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 in the following manner : Let A (fig. 13) 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 12.5, 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 of it would refract the white light from A', in the upper line of this figure, in such a manner that a spectrum R'OΥ'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 A'H be taken about one third 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 s 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 R. Blair 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. 14), 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 45° ; so that drawing thc perpendicular RC', 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 *RoygbpvC,* which is convex towards the axis R'C'. In like manner, we may be assured that Dr Blair’s fluid will form a spectrum R*o'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 EE. 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 found by measuring the ordinates of the curves RAC or R*b'*C.

Having formed the oblique spectrum RBC by a prism of common glass, we know that an cqual 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 RAC 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, if we place the flint-glass 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 BA is equal to AH, and AB to AH. In like manner, the other colours will not be brought back to the straight line EHF, but to a curve EAF, 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 and F, and form the crooked spectrum E*h'*F lying beyond EHF.

This experiment evidently gives us another method for 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 to do by means of a lens), it is plain that the oblique spectrum will also contract, and so will the second spectrum at AB ; and it will at last co­alesce into a white spot. The effect will be equivalent to a gradual compression of the whole figure, by which the parallel lines All and BC gradually approach, and at last unite.

In like manner, when the oblique spectrum formed by