

THE EVOLUTION OF CONE SPECTRAL SENSITIVITIES AND COLOUR VISION

It is over two centuries since Thomas Young pointed out that the eye is an imperfect measuring instrument, which has to make a compromise between sampling spectral and spatial information. Young was aware that the eye is trichromatic, and perhaps in the light of this knowledge suggested that trichromacy is indeed the best compromise. Young of course preceded Darwin, and the philosophy and insight underlying his arguments were a necessary prelude to Darwinism. At the same time his conclusion has the flavour of a naïve 'Just so story', about how we see colour. I will ask how the different and perhaps competing functions of the photoreceptor signals in natural behaviour might explain the spectral sensitivities of our three cone types, and also the diversity of colour vision in the primates of the New World and Madagascar. What if anything can we add to Young's understanding of the design of our eyes?