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Functional mapping of stimulus colour in a human subject suffering a central visual defect

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The multiple maps of the visual field found in the striate and pre-striate cortex of the macaque exhibit selective responsiveness to different stimulus parameters (Zeki, 1978, 1980). Evidence for such organization in man is derived primarily from selective losses of visual function associated with disturbance of the central pathways. We present data for a single subject, M.W., who has normal achromatic vision but exhibits grossly abnormal responses to coloured and particularly red stimuli, as is illustrated by Fig. 1 (a). The extended image of the red target appears 'steely-grey' and targets located within the image are not detected. The spreading inhibitory action of red stimuli has been demonstrated objectively by increment threshold measurements (Bender & Ruddock, 1974; Hendricks, Holliday & Ruddock, 1981).

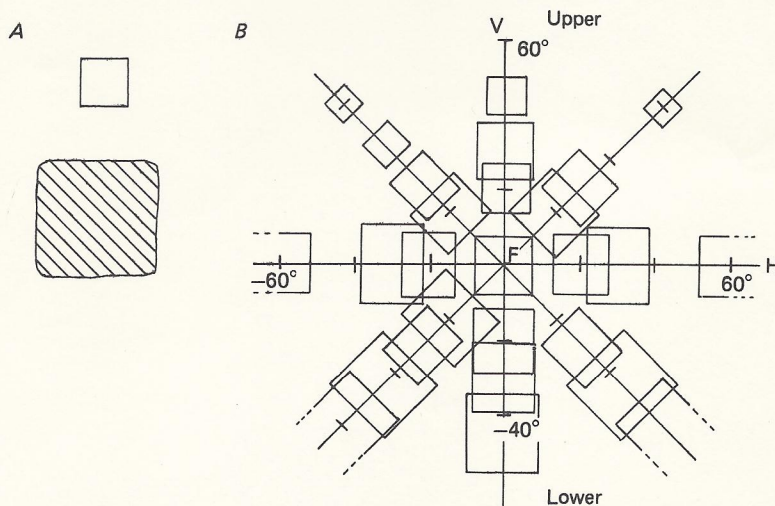


Fig. 1. *A*, the lower hatched area is M.W.'s sketch of the upper stimulus, a red square with CIE coordinates $x = 0.505$; $y = 0.284$; $Y = 23$. *B*, the image produced by the same red square, presented at different points (denoted by crosses) in the visual field. H, horizontal meridian; V, vertical meridian; F, fixation point. Subject M.W.

We have determined the apparent size of images generated at different locations by a 6.2 deg square red patch. The results (Fig. 1 *B*) demonstrate grossly non-uniform magnification over the visual field, and both psychophysical and evoked potential measurements indicate that the distorted images arise at post-striate level.

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