the ſame preciſe colour by the different priſms placed at B, we marked the preciſe poſition of the priſm A when the ray of a particular colour fell on the priſm B. This was done by an index AG attached to A, and turning with it, when we cauſed the different colours of the ſpectrum form­ed by A to fall on B. Having examined one priſm B with reſpect to all the colours in the ſpectrum formed by A, we put another B in its place. Then bringing A to all its for­mer poſitions ſucceſſively, by means of a graduated arch HGK, we were certain that when the index was at the ſame diviſion of the arch it was the very ray which had been made to paſs through the firſt priſm B in a former experi­ment. We did not ſolicitouſly endeavour to find the very extreme red and violet rays ; becauſe, although we did not learn the whole diſperſions of the two priſms, we learned their proportions, which is the circumſtance wanted in the conſtruction of achromatic glaſſes. It is in vain to attempt this by meaſuring the ſpectrums themſelves ; for we cannot be certain of ſelecting the very ſame colours for the compariſon, becauſe they ſucceed in an inſenſible gradation.

The intelligent reader will readily obſerve, that we have hitherto proceeded on the ſuppoſition, that when, by means of contrary refractions, we have united the extreme red and violet rays, we have alſo united all the others. But this is quite gratuitous. Sir Iſaac Newton would, however, have made the ſame ſuppoſition ; for he imagined that the diffe­rent colours divided the ſpectrum formed by all ſubſtances in the proportions of a muſical canon. This is a miſtake. When a ſpectrum is formed by a priſm of crown glaſs, and another of preciſely the ſame length is formed by the side of it by a priſm of flint-glass, the confine between the green and blue will be found preciſely in the middle of the firſt ſpectrum, but in the second it will be conſiderably nearer to the red extremity. In ſhort, different ſubſtances do not diſperſe the colours in the ſame proportion.

The effect of this irrationality (ſo to call it) of diſperſion, will appear plainly, we hope, in the following manner : Let A (fig. 9. A) repreſent a ſpot of white solar light falling per­pendicularly on a wall. Suppoſe a priſm of common glass placed behind the hole through which the light is admitted, with its refracting angle facing the left hand. It will refract the beam of light to the right, and will at the ſame time diſperſe this heterogeneous light into its component rays, carrying the extreme red ray from A to R, the extreme orange from A to O, the extreme yellow from A to Y, &c. and will form the uſual priſmatic ſpectrum ROYGBPVC. If the whole length RC be divided into 1000 parts, we ſhall have (when the whole refraction AR is ſmall) RO very nearly 125, RY = 200, RG — 333, RB = 500, RP = 667, RV = 778, and RC = 1000; this being the propor­tion obſerved in the differences of the sines of refraction by Sir Iſaac Newton.

Perhaps a refracting medium may be found ſuch, that a priſm made oſ it would refract the white light ſrom A , in the upper line of this figure, in ſuch a manner that a ſpec­trum R'O'Y'G'B'P'V'C' ſhall be formed at the ſame diſtance from A', and of the ſame length, but divided in a dif­ferent proportion. We do not know that ſuch a medium has been found ; but we know that a priſm of flint-glass has its refractive and diſperſive powers ſo conſtituted, that if ΑΉ' be taken about 1/3d of AR, a ſpot of white light, formed by rays falling perpendicularly at H , will be ſo re­fracted and diſperſed, that the extreme red ray will be car­ried from H' to R', and the extreme violet from H' to C', and the intermediate colours to intermediate points, forming a ſpectrum reſembling the other, but having the colours more constipated towards R', and more dilated towards C ; ſo that the ray which the common glaſs carried to the middle point B of the ſpectrum RC is now in a point B' of the ſpectrum R'C', conſiderably nearer to R'.

Dr Blair has found, on the other hand, that certain fluids, particularly ſuch as contain the muriatic acid, when formed into a priſm, will refract the light from H" (in the lower line) ſo as to form a ſpectrum R''C'' equal to RC, and as far removed from A" as RC is from A, but having the co­lours more dilated toward R", and more conſtipated to­ward C, than is obſerved in RC ; ſo that the ray which was carried by the priſm of common glaſs to the middle point B is carried to a point B", conſiderably nearer to C''.

Let us now suppoſe that, inſtead of a white ſpot at A, we have a priſmatic ſpectrum AB (fig. 9. B), and that the priſm of common glaſs is applied as before, immediately be­hind the priſm which forms the spectrum AB. We know that this will be refracted ſidewiſe, and will make a ſpectrum ROYGBPC, inclined to the plane of refraction in an angle of 45⁰; ſo that drawing the perpendicular R'C' , we have RC' = C'C.

We alſo know that the priſm of flint-glaſs would refract the ſpectrum formed by the firſt priſm on EHF, in ſuch a manner that the red ray will go to R, the violet to C, and the intermediate rays to points o*, y, g, b, p, v,* ſo ſituated that O'o' is = R'O' of the other figure ; Yy is = R'Y' of that figure, Gg — R'G', &c. Theſe points muſt there­fore lie in a curve R *oygbpv*C, which is convex toward the axis R'C'.

In like manner we may be assured that Dr Blair’s fluid will form a ſpectrum Ro'y'*g'b'p', v'*C, concave toward R'C.

Let it be obſerved by the way, that this is a very good method for diſcovering whether a medium diſperſes the light in the ſame proportion with the priſm which is employed for forming the firſt ſpectrum AB or EF. It diſperſes in the ſame or in a different proportion, according as the ob­lique ſpectrum is ſtraight or crooked ; and the exact propor­tion correſponding to each colour is had by meaſuring the ordinates of the curves R*b*C or R b'C.

Having formed the oblique ſpectrum RBC by a priſm of common glaſs. we know that an equal priſm of the ſame glaſs, placed in a contrary poſition, will bring back all the rays from the ſpectrum RBC to the ſpectrum AB, laying each colour on its former place.

In like manner, having formed the oblique ſpectrum R*b*G by a prism of flint-glaſs, we know that another priſm of flint-glass, placed in the oppoſite direction, will bring all the rays back to the ſpectrum EHF.

But having formed the oblique ſpectrum RBC by a priſm of common glaſs, it we place the flint-glals priſm in the contrary poſition, it will bring the colour R back to E, and the colour C to F ; but it will not bring the colour B to H, but to a point *h,* ſuch that Bh is equal to bH, and *b* B to *h*H. In like manner, the other colours will not be brought back to the ſtraight line EHF, but to a curve E*h*F, forming a crooked ſpectrum.

In like manner, the fluids diſcovered by Dr Blair, when employed to bring back the oblique ſpectrum RBC formed by common glass, will bring its extremities back to E arid F, and form the crooked ſpectrum Eh'F lying beyond EHF.

This experiment evidently gives us another method ſor examining the proportionality of the diſperſion of different ſubſtances.

Having, by common glaſs, brought back the oblique ſpectrum formed by common glaſs to its natural place AB, ſuppoſe the original ſpectrum at AB to contract gradually (as Newton has made it do by means of a lens), it is plain that the oblique ſpectrum will alſo contract, and ſo will the