

Why the cortical magnification factor in rhesus is isotropic

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We examine the arguments advanced recently [by Sakitt (Vision Res. 22, 417-421, 1982), and Tootell et al. (Science 218, 902-904, 1982)] leading to the conclusion that the retino-cortical magnification factor cannot be isotropic. The relevance of the issue is discussed through the use of complex function theory as the appropriate tool to express the geometry of interconnections between neural lamina. A general expression is obtained to compute the length of a curve under a conformal transformation. When this result is applied to circles in the visual field, it is shown that Sakitt's findings imply radial asymmetry of the retino-cortical map, and not local anisotropy, as claimed. In fact, by taking Schwartz's (Vision Res. 20, 645-670, 1980) proposal that the complex log map including a constant eccentricity term be used to represent the retino-cortical mapping, we show that both local isotropy and radial asymmetry are simultaneously valid. Furthermore, the values of cortical length predi