which wave follows wave. This is well exemplified in waves of air producing sound; a long wave producing a grave tone, and a short wave, or that in which impulse follows impulse rapidly, produces an acute one.

The same estimation applies to ethereal waves; and hence, in the prismatic spectrum, the waves causing red light are the longest, and those of violet the shortest.

What is termed the interference of light may be explained in a similar way. It is known that, if two impulses of sound meet together while proceeding in a merely parallel course, the sound becomes increased, but, should they travel and meet in opposite directions, silence is the result. So it is with light, two rays coalescing increase the effulgence, while meeting in opposition they produce darkness. Shadows, then, are as often produced by the interference of light-giving rays as by the absence of any ray whatever. It is by the convergence and traveling of many rays together that the brightness of the image is produced in the camera.

The colors of the spectrum are not of equal brilliancy or breadth. The red, at the lowest extremity, is rather faint, but it becomes much brighter as it approaches the orange. At the middle of the yellow the light is brightest, and thence upward it gradually declines in intensity until it reaches the upper edge of the violet, where it is completely lost.

The action of the glass prism is easily understood: white light is a bundle of colored rays united together. In passing through the prism the bond of union is severed, and the colored rays come out singly and *separately*, because each ray has a certain amount of bending or refraction proper to it. Thus it is that every spectrum or rainbow has the colors arranged precisely alike; there is never any confusion or misplacement of the rays.

The rays of light leave the prism at the same angle they entered it, and are decomposed in the body of the prism. The ray of light must fall upon the *centre* of one of the sides and not touch the angle. We have seen a woodcut illustration, where the ray of white light is made to turn a corner of the prism, and then be broken up into colors. This would never occur in nature: the ray must traverse the glass or pass right through it. To obtain a good spectrum, if the operator stand at a table, let him hold the prism so that one of the angles may point to his eye, and the lower angle point about 24 inches in advance of his toes; if a lamp be placed between his body and the prism, he will have a spectrum thrown immediately before him.

Seven colors being observed in the spectrum distinctly, Newton and others were led to believe that there were as many rays of colored light, namely, seven. But Sir D. Brewster, in his experiments upon the absorption of colored rays by plates of glass of different tints, has proved what had been maintained before, that the seven colors of the spectrum are not occasioned by seven, but by three primary rays, viz., the red, the yellow, and the blue. These rays are concentrated in those parts of the spectrum where each primary color respectively appears; but each spreads more or less over the whole spectrum, the mixture of red and yellow giving orange, of yellow and blue green, and red with blue, aud a little yellow, giving violet.

Though a prism is the most convenient instrument for decomposing light, the separation of the colored rays is more or less effected by any substance which refracts or bends the rays of light out of their original course. Drops of chandeliers effect this very beautifully, and the little vesicles of vapor in a cloud by effecting it produces the rainbow. Lenses, while they bend the rays, also disperse them, aed this result constitutes one of the greatest difficulties in the construction of telescopes, microscopes, and cameras, for any separation or dispersion of these rays causes the play of colors, and a diminished distinctness of the image. The