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There are several well-known methods of mixing colours, such as the superposition of two spectra or of different parts of the same

spectrum—the method of reflection, Czermak's modification of Scheiner's experiment, the use of rotating disks having coloured sectors, and the direct mixture of coloured powders or coloured liquids. In all of these cases the effect may be seen with one eye, and is due to the action of light on a definite portion of one retina. But may sensations of mixed colours be produced by binocular vision of the components? Regarding this question various well-known observers have arrived at completely opposite results. Thus, as mentioned by Helmholtz in his "Optique Physiologique," p. 976, H. Meyer, Volkmann, Meissner, Funke, and he himself fail in obtaining the sensation of the resulting colour, whilst Dove, Regnault, Brücke, Ludwig, Panum, and Hering state the reverse. In his great work, Helmholtz describes various methods by which he investigated the question, and his opinion amounts to this, that we have no true binocular perception of colour. According to him we may have a resultant sensation of a particular kind, different from that of the two components, but also unlike the sensation of the mixed colour obtained by methods appealing to one eye only.

In studying this subject I lately devised the following simple arrangement:—Take two No. 3 eye-pieces of Hartnack's microscope, or any similar eye-pieces of considerable focal length, and place one before each eye. If they be somewhat diverged, two luminous fields will be seen, and by adjustment, the edge of the one luminous field may be caused to touch the edge of the other. In these circumstances a definite area of each retina is illuminated. By converging the eye-pieces, the two fields may then be partially overlapped, and when the axes of the two eye-pieces are parallel, both fields coincide. It will then be found that the overlapped portion is intensely luminous, whilst the other portions become less luminous, as if cast into shadow. By increasing or diminishing the amount of convergence of the eye-pieces, the extent of the luminous field may be varied at pleasure, and the two fields coincide when the two images fall on the two yellow spots. If, then, a small piece of coloured glass be inserted into each eye-piece, say red into one and blue into the other, on repeating the experiment as above mentioned, I find that the overlapping portion of the two fields gives a sensation of the resultant colour. I have repeated the experiment with various coloured media, such as coloured gelatine paper, coloured

paper rendered translucent by oil, &c. In showing the experiment to others, I have found that certain people do not see the resultant colour, whilst others do so readily. The cause of this and of the opposite statements of the observers above alluded to, I believe to be this: The sensation resulting from the fusion in the brain of the two impressions, one coming from each eye, appears to be capable of decomposition by a mental effort. Thus, the purple produced by red and blue appears as such to my eye so long as I simply look at it without any conscious effort; but if I wish to analyse it, I then find that the two colours, red and blue, seem to be superposed on each other, and the one appears to shine through the other. On ceasing to make any effort, they again fuse together as before. Again, by thinking of the colour opposite the right eye, say red, the field ceases to be purple and has a decided tinge of red, and on thinking of the colour before the left eye, say blue, the prevailing tone of the field is blue. Apparently, then, if corresponding points of two retinæ be simultaneously stimulated by two different colours, the impressions are fused in consciousness into the resultant colour; but the resulting sensation may be decomposed by an act of attention. The decomposition is effected partly by strongly directing the attention to one eye, and less strongly to the other, and the result is a sensation corresponding to the colour placed before the eye to which the attention is most strongly directed. Some of the same facts may be studied with the aid of the stereoscope.