

Frontal and lateral visual system in birds: Frontal and lateral gaze

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Birds exhibit a variable retinal organization in terms of foveas and areas of high cell density. The distribution of these retinal structures in different species does not follow phylogenetic lines. In order to study this phenomenon, we presented chickens and pigeons with a luminous bar that could be moved at different speeds and directions in the visual field and could be located at various distances from the animal; head movements were monitored during the presentations. The results show that for a static or slow-moving stimulus the birds adopted a frontal gaze that stabilized the image in the retina, and for a fast-moving stimulus they adopted a lateral gaze that allowed the image to move across the retina. These results reveal that; (a) these two ways of looking correlate with the retinal anatomy, not with the phylogeny, of the species, and (b) these two ways of looking reflect two different sensorimotor systems that involve different anatomical features and neurophysiological prop