Errata V3


These are the errors I have found and that have been sent to me by understanding readers. If you find any others, please let me know! A downloadable PDF of this document (in color, of course) can be found at either: www.wiley.com/color or www.cis.rit.edu:80/people/faculty/berns/.

Thanks in advance,
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June 12, 2001

**Page 6**
Figure legends on the bottom of the page are reversed.

**Page 24**
The left-hand figure did not print correctly. The figure should have looked like:

![Diagram](image)

**Page 52**
Right column, about 2/3 down, "fancv" should be "fancy."
Page 54
Top-right figure caption, five lines down, “of the same X, Y, and Z primaries,” should read “similar, X, Y, and Z primaries.”

Page 65
Left column, 4th line from the bottom, "lightess" should be "lightness."

The equation for calculating $u'$ from chromaticities is wrong. It should be:

$$u' = \frac{4x}{-2x + 12y + 3}$$

Also, the reverse equations can be simplified:

$$x = \frac{9u'}{6u' - 16v' + 12}$$

$$y = \frac{4v'}{6u' - 16v' + 12}$$

Page 66
The Priest 1920 square-root function, shown in the left-hand box is wrong. It should be:

$$V = 10 \sqrt{Y} \quad (0 \leq Y \leq 1)$$

Page 67
The Hunter Lab equations are incorrect. The correct equation is:

$$a = \frac{175(0.0102X_n)^{1/2}(X/X_n - Y/Y_n)}{(Y/Y_n)^{1/2}}$$

$$b = \frac{70(0.00847Z_n)^{1/2}(Y/Y_n - Z/Z_n)}{(Y/Y_n)^{1/2}}$$

Page 68
In the right-hand column figure title, "Roberston" should be "Robertson."

Page 69
The CIELAB $L^*$ equation for $Y/Y_n$ less than 0.01 (actually, less than 0.008856) should be:

$$L^* = 903.3(Y/Y_n) \text{ for } Y/Y_n \leq 0.008856$$

"where (fY/Y_n)=..." should be "where f(Y/Y_n)=..."

Page 72
The equation for $\Delta C_{ab}^*$ is missing square terms for the standard. The correct equation is:

$$\Delta C_{ab}^* = C_{ab}^* - C_{ab}^* = \left(\frac{a_{\text{batch}}^*}{a_{\text{batch}}^*} + \frac{b_{\text{batch}}^*}{b_{\text{batch}}^*}\right)^{1/2} - \left(\frac{a_{\text{standard}}^*}{a_{\text{standard}}^*} + \frac{b_{\text{standard}}^*}{b_{\text{standard}}^*}\right)^{1/2}$$
Page 85
Strictly speaking, the left-hand figure is correct because light is reversible through an optical system (Helmholtz principle). However, the figure is confusing. The following figure is more intuitive:

![Figure showing correct light paths through an optical system](image)

Page 85
Top right-hand figure heading has a typo. Second to last line in heading, "measurement" should be "measurement."

Page 93
Left side bar refers to seven channels. "Seven" should be replaced with "six." (My original filter database had seven filters; the filter peaking at 700 nm was omitted.)

Page 98
Right-hand column, first paragraph, 9th line: "...be no less that..." replaced with "...be no less than..."

Page 99
The equation for standard error should show the standard deviation and standard errors as lower case.

Page 103
The equation for estimating wavelength error from $\Delta L^*$, $\Delta a^*$, and $\Delta b^*$ bidirectional measurements has a typo. The constant in front of $\Delta L^*$ should be positive 0.08. That is:

$$E_{\text{reference white}} = -2.79\Delta L^* + 1.50\Delta a^* + 2.96\Delta b^*$$

$$E_{\text{reference black}} = -0.32\Delta L^* - 0.48\Delta a^* - 0.42\Delta b^*$$

$$E_{\text{wavelength}} = 0.08\Delta L^* - 0.82\Delta a^* + 0.67\Delta b^*$$

Page 107
8th line from the bottom on the left column, add "are" between "there" and "many." This results in: "... a threshold has been measured and there are many techniques used..."

Page 116
Right column, 3rd line down, "dimensions" is printed strangely.
Page 117
The two figures plotting the relationship between $\Delta C^*_{ab}$ or $\Delta H^*_{ab}$ and $C^*_{ab}$: the equations should be $S_C = 1.0 + 0.04C^*_{ab}$ and $S_H = 1.2 + 0.01C^*_{ab}$.

Page 121
The equation for CIE94 is missing a left parenthesis. The correct equation is:

$$\Delta E_{94} = \left[ \frac{\Delta L^*}{k_L S_L} + \frac{\Delta C^*_{ab}}{k_C S_C} + \frac{\Delta H^*_{ab}}{k_H S_H} \right]^{1/2}$$

$S_L = 1$

$S_C = 1 + 0.045C^*_{ab}$

$S_H = 1 + 0.015C^*_{ab}$

$k_L = k_C = k_H = 1$ for reference conditions

$C^*_{ab} = C_{ab,standard}$ or $\sqrt{C_{ab,1}^* C_{ab,2}^*}$

Page 125
Bottom figure: the y-axis legend should read “cumulative percentage of observations.”

Page 130
Right column, 14th line from the bottom, "uisng" should be "using."

Page 208
In equation E-1, the conversion equation from reflectance to K/S is missing a square. The correct equation is:

$$\left( \frac{K}{S} \right)_\lambda, mix = \left( \frac{k}{s} \right)_\lambda, t + c_1 \left( \frac{k}{s} \right)_\lambda, 1 + c_2 \left( \frac{k}{s} \right)_\lambda, 2 + c_3 \left( \frac{k}{s} \right)_\lambda, 3 \right), \quad (E-1)$$

where

$$\left( \frac{K}{S} \right)_\lambda = \frac{(1 - R_{\lambda, i})^2}{2R_{\lambda, i}}.$$
Pages 218, 220, and 221
The ColorChecker sample between Red and Magenta should be Yellow, not Yellow green.

Page 219
Equation (G-10) has a typo. For the B channel, "3.27" should be "8.27":
\[
\begin{align*}
R_{\text{camera}} &= 3.81\times10^{-4} d_r - 1.86\times10^{-2} \\
G_{\text{camera}} &= 3.82\times10^{-4} d_g - 1.89\times10^{-2} \\
B_{\text{camera}} &= 8.27\times10^{-4} d_b - 1.89\times10^{-2}
\end{align*}
\]

Page 222
The sRGB equation, (G-16), needs to have each matrix element multiplied by 100. The error occurred because I forgot that in Eq. (G-13), the tristimulus values are divided by 100 in order to apply the Bradford chromatic adaptation transform. Normally, following this transformation, the corresponding-color tristimulus values are multiplied by 100 so that Y=100 for the white point. However, the sRGB matrix assumes tristimulus values scaled such that Y=1. The correct matrix is:
\[
\begin{bmatrix}
R_{\text{display}} \\ G_{\text{display}} \\ B_{\text{display}}
\end{bmatrix} =
\begin{bmatrix}
3.2410 & -1.5374 & -0.4986 \\
-0.9692 & 1.8760 & 0.0416 \\
0.0556 & -0.2040 & 1.0570
\end{bmatrix}
\begin{bmatrix}
X_{c} \\ Y_{c} \\ Z_{c}
\end{bmatrix}
\]

Page 226
"R. Ashok" should be “A. Roy.” (For obvious reasons, I thought his first name was Roy 😃)