceeded without refraction, was 44 deg. 56′. And the vertical Angle of the Prisme, 63 deg. 12′. Also the Refractions on both sides the Prisme, that is, of the Incident, and Emergent Rays, were as near, as I could make them, equal, and consequently about 54 deg. 4′. And the Rays fell perpendicularly upon the wall. Now subducting the diameter of the hole from the length and breadth of the Image, there remains 13 Inches the length, and $2\frac{3}{8}$ the breadth, comprehended by those Rays, which passed through the center of the said hole, and consequently the angle of the hole, which that breadth subtended, was about 31′, answerable to the Suns Diameter; but the angle, which its length subtended, was more then five such diameters, namely 2 deg. 49′.

Having made these observations, I first computed from them the refractive power of that glass, and found it measured by the *ratio* of the sines, 20 to 31. And then, by that *ratio*, I computed the Refractions of two Rays flowing from opposite parts of the Sun's *discus*, so as to differ 31′ in their obliquity of Incidence, and found, that the emergent Rays should have comprehended an angle of about 31′, as they did, before they were incident.

But because this computation was founded on the Hypothesis of the proportionality of the *sines* of Incidence, and Refraction, which though by my own Experience I could not imagine to be so erroneous, as to make that Angle but 31′, which in reality was 2 deg. 49′; yet my curiosity caused me again to take my Prisme. And having placed it at my window, as before, I observed, that by turning it a little about its *axis* to and fro, so as to vary its obliquity to the light, more then an angle of 4 or 5 degrees, the Colours were not thereby sensibly translated from their place on the wall, and consequently by that variation of Incidence, the quantity of Refraction was not sensibly varied. By this Experiment therefore, as well as by the former computation, it was evident, that the difference of the Incidence of Rays, flowing from divers

parts of the Sun, could not make them after decuſſation diverge at a ſenſibly greater angle, than that at which they before converged; which being, at moſt, but about 31 or 32 minutes, there ſtill remained ſome other cauſe to be found out, from whence it could be 2 degr. 49'.

Then I began to ſuſpect, whether the Rays, after their trajection through the Priſme, did not move in curve lines, and according to their more or leſs curvity tend to divers parts of the wall. And it increaſed my ſuſpition, when I remembred that I had often ſeen a Tennis-ball, ſtruck with an oblique Racket, deſcribe ſuch a curve line. For, a circular as well as a progreſſive motion being communicated to it by that ſtroak, its parts on that ſide, where the motions conſpire, muſt preſs and beat the contiguous Air more violently than on the other, and there excite a reluctancy and reaction of the Air proportionably greater. And for the ſame reaſon, if the Rays of light ſhould poſſibly be globular bodies, and by their oblique paſſage out of one medium into another acquire a circulating motion, they ought to feel the greater reſiſtance from the ambient Æther, on that ſide, where the motions conſpire, and thence be continually bowed to the other. But notwithſtanding this plauſible ground of ſuſpition, when I came to examine it, I could obſerve no ſuch curvity in them. And beſides (which was enough for my purpoſe) I obſerved, that the difference 'twixt the length of the Image, and diameter of the hole, through which the light was tranſmitted, was proportionable to their diſtance.

The gradual removal of theſe ſuſpitions, at length led me to the *Experimentum Crucis*, which was this: I took two boards, and placed one of them cloſe behind the Priſme at the window, ſo that the light might paſs through a ſmall hole, made in it for the purpoſe, and fall on the other board, which I placed at about 12 feet diſtance, having firſt made a ſmall hole in it alſo, for ſome of that Incident light to paſs through. Then I placed another Priſme behind this ſecond board, ſo that the light, trajected through both the boards, might paſs through that alſo, and be again refracted before it arrived at the wall. This done, I took the firſt Priſme in my hand, and turned it to and fro ſlowly about its *Axis*, ſo much as to make the ſeveral parts of the Image, caſt on the ſecond board, ſucceſſively paſs through the hole in it, that I might obſerve to what places on the wall the ſecond Priſme would refract them.

And

And I saw by the variation of those places, that the light, tending to that end of the Image, towards which the refraction of the first Prisme was made, did in the second Prisme suffer a Refraction considerably greater then the light tending to the other end. And so the true cause of the length of that Image was detected to be no other, then that *Light* consists of *Rays differently refrangible*, which, without any respect to a difference in their incidence, were, according to their degrees of refrangibility, transmitted towards divers parts of the wall.

When I understood this, I left off my aforesaid Glass works; for I saw, that the perfection of Telescopes was hitherto limited, not so much for want of glasses truly figured according to the prescriptions of Optick Authors, (which all men have hitherto imagined,) as because that Light it self is a *Heterogeneous mixture of differently refrangible Rays*. So that, were a glass so exactly figured, as to collect any one sort of rays into one point, it could not collect those also into the same point, which having the same Incidence upon the same Medium are apt to suffer a different refraction. Nay, I wondered, that seeing the difference of refrangibility was so great, as I found it, Telescopes should arrive to that perfection they are now at. For, measuring the refractions in one of my Prismes, I found, that supposing the common *sine* of Incidence upon one of its planes was 44 parts, the *sine* of refraction of the utmost Rays on the red end of the Colours, made out of the glass into the Air, would be 68 parts, and the *sine* of refraction of the utmost rays on the other end, 69 parts: So that the difference is about a 24*th* or 25*th* part of the whole refraction. And consequently, the object-glass of any Telescope cannot collect all the rays, which come from one point of an object, so as to make them convene at its *focus* in less room then in a circular space, whose diameter is the 50*th* part of the Diameter of its Aperture; which is an irregularity, some hundreds of times greater, then a circularly figured *Lens*, of so small a section as the Object-glasses of long Telescopes are, would cause by the unfitness of its figure, were Light *uniform*.

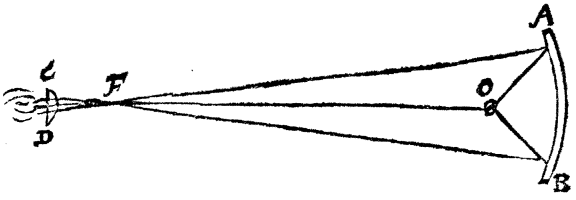
This made me take *Reflections* into consideration, and finding them regular, so that the Angle of Reflection of all sorts of Rays was equal to their Angle of Incidence; I understood, that by their mediation Optick instruments might be brought to any degree of perfection imaginable, provided a *Reflecting* substance could be found,

found, which would poliſh as finely as Glaſs, and *reflect* as much light, as glaſs *tranſmits*, and the art of communicating to it a *Parabolick* figure be alſo attained. But there ſeemed very great difficulties, and I have almoſt thought them inſuperable, when I further conſidered, that every irregularity in a reflecting ſuperficies makes the rays ſtray 5 or 6 times more out of their due courſe, than the like irregularities in a refracting one: So that a much greater curioſity would be here requiſite, than in figuring glaſſes for Refraction.

Amidſt theſe thoughts I was forced from *Cambridge* by the Intervening Plague, and it was more then two years, before I proceeded further. But then having thought on a tender way of poliſhing, proper for metall, whereby, as I imagined, the figure alſo would be corrected to the laſt; I began to try, what might be effected in this kind, and by degrees ſo far perfected an Inſtrument (in the eſſential parts of it like that I ſent to *London*,) by which I could diſcern Jupiters 4 Concomitants, and ſhewed them divers times to two others of my acquaintance. I could alſo diſcern the Moon-like phaſe of *Venus*, but not very diſtinctly, nor without ſome niceneſs in diſpoſing the Inſtrument.

From that time I was interrupted till this laſt Autumn, when I made the other. And as that was ſenſibly better then the firſt (eſpecially for Day-Objects,) ſo I doubt not, but they will be ſtill brought to a much greater perfection by their endeavours, who, as you inform me, are taking care about it at *London*.

I have ſometimes thought to make a *Microſcope*, which in like manner ſhould have, inſtead of an Object-glaſs, a Reflecting piece of metall. And this I hope they will alſo take into conſideration. For thoſe Inſtruments ſeem as capable of improvement as *Teleſcopes*, and perhaps more, becauſe but one reflective piec of metall is requiſite in them, as you may perceive by the annexed diagram, where A B repreſenteth the object metall, C D the eye glaſs, F their common Focus, and O the other focus of the metall, in which the object is placed.



But

But to return from this digreſſion, I told you, that Light is not ſimilar, or homogeneal, but conſiſts of *difform* Rays, ſome of which are more refrangible than others: So that of thoſe, which are alike incident on the ſame medium, ſome ſhall be more refracted than others, and that not by any virtue of the glaſs, or other external cauſe, but from a prediſpoſition, which every particular Ray hath to ſuffer a particular degree of Refraction.

I ſhall now proceed to acquaint you with another more notable difformity in its Rays, wherein the *Origin of Colours* is unfolded: Concerning which I ſhall lay down the *Doctrine* firſt, and then, for its examination, give you an inſtance or two of the *Experiments*, as a ſpecimen of the reſt.

The Doctrine you will find comprehended and illuſtrated in the following propoſitions.

1. As the Rays of light differ in degrees of Refrangibility, ſo they alſo differ in their diſpoſition to exhibit this or that particular colour. Colours are not *Qualifications of Light*, derived from Refractions, or Reflections of natural Bodies (as 'tis generally believed,) but *Original* and *connate properties*, which in divers Rays are divers. Some Rays are diſpoſed to exhibit a red colour and no other; ſome a yellow and no other, ſome a green and no other, and ſo of the reſt. Nor are there only Rays proper and particular to the more eminent colours, but even to all their intermediate gradations.

2. To the ſame degree of Refrangibility ever belongs the ſame colour, and to the ſame colour ever belongs the ſame degree of Refrangibility. The *leaſt Refrangible* Rays are all diſpoſed to exhibit a *Red* colour, and contrarily thoſe Rays, which are diſpoſed to exhibit a *Red* colour, are all the leaſt refrangible: So the *moſt refrangible* Rays are all diſpoſed to exhibit a deep *Violet-Colour*, and contrarily thoſe which are apt to exhibit ſuch a violet colour, are all the moſt Refrangible. And ſo to all the intermediate colours in a continued ſeries belong intermediate degrees of refrangibility. And this Analogy 'twixt colours, and refrangibility, is very preciſe and ſtrict; the Rays always either exactly agreeing in both, or proportionally diſagreeing in both.

3. The ſpecies of colour, and degree of Refrangibility proper to any particular ſort of Rays, is not mutable by Refraction, nor by Reflection from natural bodies, nor by any other cauſe, that I could yet obſerve. When any one ſort of Rays hath been well parted

parted from thoſe of other kinds, it hath afterwards obſtinately retained its colour, notwithſtanding my utmoſt endeavours to change it. I have refracted it with Priſmes, and reflected it with Bodies, which in Day-light were of other colours; I have intercepted it with the coloured film of Air interceding two compreſſed plates of glaſs; tranſmitted it through coloured Mediums, and through Mediums irradiated with other ſorts of Rays, and diverſly terminated it; and yet could never produce any new colour out of it. It would by contracting or dilating become more brisk, or faint, and by the loſs of many Rays, in ſome caſes very obſcure and dark; but I could never ſee it changed *in ſpecie*.

Yet ſeeming tranſmutations of Colours may be made, where there is any mixture of divers ſorts of Rays. For in ſuch mixtures, the component colours appear not, but, by their mutual allaying each other, conſtitute a midling colour. And therefore, if by refraction, or any other of the aforeſaid cauſes, the difform Rays, latent in ſuch a mixture, be ſeparated, there ſhall emerge colours different from the colour of the compoſition. Which colours are not New generated, but only made Apparent by being parted; for if they be again intirely mix't and blended together, they will again compoſe that colour, which they did before ſeparation. And for the ſame reaſon, Tranſmutations made by the convening of divers colours are not real; for when the difform Rays are again ſevered, they will exhibit the very ſame colours, which they did before they entered the compoſition; as you ſee, *Blew* and *Yellow* powders, when finely mixed, appear to the naked eye *Green*, and yet the Colours of the Component corpuſcles are not thereby really tranſmuted, but only blended. For, when viewed with a good Microſcope, they ſtill appear *Blew* and *Yellow* interſperſedly.

5. There are therefore two ſorts of Colours. The one original and ſimple, the other compounded of theſe. The Original or primary colours are, *Red*, *Yellow*, *Green*, *Blew*, and a *Violet-purple*, together with Orange, Indico, and an indefinite variety of Intermediate gradations.

6. The ſame colours in *Specie* with theſe Primary ones may be alſo produced by compoſition: For, a mixture of *Yellow* and *Blew* makes *Green*; of *Red* and *Yellow* makes *Orange*; of *Orange* and *Yellowiſh green* makes *yellow*. And in general, if any two Colours be mixed, which in the ſeries of thoſe, generated by the Priſme, are

not

not too far distant one from another, they by their mutual alloy compound that colour, which in the said series appeareth in the mid-way between them. But those, which are situated at too great a distance, do not so. *Orange* and *Indico* produce not the intermediate Green, nor Scarlet and Green the intermediate yellow.

7. But the most surprising, and wonderful composition was that of *Whiteness*. There is no one sort of Rays which alone can exhibit this. 'Tis ever compounded, and to its composition are requisite all the aforesaid primary Colours, mixed in a due proportion. I have often with Admiration beheld, that all the Colours of the Prisme being made to converge, and thereby to be again mixed as they were in the light before it was Incident upon the Prisme, reproduced light, intirely and perfectly white, and not at all sensibly differing from a *direct* Light of the Sun, unless when the glasses, I used, were not sufficiently clear; for then they would a little incline it to *their* colour.

8. Hence therefore it comes to pass, that *Whiteness* is the usual colour of *Light*; for, Light is a confused aggregate of Rays indued with all sorts of Colors, as they are promiscuously darted from the various parts of luminous bodies. And of such a confused aggregate, as I said, is generated Whiteness, if there be a due proportion of the Ingredients; but if any one predominate, the Light must incline to that colour; as it happens in the Blew flame of Brimstone; the yellow flame of a Candle; and the various colours of the Fixed stars.

9. These things considered, the *manner*, how colours are produced by the Prisme, is evident. For, of the Rays, constituting the incident light, since those which differ in Colour proportionally differ in Refrangibility, *they* by their unequall refractions must be severed and dispersed into an oblong form in an orderly succession from the least refracted Scarlet to the most refracted Violet. And for the same reason it is, that objects, when looked upon through a Prisme, appear coloured. For, the difform Rays, by their unequal Refractions, are made to diverge towards several parts of the *Retina*, and there express the Images of things coloured, as in the former case they did the Suns Image upon a wall. And by this inequality of refractions they become not only coloured, but also very confused and indistinct.

10. Why the Colours of the *Rainbow* appear in falling drops

of Rain, is alſo from hence evident. For, thoſe drops, which refract the Rays, diſpoſed to appear purple, in greateſt quantity to the Spectators eye, refract the Rays of other ſorts ſo much leſs, as to make them paſs beſide it; and ſuch are the drops on the inſide of the *Primary* Bow, and on the outſide of the *Secondary* or Exteriour one. So thoſe drops, which refract in greateſt plenty the Rays, apt to appear red, toward the Spectators eye, refract thoſe of other ſorts ſo much more, as to make them paſs beſide it; and ſuch are the drops on the exteriour part of the *Primary*, and interiour part of the *Secondary* Bow.

11. The odd Phænomena of an infuſion of *Lignum Nephriticum*, *Leaf gold*, *Fragments of coloured glaſs*, and ſome other tranſparently coloured bodies, appearing in one poſition of one colour, and of another in another, are on theſe grounds no longer riddles. For, thoſe are ſubſtances apt to reflect one ſort of light and tranſmit another; as may be ſeen in a dark room, by illuminating them with ſimilar or uncompounded light. For, then they appear of that colour only, with which they are illuminated, but yet in one poſition more vivid and luminous than in another, accordingly as they are diſpoſed more or leſs to reflect or tranſmit the incident colour.

12. From hence alſo is manifeſt the reaſon of an unexpected Experiment, which Mr. *Hook* ſomewhere in his *Micrography* relates to have made with two wedg-like tranſparent veſſels, fill'd the one with a red, the other with a blew liquor: namely, that though they were ſeverally tranſparent enough, yet both together became opake; For, if one tranſmitted only red, and the other only blew, no rays could paſs through both.

13. I might add more inſtances of this nature, but I ſhall conclude with this general one, that the Colours of all natural Bodies have no other origin than this, that they are variouſly qualified to reflect one ſort of light in greater plenty then another. And this I have experimented in a dark Room by illuminating thoſe bodies with uncompounded light of divers colours. For by that means any body may be made to appear of any colour. They have there no appropriate colour, but ever appear of the colour of the light caſt upon them, but yet with this difference, that they are moſt brisk and vivid in the light of their own day-light-colour. *Minium* appeareth there of any colour indifferently, with which 'tis illuſtrated, but yet moſt luminous in red, and ſo

Biſe appeareth indifferently of any colour with which 'tis illuſtrated, but yet moſt luminous in blew. And therefore *Minium* reflecteth Rays of any colour, but moſt copiouſly thoſe indued with red; and conſequently when illuſtrated with day-light, that is, with all ſorts of Rays promiſcuouſly blended, thoſe qualified with red ſhall abound moſt in the reflected light, and by their prevalence cauſe it to appear of that colour. And for the ſame reaſon *Biſe*, reflecting blew moſt copiouſly, ſhall appear blew by the exceſs of thoſe Rays in its reflected light; and the like of other bodies. And that this is the intire and adequate cauſe of their colours, is manifeſt, becauſe they have no power to change or alter the colours of any ſort of Rays incident apart, but put on all colours indifferently, with which they are inlightned.

Theſe things being ſo, it can be no longer diſputed, whether there be colours in the dark, nor whether they be the qualities of the objects we ſee, no nor perhaps, whether Light be a Body. For, ſince Colours are the *qualities* of Light, having its Rays for their intire and immediate ſubject, how can we think thoſe Rays *qualities* alſo, unleſs one quality may be the ſubject of and ſuſtain another; which in effect is to call it *Subſtance*. We ſhould not know Bodies for ſubſtances, were it not for their ſenſible qualities, and the Principal of thoſe being now found due to ſomething elſe, we have as good reaſon to believe that to be a Subſtance alſo.

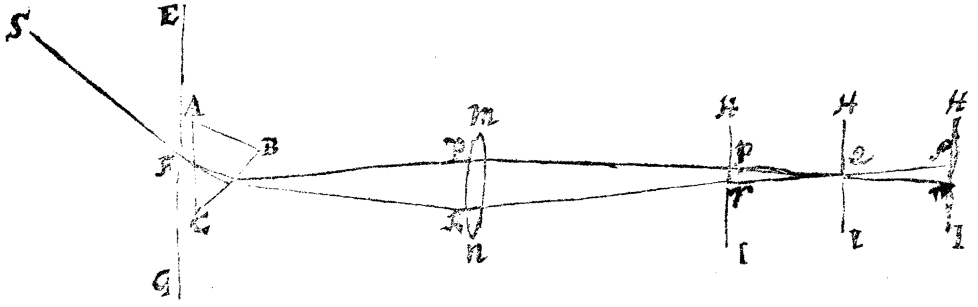
Beſides, whoever thought any quality to be a *heterogeneous* aggregate, ſuch as Light is diſcovered to be. But, to determine more abſolutely, what Light is, after what manner refracted, and by what modes or actions it produceth in our minds the Phantaſms of Colours, is not ſo eaſie. And I ſhall not mingle conjectures with certainties.

Reviewing what I have written, I ſee the diſcourſe it ſelf will lead to divers Experiments ſufficient for its examination: And therefore I ſhall not trouble you further, than to deſcribe one of thoſe, which I have already inſinuated.

In a darkened Room make a hole in the ſhut of a window, whoſe diameter may conveniently be about a third part of an inch, to admit a convenient quantity of the Suns light: And there place a clear and colourleſs Priſme, to refract the entring light towards the further part of the Room, which, as I ſaid, will thereby be diffuſed into an oblong coloured Image. Then place a *Lens* of

about three foot radius (ſuppoſe a broad Object-glaſs of a three foot Teleſcope,) at the diſtance of about four or five foot from thence, through which all thoſe colours may at once be tranſmitted, and made by its Refraction to convene at a further diſtance of about ten or twelve feet. If at that diſtance you intercept this light with a ſheet of white paper, you will ſee the colours converted into whiteneſs again by being mingled. But it is requiſite, that the *Priſme* and *Lens* be placed ſteddy, and that the paper, on which the colours are caſt, be moved to and fro; for, by ſuch motion, you will not only find, at what diſtance the whiteneſs is moſt perfect, but alſo ſee, how the colours gradually convene, and vaniſh into whiteneſs, and afterwards having croſſed one another in that place where they compound Whiteneſs, are again diſſipated, and ſevered, and in an inverted order retain the ſame colours, which they had before they entered the compoſition. You may alſo ſee, that, if any of the Colours at the *Lens* be intercepted, the Whiteneſs will be changed into the other colours. And therefore, that the compoſition of whiteneſs be perfect, care muſt be taken, that none of the colours fall beſides the *Lens*.

In the annexed deſign of this Experiment, A B C expreſſeth the Priſm ſet endwiſe to ſight, cloſe by the hole F of the window



E G. Its vertical Angle A C B may conveniently be about 60 degrees: *M N* deſigneth the *Lens*. Its breadth 2½ or 3 inches. S F one of the ſtreight lines, in which difform Rays may be conceived to flow ſucceſſively from the Sun. F P, and F R two of thoſe Rays unequally refracted, which the *Lens* makes to converge towards Q, and after decuſſation to diverge again. And H I the paper, at divers diſtances, on which the colours are projected: which in Q conſtitute *Whiteneſs*, but are *Red* and *Yellow* in R, r, and ſ, and *Blew* and *Purple* in P, p, and τ.

If

If you proceed further to try the impoſſibility of changing any uncompounded colour (which I have aſſerted in the third and thirteenth Propoſitions,) 'tis requiſite that the Room be made very dark, leaſt any ſcattering light, mixing with the colour, diſturb and allay it, and render it compound, contrary to the deſign of the Experiment. 'Tis alſo requiſite, that there be a perfecter ſeparation of the Colours, than, after the manner above deſcribed, can be made by the Refraction of one ſingle Priſme, and how to make ſuch further ſeparations, will ſcarce be difficult to them, that conſider the diſcovered laws of Refractions. But if tryal ſhall be made with colours not throughly ſeparated, there muſt be allowed changes proportionable to the mixture. Thus if compound Yellow light fall upon Blew *Biſe*, the Biſe will not appear perfectly yellow, but rather green, becauſe there are in the yellow mixture many rays indued with green, and Green being leſs remote from the uſual blew colour of Biſe than yellow, is the more copiouſly reflected by it.

In like manner, if any one of the Priſmatick colours, ſuppoſe Red, be intercepted, on deſign to try the aſſerted impoſſibility of reproducing that Colour out of the others which are pretermitted; 'tis neceſſary, either that the colours be very well parted before the red be intercepted, or that together with the red the neighbouring colours, into which any red is ſecretly diſperſed, (that is, the yellow, and perhaps green too) be intercepted; or elſe, that allowance be made for the emerging of ſo much red out of the yellow green, as may poſſibly have been diffuſed, and ſcatteringly blended in thoſe colours. And if theſe things be obſerved, the new Production of Red, or any intercepted colour will be found impoſſible.

This, I conceive, is enough for an Introduction to Experiments of this kind; which if any of the *R. Society* ſhall be ſo curious as to proſecute, I ſhould be very glad to be informed with what ſucceſs: That, if any thing ſeem to be defective, or to thwart this relation, I may have an opportunity of giving further direction about it, or of acknowledging my errors, if I have committed any.

So far this Learned and very Ingenious Letter; which having been by that *Illuſtrious Company*, before whom it was read, with much applauſe committed to the conſideration of ſome of their Fellows, well verſed in this argument, the Reader may poſſibly in an other *Tract* be informed of ſome report given in upon this Diſcourſe.

An.