CORRESPONDENCE

FACTORS IN STEREOSCOPIC VISION

To the Editor, BRITISH JOURNAL OF OPHTHALMOLOGY

SIR,—Dr. Stewart Barrie's observations upon stereoscopic pictures raise some very interesting points for study. They appear to me, however, to be in no way incompatible with my facts or deductions, **but, on** the contrary, they can be shown to afford material for confirmation. **I shall** review them *seriatim*.

On looking into a stereoscope **containing a picture on the left** and a blank space on the right, a falsely projected complete view was seen with the left eye, and (except for prismatic displacement) a correctly projected margin was seen with the right eye. The illusion of the deflected image is due to the fact that the image on the left retina is interpreted as if seen with the right eye. The presence of the margin of the card in the field of the right eye is the chief exciting factor. The apparently deflected image is lighter than the correctly projected one because of its being superimposed psychically on the impression of diffuse illumination received through the unoccupied part of the right retina. It is well defined, because optically it is centred on the macula; in this respect it differs from the ordinary "false image."

When the complementary view is brought in front of the right eye, that is to the position of the falsely projected image, the left eye view is no longer seen as from the position of the right eye, but as from the middle of the interocular space. The newly inserted picture is also seen from that position, and the condition becomes that of a normal stereoscopic view. It was therefore seen as such in this the first position with paired views.

In the second position, when the pictures were transposed, no difference from the single eye view was seen except slight blurring of details. Other factors, therefore, maintained a normal general disposition of the view despite the antagonism of the fusion sense.

The same experiments were then repeated with inverted pictures. The false projection with a single picture was as before. Sometimes there was no difficulty in interpreting the view, which appeared like the reflection in the still waters of a lake. In this event the circumstance occurred to which I referred, in saying that after some study the sense of perspective (with, of course, other factors such as shadow effects) may enable us to apprehend the inverted picture.

When the views were placed in the third position—inverted with

right view in front of left eye, and vice versa—the fusion sense was brought into assistance, and the water reflection impression was consequently accentuated.

In other cases with a single eye, however, an entirely different view was seen, owing to a new interpretation of the shadow effects, etc. In these cases, therefore, a false apprehension was established, in which, of necessity, the various uniocular factors were not acting in unison.

In such circumstances, when the fusion sense was brought into antagonism, as in the fourth experiment, it had sufficient power to cause confusion. Those parts of the picture which contributed to the new view were anchored thereby; other parts, both from the foreground and from the back, were seen in front. The detached distant parts were brought forward by the reversed action of the fusion sense, and the parts from the original foreground—always large and prominent objects—were in some instances apprehended in the normal way through the uniocular factors, and were therefore also brought forward.

I cannot agree that the fusion sense had full play when acting upon the new falsely apprehended view. Geometrically, it was placed in antagonism to anything except complete reversal of the third dimension, and, from my own observations, I do not think the new view was specifically a reversed one. A definite, though false, perception had been formed during the uni-ocular observation, and the fusion sense was unable to upset this. Its only observed effects were to make the confused view preferable to the "water view," and to bring forward from the distance those parts which were not held by the new perspective construction.

The particular point to which Dr. Stewart Barrie takes exception is my statement that the fusion sense is readily capable of compromise or even of suppression. My interpretation of the observations he has described, however, is that this sense acted normally in the harmonious conditions of the first position; in the second it was suppressed; in the third, where there again were no antagonisms, it acted normally; and in the fourth, its behaviour varied in different parts of the picture. It brought forward the detached parts from the distance; it remained indifferent to the establishment of a co-ordinated false apprehension of the greater part of the picture; and it failed to carry backward some of the objects belonging to the original foreground: in some parts it acted normally, in others it was modified or suppressed, and in some it was definitely suppressed.

Yours, etc.,

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