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! Thanks in advance,
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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:

Page 52
Right column, about 2/3 down, "fancv" should be "fancy."

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

Berns, "Billmeyer and Saltzman’s Principles of Color Technology" 3rd edition
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:

$$V = 10Y^{1/2} \quad (0 \leq Y \leq 1)$$

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

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

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

**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:

$$\Delta C^*_{ab} = C^*_{ab} - C^*_{ab} = \left( a_{\text{batch}}^* + b_{\text{batch}}^* \right)^{1/2} - \left( a_{\text{standard}}^* + b_{\text{standard}}^* \right)^{1/2}$$
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:

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

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 121
The equation for CIE94 is missing a left parenthesis. The correct equation is:
\[
\Delta E_{94} = \left[ \left( \frac{\Delta L^*}{k_L S_L} \right)^2 + \left( \frac{\Delta C^*_{ab}}{k_C S_C} \right)^2 + \left( \frac{\Delta H^*_{ab}}{k_H S_H} \right)^2 \right]^{1/2}
\]
where:
- \( S_L = 1 \)
- \( S_C = 1 + 0.045 C_\text{ab}^* \)
- \( S_H = 1 + 0.015 C_\text{ab}^* \)
- \( k_L = k_C = k_H = 1 \) for reference condition:
- \( C_\text{ab}^* = C_\text{ab,standard} \) or \( \sqrt{C_\text{ab,1}^* C_\text{ab,2}^*} \)

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:
\[
\frac{K}{S}_{\lambda,\text{mix}} = \left( \frac{k}{S} \right)_{\lambda,1} + c_1 \left( \frac{k}{S} \right)_{\lambda,2} + c_2 \left( \frac{k}{S} \right)_{\lambda,3} + c_3 \left( \frac{k}{S} \right)_{\lambda,3}, \quad \text{(E-1)}
\]
where
\[
\frac{K}{S} = \frac{(1 - R_{\lambda,i})^2}{2R_{\lambda,i}}.
\]

Page 213
In equation (F-7), the right hand matrix should have elements of \( X/Y_n, Y/Y_n, \) and \( Z/Y_n \). That is, add "n" subscripts to this equation.
\[
\begin{bmatrix}
R & 0.8951 & 0.2664 & -0.1614 \\
G & -0.7502 & 1.7135 & 0.0367 \\
B & 0.0389 & -0.0685 & 1.0296
\end{bmatrix}
\begin{bmatrix}
X / Y \\
Y / Y \\
Z / Y_n
\end{bmatrix}
\]

Page 214
Right column, 2nd line, replace "illuminant" with "observer." That is, "... are defined for D65 and the selected observer."

Berns, "Billmeyer and Saltzman's Principles of Color Technology" 3rd edition
Errata
Page 219
Equation (G-10) has a typo. For the B channel, "3.27" should be "8.27":
\[
\begin{align*}
R_{\text{camera}} &= 3.81 \times 10^{-4} d_r - 1.86 \times 10^{-2} \\
G_{\text{camera}} &= 3.82 \times 10^{-4} d_g - 1.89 \times 10^{-2} \\
B_{\text{camera}} &= 8.27 \times 10^{-4} d_b - 1.89 \times 10^{-2}
\end{align*}
\]

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:
\[
\begin{pmatrix}
R_{\text{display}} \\
G_{\text{display}} \\
B_{\text{display}}
\end{pmatrix} =
\begin{pmatrix}
3.2410 & -1.5374 & -0.4986 \\
-0.9692 & 1.8760 & 0.0416 \\
0.0556 & -0.2040 & 1.0570
\end{pmatrix}
\begin{pmatrix}
\hat{X}_c \\
\hat{Y}_c \\
\hat{Z}_c
\end{pmatrix}
\]