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 AR and BC gradually approach, and at laſt unite.

In like manner, when the oblique ſpectrum formed by flint-glass is brought back to EHF by a flint-glaſs prism, and the figure compressed in the ſame gradual manner, all the colours will coaleſce into a white spot.

But when flint-glaſs is employed to bring back the ob­lique ſpectrum formed by common glaſs, it forms the crook­ed ſpectrum EhF. Now let the figure be compreſſed. The curve EhF will be doubled down on the line H*h,* and there will be formed a compound ſpectrum H *b,* quite un­like the common ſpectrum, being purple or claret coloured at H by the mixture of the extreme red and violet, and green edged with blue at h by the mixture of the green and blue. The fluid priſms would in like manner form a ſpectrum of the ſame kind on the other side of H.

This is preciſely what is obſerved in achromatic object-glaſſes made of crown-glaſs and flint ; for the refraction from A to R correſponds to the refraction of the convex crown-glaſs ; and the contrary refraction from R to E corresponds to the contrary refraction of the concave flint- glass, which ſtill leaves a part of the firſt refraction, produ­cing a convergence to the axis of the teleſcope. It is found to give a purple or wine coloured focus, and within this a green one, and between theſe an imperfect white. Dr Blair found, that when the eye-glaſs was drawn out beyond its proper diſtance, a ſtar was ſurrounded by a green fringe, by the green end of the ſpectrum, which croffed each other within the focus ; and when the eye-glaſs was too near the object-glaſs, the ſtar had a wine-coloured fringe. The green rays were ultimately moſt refracted. *N. B.* We ſhould ex­pect the fringe to be of a blue colour rather than a green. But this is eaſily explained : The extreme violet rays are very faint, ſo as hardly to be ſenſible ; therefore when a compound glaſs is made as achromatic as poſſible to our ſenſes, in all probability (nay certainly) theſe almoſt inſenſible violet rays are left out, and perhaps the extreme co­lours which are united are the red and the middle violet rays. This makes the green to be the mean ray, and there­fore the moſt outſtanding when the diſperſions are not pro­portional.

Dr Biair very properly calls theſe ſpectrums, Hh and Hh', *ſecondary spectrums,* and ſeems to think that he is the ſirſt who has taken notice of them. But Mr Clairault was too accurate a mathematician, and too careful an obſerver, not to be aware of a circumſtance which was of primary conſe­quence to the whole inquiry. He could not but obſerve that the ſucceſe reſted on this very particular, and that the proportionality of diſperſion was indiſpenſably neceſſary.

This ſubject was therefore touched on by Clairault ; and *fully* diſcuſſed by Boſcovich, ſirſt in his Dissertations pub­liſhed at Vienna in 1759; then in the *Comment. Bonοniensis;* and, laſtly, in his *Opuscula,* publiſhed in 1785. Dr Blair, in his ingenious Dissertation on Achromatic Glaſſes, read to the Royal Society of Edinburgh in 1793, ſeems not to have known of the labours of theſe writers; ſpeaks of it as a new discovery; and exhibits ſome of the conſequences of this principle in a singular point of view, as ſomething very paradoxical and inconſiſtent with the uſually received no­tions on theſe ſubjects. But they are by no means ſo. We are, however, much indebted to his ingenious reſearches, and his ſucceſsful endeavours to find ſome remedy for this imperfection of achromatic glaſſes. Some of his contrivances are exceedingly ingenious ; but had the Doctor con- ſulted theſe writers, he would have ſaved himſelf a good deal of trouble.

Boſcovicſh ſhows how to unite the two extremes with the moſt outſtanding colour of the ſecondary ſpectrum, by means of a third ſubſtance. When we have done this, the aberration occaſioned by the ſecondary ſpectrums muſt be prodigiouſly diminiſhed ; for it is evidently equivalent to the union of the points H and *b* of our figure. Whatever cauſe produces this muſt diminiſh the curvature of the archet E*b* and *b*F : but even if theſe curvatures were not diminiſhed, their greateſt ordinates cannot exceed 1/4th of Hh; and we may ſay, without heſitation, that by uniting the mean or moſt outſtanding ray with the two extremes, the remaining diſperſion will be as much leſs than the uncor­rected colour of Dollond’s achromatic glaſs, as this is left than four times the diſperſion of a common object-glaſs. It muſt therefore be altogether inſenſible.

Boſcovich afferts, that it is not poſſible to unite more than two colours by the oppoſite refraction of two substances, which do not diſperse the light in the ſame propor­tions. Dr Blair makes light of this aſſertion, as he finds it made in general terms in the vague and paltry-extract made by Prieſtley from Boſcovich in his Eſſay on the Hiſtory of Optics ; but had he read this author in his own dissertations, he would have ſeen that he was perfectly right. Dr Blair, however, has hit on a very ingenious and effectual method of producing this union of three colours. In the ſame way as we correct the diſperſion of a concave lens of crown-glaſs by the oppoſite disperſion of a concave lens of flint-glass, we may correct the ſecondary diſperſion of an, achromatic convex lens by the oppoſite ſecondary diſperſion of an achromatic concave lens. But the intelligent reader will obſerve, that this union does not contradict the aſſertion of Boſcovich, becauſe it is *necessarily* produced by means of three refracting ſubſtances.

The moſt eſſential ſervice which the public has received at the hands of Dr Blair is the discovery of fluid mediums of a proper diſperſive power. By compoſing the lenſes of ſuch ſubſtances, we are at once freed from the irregula­rities in the refraction and diſperſion of flint-glaſs, which the chemists have not been able to free it from. In whatever way this glaſs is made, it conſiſts of parts which differ both in refractive and diſperſive power ; and when taken up from the pot, theſe parts mix in threads, which may be disſeminated through the mass in any degree of fineneſs. But they ſtill retain their properties ; and when a piece of flint- glass has been formed into a lens, the eye, placed in its fo­cus, ſees the whole ſurface occupied by gliſtening threads or broader veins running acroſs it. Great rewards have been of­fered for removing this defect, but hitherto to no purpoſe. We beg leave to propoſe the following method : Let the glaſs be reduced to powder, and then melted with a great proportion of alkaline ſalt, ſo as to make a liquor ſilicum. When precipitated from this by an acid, it muſt be in a ſtate of very uniform compoſition. If again melted into glaſs, we ſhould hope that it would be free from this de­fect ; if not, the cafe ſeems to be deſperate.

But by uſing a fluid medium, Dr Blair was freed from all this embarrassment ; and he acquired another immenſe advantage, that of adjuſting at pleaſure both the refractive and diſperſive powers of his lenſes. In ſolid lenſes, we do not know whether we have taken the curvatures ſuited to the refractions till our glaſs is finiſhed ; and if we have miſtaken the proportions, all our labour is loſt. But when fluids are uſed, it is enough that we know nearly the re­fractions. We suit our focal diſtances to theſe, and then ſelect our curvatures, ſo as to remove the aberration of fi­gure, preſerving the focal diſtances. Thus, by properly tempering the fluid mediums, we bring the lens to agree