

Colours and Colour Vision

Colours are increasingly important in our daily life but how did colour vision evolve? How have colours been made, used and talked about in different cultures and tasks? How do various species of animals see colours? Which physical stimuli allow us to see colours and by which physiological mechanisms are they perceived? And how and why do people differ in their colour perceptions? In answering these questions and others, this book offers an unusually broad account of the complex phenomenon of colour and colour vision. The book's broad and accessible approach gives it wide appeal; it will serve as a useful coursebook for upper-level undergraduate students studying psychology, particularly cognitive neuroscience and visual perception courses, as well as for students studying colour vision as part of biology, medicine, art and architecture courses.

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Colours and Colour Vision

An Introductory Survey

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To Hilda



Contents

List of plates	<i>page</i> xiii
List of figures	xxiii
List of tables	xxv
Preface	xxvii
1 Colour vision in everyday life	1
1.1 Numbers and dimensions of colours: hue, colourfulness, brightness	2
1.2 Commonly used colour names in different languages	4
1.3 Development of colour vision and colour naming in children	9
1.4 History of colour pigments and dyes	11
1.5 Psychology and symbolic values of colours	17
1.6 Colour mixtures	20
1.6.1 Subtractive and additive mixtures	20
1.6.2 Pigment mixtures and palettes	23
1.6.3 Optical mixtures	24
1.7 Colour and pictorial art	24
1.8 Colour and music	29
1.9 Colour and literature	31
1.10 Colour and philosophy	34
2 The signals of colours: light and wavelengths	36
2.1 Light and darkness: early thoughts concerning the nature of colours	37
2.2 White light and spectral colours: Newton’s experiments	39
2.3 The rainbow	42
2.4 Properties of light: wavelength and frequency	45
2.5 Trichromatic nature of colour vision: all hues from three	50
2.6 Trichromatic colour production and reproduction	53
2.6.1 Additive mixtures using coloured lights (RGB)	54
2.6.2 Subtractive mixtures of coloured substances (CMYK)	54
2.7 Colour hierarchies: primary, elementary and complementary colours	57

2.8	Light of naturally occurring colours	58
2.8.1	Absorption colours: selective absorption and reflection	59
2.8.2	Structural colours: refraction, scattering, interference	66
2.8.2.1	Light refraction	66
2.8.2.2	Wavelength-related light scattering	66
2.8.2.3	Random light scattering and reflection of all wavelengths together	68
2.8.2.4	Interference	69
2.8.3	Radiating colours: the active production of coloured light	69
2.8.3.1	Heat radiation and fire	69
2.8.3.2	Fluorescence and phosphorescence	71
2.8.3.3	Photochemical processes, bioluminescence	72
3	Colours and viewing conditions: not only local wavelengths	74
3.1	Colour interactions within a visual image	74
3.1.1	Simultaneous contrast	74
3.1.2	Negative and positive afterimages	76
3.1.3	Colour constancy and coloured shadows	77
3.2	Alternative colour theories: Goethe and Hering	82
3.2.1	Goethe and his <i>Farbenlehre</i>	82
3.2.2	Hering and his theory of colour opponents	85
3.3	Our strange visual field, our eye movements and the creativity of our brain	88
3.3.1	All eyes are halfblind	89
3.3.2	Eyes must move to see	89
3.3.3	All eyes are partly colour blind	93
3.3.4	All eyes have a hole in the visual field	94
3.4	Colours without images	96
3.4.1	Synesthesia: colours of sounds and letters	96
3.4.2	Other examples of colours without images	97
4	Our biological hardware: eye and brain	99
4.1	Our three main kinds of vision	99
4.2	Eye	103
4.2.1	Refraction and image projection	103
4.2.2	Diaphragm of the eye: the iris	104

4.2.3	Sensor and processor: the retina	104
4.2.4	The visual receptor cells	105
4.3	Cones	107
4.3.1	The three kinds of cones	107
4.3.2	Cones and the sharp vision of lightness contrast	109
4.3.3	Cones and colour vision	110
4.3.4	Cone properties and the wavelength/intensity distributions in natural scenes	112
4.4	Rods	112
4.4.1	Seeing in darkness	112
4.4.2	Sensitivity of rods to different wavelengths of light	113
4.4.3	The possible role of rods in colour vision	115
4.5	Chemical mechanisms of light sensitivity	115
4.5.1	The visual pigments	115
4.5.2	Dark and light adaptation	117
4.5.3	Negative and positive afterimages	119
4.6	From eye to brain	120
4.6.1	Structure and function of nerve cells	120
4.6.2	Nerve cells of the retina	122
4.6.3	The visual pathway	123
4.6.4	Neuronal receptive fields and the processing of lightness contrast	125
4.6.5	Colour sensitivity of neurones	128
4.7	The further brain analysis of colour and shape	131
4.7.1	Cortical regions for visual functions	131
4.7.2	Colour sensitivity and cellular organization of cortical neurones	133
5	Eyes with unconventional properties: the ‘red-green blinds’	135
5.1	John Dalton and his brother	136
5.2	Kinds of red-green blindness: cones and visual pigments	138
5.3	Inheritance: from mother to son	141
5.4	Occurrence of inherited red-green blindness within different populations	143
5.5	How do red-green blind persons see colours?	144
5.5.1	Colours (hues) are more similar to each other	144
5.5.2	Colours more difficult to discover when unsaturated, when in small objects, when in thin lines	148

5.5.3	Red colours might seem abnormally dark (protanopes, protanomals)	150
5.5.4	White/grey streak in blue/green part of spectrum (dichromats)	150
5.5.5	Can red-green blind individuals see some things better than normal trichromats?	151
5.6	Practical consequences of red-green blindness	152
5.6.1	Problems of everyday life	153
5.6.1.1	Irritating moments	153
5.6.1.2	Advice for normal trichromats	155
5.6.1.3	Parents and schools	156
5.6.1.4	Car driving	157
5.6.2	Problems at work	158
5.6.3	The usefulness of colour filters and other aids	160
5.7	Molecular biology and inherited red-green blindness: new perspectives	165
6	Other kinds of unconventional colour vision	167
6.1	Inherited blue-green blindness (tritanopia)	167
6.2	Inherited total colour blindness	168
6.2.1	Rod achromatopsia	169
6.2.2	S-cone (blue-cone) monochromacy	170
6.2.3	Inborn total colour blindness with normal visual acuity	171
6.3	Acquired colour blindness	171
6.3.1	Changes of colour vision after brain damage	171
6.3.2	Changes of colour vision caused by disease, drugs, poison, ageing	173
6.4	Variations in and above normal colour vision	176
7	Colour vision in different species of animals	178
7.1	Methods for comparative studies of (the capability for) colour vision	178
7.2	Different animal species: evolutionary relationships and general properties of eyes and visual receptor cells	180
7.3	Humans versus other primates, the evolution of trichromacy	181
7.4	Mammals other than primates	184

7.5 The vertebrate ancestors of mammals: reptiles, amphibians and fish	185
7.6 Birds	187
7.7 Invertebrates	188
7.7.1 Invertebrates with camera-like eyes	188
7.7.2 Invertebrates with compound eyes	189
7.8 Sensitivity to light polarization	192

Appendices

Appendix A Diagnosis and measurement of differences in colour vision 194

A.1 Pseudoisochromatic plates	194
A.1.1 Ishihara	194
A.1.2 Other pseudoisochromatic tests	196
A.2 Arrangement tests: Farnsworth D15 and 100 hue	197
A.3 Practical tests: lanterns and wires	199
A.4 Anomaloscope	200
A.5 The neutral point of dichromats	202
A.6 Genetic tests	203

Appendix B Specification and measurement of colours 204

B.1 Colour charts and systems	204
B.1.1 Colour systems for practical use: Munsell colour system	205
B.1.2 Measurement schemes: CIE chromaticity charts	207
B.1.2.1 Nomenclature for specifying colours in xyz CIE chromaticity charts	209
B.1.2.2 Calculations using the 1931 xyz CIE chromaticity chart	211
B.1.2.3 Different versions of CIE chromaticity charts: other colour spaces	212
B.2 Measurements using a colorimeter	213
B.3 Measurements using a spectrophotometer	213

Appendix C Light and lighting 214

C.1 Wavelength and oscillation frequency of light	214
C.2 Light refraction	214

C.3 Quality of lighting	215
C.4 Lighting and metamerism colours	216
C.5 Total intensity of lighting	217
Appendix D Digital cameras	220
D.1 Sensor and colour analysis	220
D.2 Light sensitivity	222
D.3 Colour constancy and white balance	223
Appendix E Technical terms	224
Notes	229
References	241
Selected literature (with comments)	241
Cited references	243
Index	251
Colour plate section between pages 138 and 139.	



Plates

- 1.1 The three dimensions of colour: “*Brightness*” (approximate synonyms: *lightness* / *value*), here darker vs lighter blue. “*Hue*” (here blue vs. yellow). “*Colourfulness*” (approximate synonyms: *chroma* / *saturation*) here decreasing from above to below. page 2
- 1.2 Diagram summarizing the “validity-ranges” of colour names in languages with few colour terms. Small coloured squares signify each one of 11 basal colour names / categories in common European languages. The diagram shows in which manner these basal colours have generally been bundled together in languages with fewer terms. Depending on the number of basal colour terms, the languages were classified into seven different stages, here signified with Roman numbers I - VII. Note that languages of stages I-IV have one or several composite basal colour terms comprising >1 of our own most elementary colours of red, green, blue and yellow. *Abbreviations:* B blue, Bk black G green, R red, Wh white, Y yellow. 6
- 1.3 (a) Colours from far away. (a) The blue pigment ultramarine, prepared by powdering the mineral *lapis lazuli*, was obtained from mines in e.g. Afghanistan. Source: http://en.wikipedia.org/wiki/File:Natural_ultramarine_pigment.jpg. Image by Palladian. (b) The wood of the Pau Brasil tree (*Caesalpinia echinata*) delivered a red pigment; its home country got its name from this tree. Source: <http://en.wikipedia.org/wiki/File:PAUBRASIL.jpg>. Image by Mauroguanandi. 14
- 1.4 (a) Colours requiring lots of work. (a) Cochineal insects (*Dactylopius coccus*), used for red carmine dye, are cultivated on cactus plants. © The Newberry Library. (inset) Cochineal insect. Source: http://en.wikipedia.org/wiki/File:Cochineal_drawing.jpg. (b) The snail *Murex brandaris*, used for purple dye, can be found in the Mediterranean sea as well as in the Indian Ocean and the South China Sea. Source: http://en.wikipedia.org/wiki/File:Haustellum_brandaris_000.jpg. Image by M. Violante. 16
- 1.5 (a) Subtractive colour mixtures, using cyan (C), magenta (M), and yellow (Y) filters (cf. Plate 2.8). Source: <http://en.wikipedia.org/wiki/File:SubtractiveColor.svg>. (b) Additive colour mixtures, using red (R),

- green (G) and blue (B) lights. Source: <http://en.wikipedia.org/wiki/File:AdditiveColor.svg>. 22
- 1.6 (a) Colour mixtures of mainly an additive (optical) kind take place in, for instance, mosaics (a), paintings made using pointillistic techniques (b), and woven fabrics (c-d). (a) Roman mosaic from Tunisia. (b) Example of pointillistic painting from a detail of *Circus Sideshow*, 1887–1888 by Georges-Pierre Seurat. © Tomas Abad/Alamy. (c) Detail of tapestry of Louis XIV visiting the Gobelins Factory, 1673, by Charles Le Brun (1619–1690), 370 × 576 cm, Versailles, Musée National du Château. © DeAgostini Picture Library/Scala, Florence. (d) General schematic illustration of woven fabric. Source: http://en.wikipedia.org/wiki/File:Kette_und_Schu%C3%9F.jpg. 25
- 2.1 (a) Isaac Newton (1643–1727), portrait painted by Godfrey Kneller. © GL Archive/Alamy. (b) In experiments with glass prisms, Newton showed that the white sunlight contains all the colours of the spectrum (see text). Source: http://commons.wikimedia.org/wiki/File:Prism_rainbow_schema.png. Image by Joanjoc. (c) Newton ordered the spectral colours in a circle with white in the middle. Source: http://en.wikipedia.org/wiki/File:Newton's_colour_circle.png. 40
- 2.2 Sunshine and rain combining to a rainbow, Nature's own demonstration of sunlight's colour spectrum. A weak secondary bow is seen above the stronger primary version. Source: http://commons.wikimedia.org/wiki/File:Rainbow_02.jpg. Image by Jerry Magnum Porsbjer. 43
- 2.3 (a) Example of rainbow in art: "*The blind girl*" by John Everett Millais (1829–1896), using the rainbow as a symbol for things lost to the blind. (b) Diagram showing how refraction separates sunlight into its different wavelength components when light leaves a rain drop. In a rainbow, the refraction follows an inside reflection which, in each droplet, happens once for the primary (b, right) and twice for the secondary bow (b, left). (c) Diagram showing the observation angles and colour sequences for primary (lower) and secondary (upper) rainbows. (a) *The Blind Girl* oil on canvas 1854–1856, by Sir John Everett Millais, 1st Baronet, PRA (1829–96). © World History Archive/Alamy. (b–c) Rainbow mechanisms. Source: http://commons.wikimedia.org/wiki/File:Rainbow_formation.png. Image by Peo. 44
- 2.4 Different types of electromagnetic radiation, having different wavelengths (lower scale, m) and frequencies of oscillation

- (upper scale, Hz). The visible portion of electromagnetic radiation (i.e. “light”) covers a narrow region of wavelengths from just under 400 to a little above 700 nm (1 nm = 1/1 000 000 000 m). Adjoining regions are called UV (ultraviolet) for shorter and IR (infrared) for longer wavelengths (i.e. for higher and lower frequencies respectively). The lower portion of the diagram shows the spectrum of sunlight (see sections 2.2 and 2.4). Source: http://en.wikipedia.org/wiki/File:EM_spectrum.svg. Image by Philip Ronan. 47
- 2.5 (a) *James Clerk Maxwell (1831-1879)* performed important basic research concerning the nature of electromagnetic radiation, including light. He analyzed trichromatic colour vision and the effects of additive colour mixtures, including mixtures produced using a rotating “colour top” (b). © nicku/123RF.com. (b) Colour top. Source: http://commons.wikimedia.org/wiki/File:Color_top_1895.png. (c) Maxwell also produced the first-ever colour photograph (1861, a coloured tartan ribbon), which then was shown by superimposing three coloured light projections. Source: http://en.wikipedia.org/wiki/File:Tartan_Ribbon.jpg. 51
- 2.6 CIE-1931 chromaticity diagram, including an indication of the inner triangular region of colours covered by the sRGB-system for colour reproduction. This latter system is widely used and it corresponds to the original gamut for European colour television. Many of the most saturated colours that human eyes can see fall outside the range of the sRGB system. The point labelled D65 shows the CIE-coordinates for the white colour of a standard daylight type of illuminant. Source: http://commons.wikimedia.org/wiki/File:CIExy1931_sRGB.png. Image by PAR. 52
- 2.7 Example of how a colour picture may be made, using a combination of the R, G and B components of the original. Source: http://eo.wikipedia.org/wiki/Dosiero:Barn_grand_tetons_rgb_separation.jpg. 55
- 2.8 The starting colours of the *CMYK-system* for subtractive colour mixtures: Cyan, Magenta and Yellow. Each one of these colours will appear if white light is passed through a filter with roughly 1/3 of the spectral wavelengths blocked (see thick black line in filter-diagrams). The K component of the CMYK-system is black. Lower part of the illustration: list of subtractive CMYK-mixtures that give the starting colours for the additive RGB-system. 55
- 2.9 Diagram illustrating a typical example of why a sunlit blue box looks blue. As the rays of sunlight arrive at this box, those of longer

- wavelengths disappear into its blue paint (absorption) and only the shorter wavelengths become reflected and reach the eye of the observer; these shorter wavelengths are perceived as being “blue”. 60
- 2.10 (a) The coloured vertical lines show how monochromatic light of different wavelengths is emitted from different kinds of gas (*emission lines*), when activating the gas using electricity. In this illustration, only the most intense and clearly visible emission lines are shown; totally there are many more lines per chemical element. Scale of wavelengths made by the author, using the emission lines. 60
- (a) Molecular emission lines for hydrogen (H). Source: http://commons.wikimedia.org/wiki/File:Visible_spectrum_of_hydrogen.jpg. Image by Jan Homann. (b) Molecular emission lines for helium (He). Source: http://commons.wikimedia.org/wiki/File:Visible_spectrum_of_helium.jpg. Image by Jan Homann. (c) Molecular emission lines for mercury (Hg). Source: http://commons.wikimedia.org/wiki/File:Visible_spectrum_of_mercury.jpg. Image by Jan Homann. 62
- 2.11 Metameric colours: different ways to yellow. 63
- 2.12 The green colour of plants. Leaves from elm (a), aspen (b) and birch (no photo) are analyzed in the diagram of (c) with regard to the reflected wavelengths of light. The measurements of (c) were performed using a reflectance spectrophotometer (section 2.8.1). (d) Example of how light of different wavelengths is absorbed by chlorofyll a and b. Note that the peaks of light absorption in chlorofyll (i.e., light used by the plant) coincide with regions of low light reflectance from the green leaves. Source: http://en.wikipedia.org/wiki/File:Chlorophyll_ab_spectra-en.svg. Image by Aushulz. 64
- 2.13 (a) Dandelion flowers and leaves on a lawn. (b) Spectrographic measurements of the light reflected from such flowers and leaves (cf. Plate 2.12 c). (c) Corresponding measurements for blue bellflower (*Campanula*; cf. Plate 4.2). 67
- 2.14 (a) *Fluorescence*, light emitted by a material when illuminated using another “activating” light. The illustration shows the coloured fluorescence of various minerals when illuminated with ultraviolet light. The fluorescence phenomenon was named after the mineral fluorite (labelled “F”). (Photo: Hannes Grobe (Wikipedia)). (b) *Bioluminescence*, light emitted due to chemical processes in a living organism, in this case a European glowworm. (Photo: Wofl

	(Wikipedia). (c–d) <i>Interference</i> , coloured light may emerge due to interactions between different wavelength components of white light, e.g. after reflection in surfaces with an appropriately repeated microstructure. Interference colours change with the angle of viewing and, therefore, they tend to get a shimmering and glittering character (cf. colours of the recording side of a CD). (Sources: see p.xiv. Photo (c): Gregory Phillips, (d) Ubern00b (Wikipedia).)	70
3.1	A drastic example of effects of simultaneous contrast: the two squares with coloured circles have exactly the same darkness and colouring, and this is also true for the upper vs. the lower coloured circle. This “checkershadow illusion” was originally devised by Edward H. Adelson. Source: http://en.wikipedia.org/wiki/File:Optical_grey_squares_orange_brown.svg .	75
3.2	The appearance of complementary colours in negative afterimages (example inspired by the Swedish background of the author). Fixate the midpoint of the blue cross and don’t allow your eyes to wander elsewhere. Then, after at least 20 sec of staring, quickly move your eyes to a white sheet of paper. You might then see a very weak yellow cross with a blue background. After a few seconds, this afterimage fades away.	77
3.3	Demonstration of the complex phenomenon of <i>coloured shadows</i> . An unlit candle-stick is standing on a cupboard, being illuminated both by the white sunlight from a left-side window and by a lamp with blue light. For each source of illumination, the candle-stick throws a shadow on the greyish wall. Panel (a) shows the scene as it is perceived by a human observer: the left shadow is dark blue and the right one (s) is weakly yellow. In panel (d), the photographic colour-settings have been adjusted, and shadow s now has the greyish colour it should have if simply showing the light reflected from this part of the wall. In order to facilitate colour comparisons between the two versions of shadow-s and nearby portions of the wall (v), panels (b) and (c) display these details separately, as taken from panels (a) and (d). Further explanation in Text and below.	79
3.4	(a) <i>Johann Wolfgang von Goethe</i> (1749-1832), portrait painted in 1828 by Joseph Karl Stieler. As part of his extensive colour studies, Goethe analyzed phenomena that are not easily explained knowing only the spectral light composition (e.g. afterimages, coloured shadows). © Peter Horree/Alamy. (b) In his colour charts Goethe arranged the colours in various ways, e.g. in a circle showing colours together with	

	their (assumed) psychological effects. Source: http://en.wikipedia.org/wiki/File:GoetheFarbkreis.jpg .	84
3.5	(a) <i>Ewald Hering</i> (1834–1918) developed an “ <i>opponent colour system</i> ”, centred around two pairs of chromatic and one of achromatic elementary colours (“ <i>Urfarben</i> ”). Image courtesy of The National Library of Medicine. (b) Hering’s colour circle with chromatic opponents along the periphery (green/red and yellow/blue) and white/black in the middle. Source: http://commons.wikimedia.org/wiki/File:Ewald_hering_colors.jpg .	86
3.6	Charts that may be used for demonstrating how the brain continuously retouches the blind spot, providing it with colours and patterns from the immediate surrounding. <i>Instruction for use</i> : see Text.	95
4.1	Blue bellflowers (<i>Campanula</i>) on a meadow, the same photograph reproduced with (a) and without (b) colour.	101
4.2	The same photograph of a blue bellflower (<i>Campanula</i>) shown in full colour (a), in grey-tones (b), and after keeping only the (emphasized) borderlines between regions with a high lightness contrast (c).	101
4.3	(a) The relative sensitivity to light of different wavelengths for the three kinds of cones in human eyes: S cones for short wavelengths, M cones for middle wavelengths, and L cones for long wavelengths. X-scale 390–750 nm. Data from Stockman & Sharpe (2000): “ <i>cone fundamentals</i> ”, mainly derived from psychophysical measurements. Source: http://commons.wikimedia.org/wiki/File:Spectrale_gevoeligheid_kegeltjes.png . Image by Koenb. (b) Measurements of the relative light absorption at different wavelengths for the three types of human cones. Data from Dartnall et al. (1983). Note that, in both panels, data were normalized per type of cone; see text for details concerning quantitative differences between the respective cone populations. Data from Dartnall <i>et al.</i> (1983), see http://www.cvrl.org/ .	108
4.4	Structural features of the visual pathway and of the “crossing” of the optic nerve (<i>optic chiasma</i>). In the “interbrain” (<i>diencephalon</i> , at upper end of brain stem), nerve fibres of the optic nerve make synaptic contacts with nerve cells of a group called <i>Lateral Geniculate Nucleus</i> (LGN). Nerve fibres from the LGN transmit the visual information to the cerebral cortex. For both eyes, visual signals from the left side of the retina are transmitted to the left cerebral hemisphere, and vice versa.	123

4.5	Many retinal ganglion cells and visual cells of LGN will, in addition to their general reactions to light distribution (Figure 4.7) also be differentially sensitive to light of different wavelength compositions (i.e. of different colour). When illuminating the whole receptive field using light of different colours, four main categories of colour-sensitive cells have been observed; (i) some cells are activated by red and inhibited by green (+R-G); (ii) some are inhibited by red and activated by green (+G-R); (iii) some are activated by yellow and inhibited by blue (+Y-B); (iv) some are inhibited by yellow and activated by blue (+B-Y).	129
4.6	Schemes illustrating mechanisms for colour contrast. Many retinal ganglion cells and visual LGN cells and some of the visual cells in the cerebral cortex are organized such that, in addition to other properties (cf. Figure 4.7 and Plate 4.5), they react to the distribution of coloured light within their receptive field. Such “ <i>double opponent</i> ” types of receptive fields may be round and concentric (illustrated) or, in the cerebral cortex, they may have the shape of lines that are oriented in different directions for different cells. The colour sensitivity commonly concerns pairs of the same opponent colours as in Plate 4.5, i.e. either red vs. green or yellow vs. blue (illustrated for one yellow-ON-centre type only). Such a cell will give a maximal reaction if part of its receptive field is illuminated with one colour and the remaining part with its opponent colour, i.e. the cell will have a high sensitivity to colour contrast.	130
5.1	From test for colour blindness. Example of pseudoisochromatic test plate of the “ <i>vanishing</i> ” kind. People with a normal colour vision (normal trichromats) will see the digit “6”, as formed by coloured dots of the plate. Red-green blind persons will not see any digits. From Ishihara test. Source: http://en.wikipedia.org/wiki/File:Ishihara_11.PNG .	136
5.2	(a) Wavelength sensitivity of L, M and S cones in normal trichromats. Using data for 2 deg cone fundamentals from Stockman and Sharpe (2000), see http://www.cvrl.org/cones.htm . (b–e) Scheme illustrating how the properties of the normally occurring visual receptor cells (a) are changed in red-green blind persons with deviant L cones (b, d) or M cones (c, e). Each graph shows the relative light sensitivity at different wavelengths for three or two different types of cone (panels (a–c): cones S, M and L; panels (d–e): cones S and M or L). (b) As in (a),	

	but the curve for the L cones shifted toward the left (<i>protanomal</i> , <i>L-weak</i>). (c) As in (a), but the curve for the M cones shifted toward the right (<i>deuteranomal</i> , <i>M-weak</i>). (d) As in (a), but L cones lacking (<i>protanope</i> , <i>L-blind</i>). (e) As in (a), but M cones lacking (<i>deuteranope</i> , <i>M-blind</i>). In the lower panels (d-e), a vertical interrupted line indicates the wavelength for the “ <i>neutral point</i> ” (<i>NP</i> ; section 5.5.4).	140
5.3	Demonstration of how a red-green blind person might use an optical colour filter for analyzing differences between reddish and greenish colours. <i>On the left</i> : photographs taken without filtering, <i>Upper panel</i> : leaves and flower of cactus plant; <i>lower panel</i> : bottle label. <i>On the right</i> : the same scenes photographed with a red filter in front of the camera. The filter makes red items look relatively light and green items often become darker.	162
7.1	Comparisons between different animal species with regard to their conditions for colour vision. For each species, the wavelengths are indicated at which their visual cone pigments have their maximal light sensitivity and/or light absorption. Different symbols for different total numbers of cone types. For the two invertebrates (honey bee, mantis shrimp), the total number of different kinds of wavelength-selective light sensor is shown. The coloured bar along the x-axis shows the human range of light sensitivity, with vertical interrupted lines indicating the approximate transition-sites between different spectral colours.	182
7.2	Complexity of colour vision in different species, as compared to that of humans. (a–b) Mallard duck and goldfish are tetrachromats. (c) Rhesus macaque; monkeys and apes from Africa and Asia have a trichromatic colour vision very similar to that of humans. (d) The honey bee is also a trichromat, but it is capable of seeing much further into the ultraviolet than is possible for humans (cf. Plates 7.1 and 7.3). (e) American brown spider monkey; for most American species of monkeys, males are dichromats and females have varying capacities of colour vision (section 7.3). (f) Cows and most other mammalian species are dichromats. (Photographs included from Wikipedia by: (c): J.M.Garg; (d): Bartosz Kosiorek Gang65; (e): http://www.birdphotos.com edit by Fir0002; for further source information, see p.xiv).	186
7.3	The same flower may show different brightness patterns in light visible for our eyes (left), and in ultraviolet light that is visible for the honey bee (right). Source: http://en.wikipedia.org/wiki/File:Mimulus_nectar_guide_UV_VIS.jpg . Image by Plantsurfer.	190

- 7.4 An international champion of colour vision complexity: the *mantis shrimp* (*Odonotodactylus*). (a) Body anatomy, as seen from above. Source: <http://en.wikipedia.org/wiki/File:MantisShrimpLyd.jpg>; (b) As seen alive in natural surroundings. See Plate 7.1 for an example of its number of receptor-types with different wavelength sensitivities. Source: http://en.wikipedia.org/wiki/File:Mantis_shrimp_from_front.jpg. Image by Jenny. 191
- A.1 The Farnsworth D15 test. (a, b) Buttons arranged in a colour sequence conceived as correct by a normal trichromat (a) and by a red-green blind dichromat (protanope; b). (c) Scheme for the evaluation of D15 results. As part of the analysis, lines are drawn between the numbered buttons according to the sequence in which they were arranged. (d) Evaluation scheme completed for test in (a) (normal trichromat): no ‘crossing’ lines. (e) Evaluation scheme completed for test in (b) (protanope): many ‘crossing’ lines. In the evaluation scheme, interrupted lines show the approximate slanting directions for ‘crossing’ lines, as seen in different types of deviating colour vision. 198
- A.2 Diagnostic possibilities using an anomaloscope. 201
- B.1 The Munsell system for the practical organization of colours. The three dimensions of the system are called ‘hue’, ‘chroma’ (i.e. level of colourfulness or saturation) and ‘value’ (i.e. relative brightness or lightness). The hues are organized in a circle (a, b) with the most saturated colours along the rim and progressively less saturated colours toward the centre. At the centre, colours are achromatic (white/grey/black; a). Colours of different value (i.e. ‘lightness’) are represented in similar circles, vertically layered above each other (at centre: black at the bottom, white at the top). Source: (a) <http://commons.wikimedia.org/wiki/File:Munsell-system.svg>. Image by Jacob Rus. (b) <http://commons.wikimedia.org/wiki/File:MunsellColorWheel.png>. Image by PlusMinus. 206
- B.2 (a) Sensitivities to light of different wavelengths for the three imaginary sensors (cf. human cones) of the 1931 CIE ‘standard observer’, used for calculating the CIE chromaticity curve. (b) Outer rim of the chromaticity curve, representing the maximally saturated colours. Values calculated from the responses of the imaginary ‘standard observer’ to monochromatic light of different wavelengths. In this diagram, approximate wavelength-regions (nm) for different colours are indicated: 380–450 violet, 450–490 blue, 490–560, green,

	560-590 yellow, 590-635 orange, >635 red. Using data from http://www.cvgl.org : CIE 1931 2-deg, XYZ CMFs. (c) Approximate sites of different colours within the CIE chart, including the less saturated colours lying inside the rim of the chromaticity curve. Source: http://en.wikipedia.org/wiki/File:CIExy1931_fixed.svg . Image by Sakurambo.	208
C.1	Examples demonstrating the differences in wavelength composition between the light produced by incandescent light bulbs (a) and by fluorescent lamps (b). See section C.3 for comments. Source: http://en.wikipedia.org/wiki/File:Spectral_Power_Distributions.png . Image by Dkroll2.	215
D.1	Part of the light sensor of a digital camera (schematic): the commonly used Bayer pattern for the distribution of pixels with different colour (i.e. wavelength) sensitivities, i.e. the R, G and B pixels of the RGB model. Source: http://en.wikipedia.org/wiki/File:Bayer_pattern_on_sensor.svg . Image by Cburnett.	221



Figures

1.1	Statistical graph, colour words in poetry. Using data from Pratt (1898).	page 33
2.1	(a) Portrait of Thomas Young. © Classic Image/Alamy. (b) Portrait of Hermann von Helmholtz. © nicku/123RF.com.	46
2.2	Energy of sunlight at different wavelengths. Source: http://en.wikipedia.org/wiki/File:EffectiveTemperature_300dpi_e.png . Image by Sch.	49
3.1	Human field of vision.	90
3.2	Variations of visual acuity within visual field. Source: http://en.wikipedia.org/wiki/File:AcuityHumanEye.svg . Image by Vanessa Ezekowitz.	91
3.3	(a) <i>Unexpected Return</i> , c. 1884–1888 by Il'ya Repin. © Heritage Image Partnership Ltd/Alamy. (b) Eye movements when viewing Repin painting. Source: http://en.wikipedia.org/wiki/File:Vision_2_seconds.jpg . Image by Hans-Werner Hunziker.	92
4.1	Anatomy of the human eye. Source: http://en.wikipedia.org/wiki/File:Schematic_diagram_of_the_human_eye_en.svg .	103
4.2	Anatomy of the retina. Source: http://en.wikipedia.org/wiki/File:Gray882.png .	105
4.3	Ultrastructure of visual receptor cell. Source: http://en.wikipedia.org/wiki/File:Rod%26Cone.jpg .	106
4.4	Photopic/scotopic sensitivity (in daylight/in darkness) at different wavelengths. Source: http://en.wikipedia.org/wiki/File:Luminosity.png .	114
4.5	Time course of dark adaptation (schematic). Source: http://openwetware.org/wiki/Image:DarkAdaptation.jpg .	118
4.6	ON and OFF reaction of firing neurone (schematic).	125
4.7	Visual receptive fields (schematic).	127
4.8	Human brain, visual cortex (V1) indicated. Source: http://en.wikipedia.org/wiki/File:Ventral-dorsal_streams.svg . Image by Selket.	132
5.1	(a) Portrait of John Dalton. © Georgios Kollidas/123RF.com. (b) Portrait of John William Strutt, 3rd Baron Rayleigh by Walter Stoneman, 1917. © National Portrait Gallery.	137

5.2	X-linked recessive inheritance. Source: http://en.wikipedia.org/wiki/File:XlinkRecessive.jpg .	142
5.3	Colour confusion lines in colour blindness.	147
5.4	Colour saturation versus wavelength. Using data from Chapanis (1944).	149
5.5	Reflectance measurements: cactus flowers and leaves.	161
B.1	CIE-1931 chromaticity chart (cf. Plate B.2b), showing examples of how this system may be used for determining the dominant hue and wavelength of a colour. The two complementary target colours a and b correspond to the yellow and the blue of the Swedish flag. In each case, a straight evaluation line has been drawn from the central white point, through the respective colour point (a or b) and further out until the periphery of the chromaticity curve is transected, i.e. the curved line representing the sequence of spectral colours and their wavelengths. The point of transection between the straight evaluation line and the spectral curve defines the <i>dominant wavelength</i> for the target colour. In the example this transection lies at a' ~579 nm for target colour a (yellow) and at b' ~477 nm for target colour b (blue). For purples, e.g. target colour c, the straight evaluation line is drawn through the white point and then further on until the spectral curve is transected at a complementary colour of the target. For target colour c, this <i>complementary dominant wavelength</i> corresponds to a green light of about 528 nm.	210



Tables

1.1	Focus colours in languages with different numbers of basal colour terms.	<i>page 7</i>
1.2	Original sources of some important pigments and dyes used before the 1850s.	12
5.1	Occurrence of different types of inherited red-green blindness.	139
5.2	Occurrence of inherited red-green blindness among males of different geographical regions.	144
6.1	Occurrence of different types of deviating colour vision.	168
6.2	Examples of acquired deviations of colour vision.	174
C.1	Measurements of illumination under different conditions.	218



Preface

This is a book about many different aspects of colours, how they arise and how one might see and experience them. When writing this book, my first source of inspiration was my own visual system: I belong to the rather large minority with an inherited red-green blindness. It has often astonished me that most people know so little about what this sensory constitution means, in spite of the fact that, in our part of the world, it affects more than 4% of the total population. Thus, I started my writing enterprise as a book about colour blindness, but the project gradually expanded to become a more general survey of matters concerning colour. The description includes an account of the physical and physiological mechanisms of colours and colour vision in humans and other animals, which comes naturally to me because I worked in neurophysiological research for many years (albeit on subjects other than colour vision).

Colours often give us a very direct and immediate kind of sensory experience and one might therefore be inclined to think that the nature of the phenomenon is simple and straightforward. This is, however, not the case: colour vision is a highly complicated and multidimensional subject matter. For many people, colours are an important source of enjoyment in everyday life, in nature and in various expressions of art and culture (true also for red-green colour-blind persons). Publications about colour often mainly deal with their various aesthetic qualities. In 1819, Keats published his very long poem, *Lamia*, which includes a few famous lines suggesting that the rainbow might lose its colourful beauty if one knows too much about it:

*Philosophy will clip an Angel's wings,
Conquer all mysteries by rule and line,
Empty the haunted air, and gnomed mine
Unweave a rainbow¹*

However, it might equally well be argued that the unweaving of a rainbow does not make its colours and beauty less impressive but rather the opposite: the more one knows about a subject the more interesting and captivating it usually becomes.² According to some interpretations of Keats' poem, the author himself and his contemporary colleagues might even have agreed on this point, provided

that one does not lose one’s sense of wonder when confronted with the many complexities of human perceptions and the natural world.

Administrative note

Supplementary information concerning items in the running text may be found in notes at the end of the book. In Appendix E, an explanatory list is given for commonly used technical terms. In order to facilitate reading of the book, greytone-versions of all illustrations are shown close to the relevant sections of running text. For illustrations referred to as ‘Plates’, which provide further information by using coloured components, additional full-colour prints are included in a separate colour plate section.

The author of this book has lived in Sweden, in the Netherlands and (briefly) in Britain. When mentioning ‘our culture’ or other similar concepts, the ‘our’ or ‘us’ or ‘we’ refers to inhabitants or conventions of Western Europe.