Color – Black & White - Composites

Human Eye

- Can distinguish between 16 million colors
- Elements (cones) see Red, Green and Blue – very convenient for photographers
- Cameras record RGB (also convenient)
- Monitors project in RGB(W) (also convenient)

- BIG Problem:
  - Printers (Commercial and Photographic) print in CMYK
  - Very inconvenient-leads to many printing challenges for photographers

RGB vs CMYK

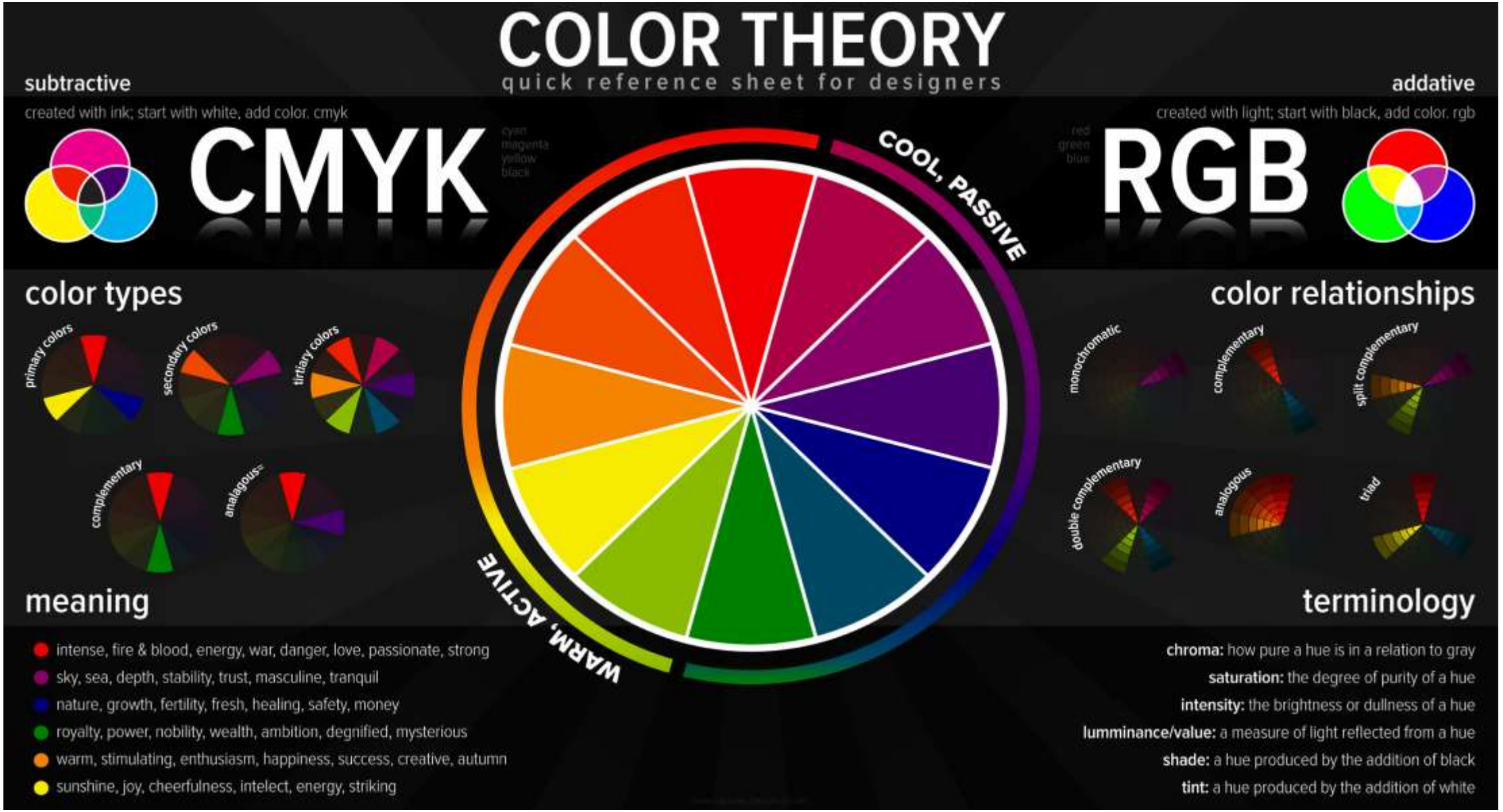
Red, Green and Blue

- *Transmitted* from a light source: monitors
- Additive colors: equal amounts create levels of gray (white to black)
- Matches color receptors in our eyes (Yaaaaah)

Cyan, Magenta, Yellow, K black

- *Reflected* colors
- Subtractive colors: photo prints, magazines, anything printed
- Part of the challenge of creating prints that match your monitor (Boooooooo)

Color Wheel - Simplified



WHAT YOU SEE ON SCREEN

RGB

CMYK

HOW IT WILL PRINT

Basic Color Attributes/Descriptors

- Hue: “Color” in the simplest terms
- Value: Light to Dark Tones (White or Black added to Change)
- Saturation: Intensity

Hue (not color) Messages

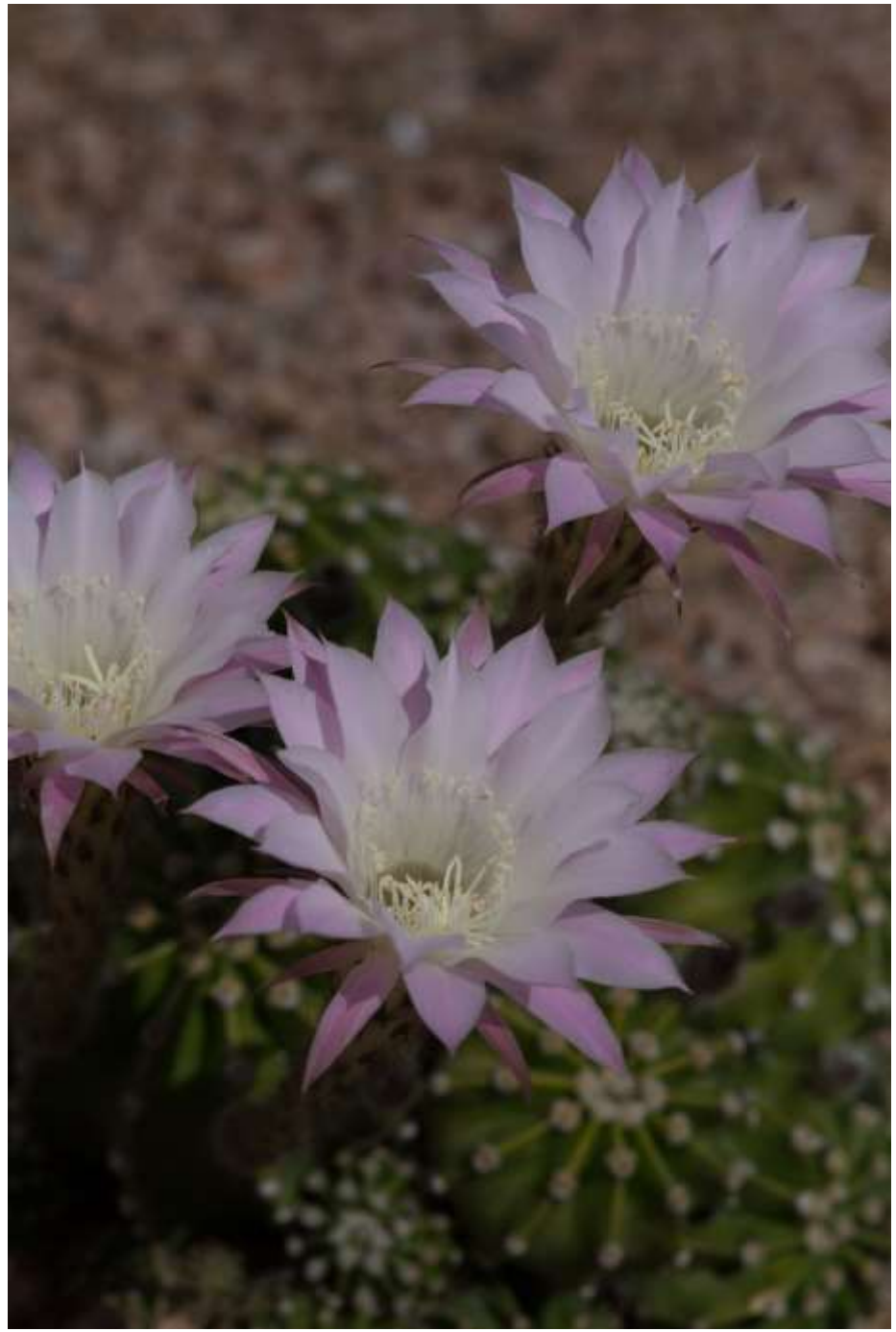
- Used to direct eye travel
- Can add visual weight to photo
- Warm: Yellow, Reds and Orange (sunsets, sunrise, fire, *reds require careful placement*)
- Cool: Blue, Violet and Greens (soothing, snow, water, shadows, sky, grass)
- Vibrant: Enhanced with Saturation (energetic, interesting)
- Contrasting: Can add emphasis: vibrant blue/violet sky, warm (grassland in foreground)

Warm Colors

Red, Yellow, Orange, Light Green

Cool Colors

Magenta, Blue, Violet, Green



Directing Eye: POI, Landing Zone

Add Visual Weight Balance

Intensity/Vibrant - Reds and Yellows

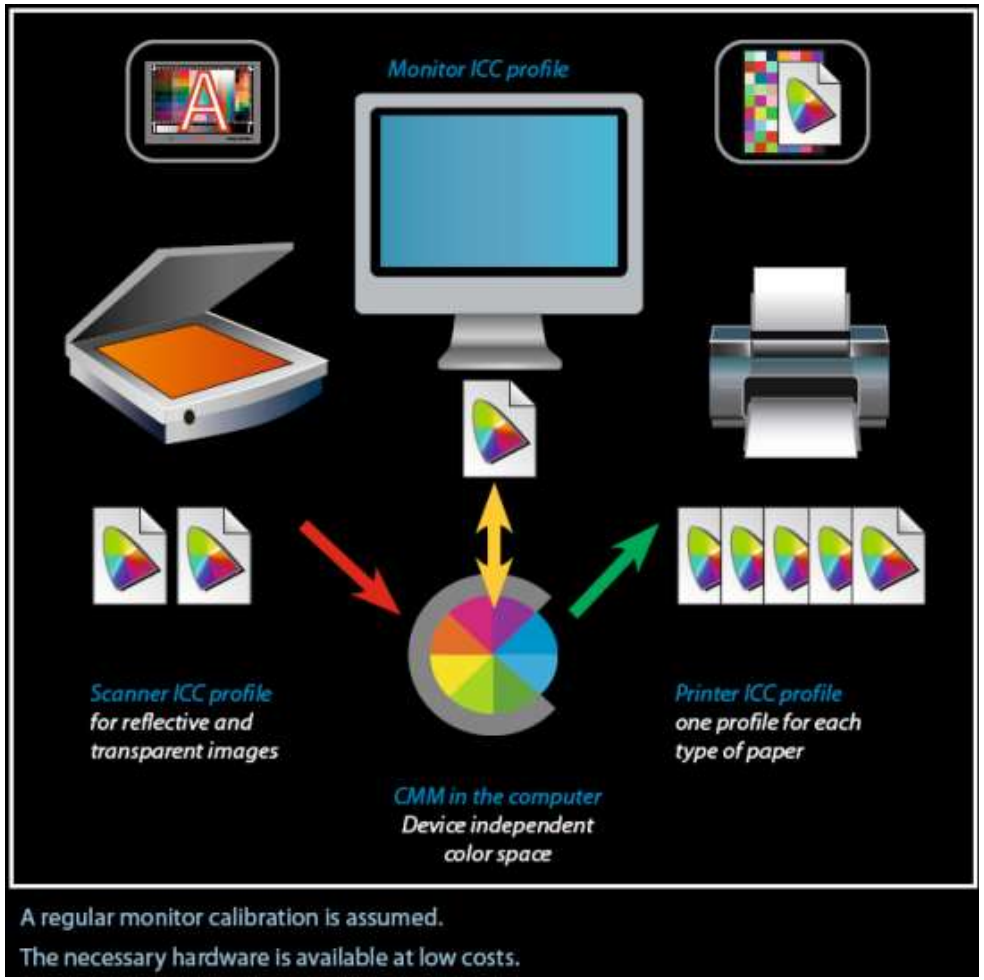
Energetic, Interesting, Active

Saturation

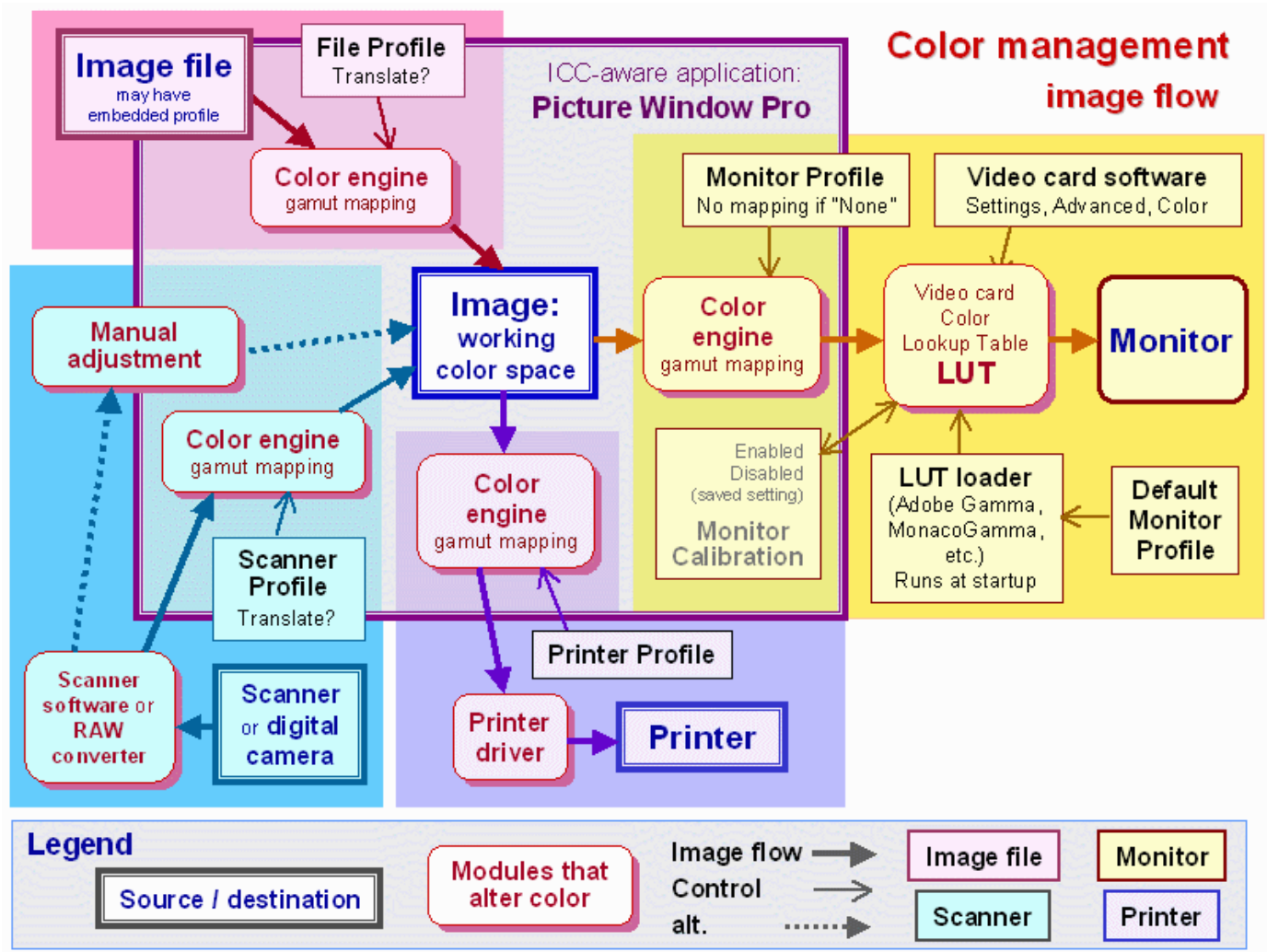
If it doesn’t feel right
it probably isn’t a good balance of colors

Color Management -*Simplified*

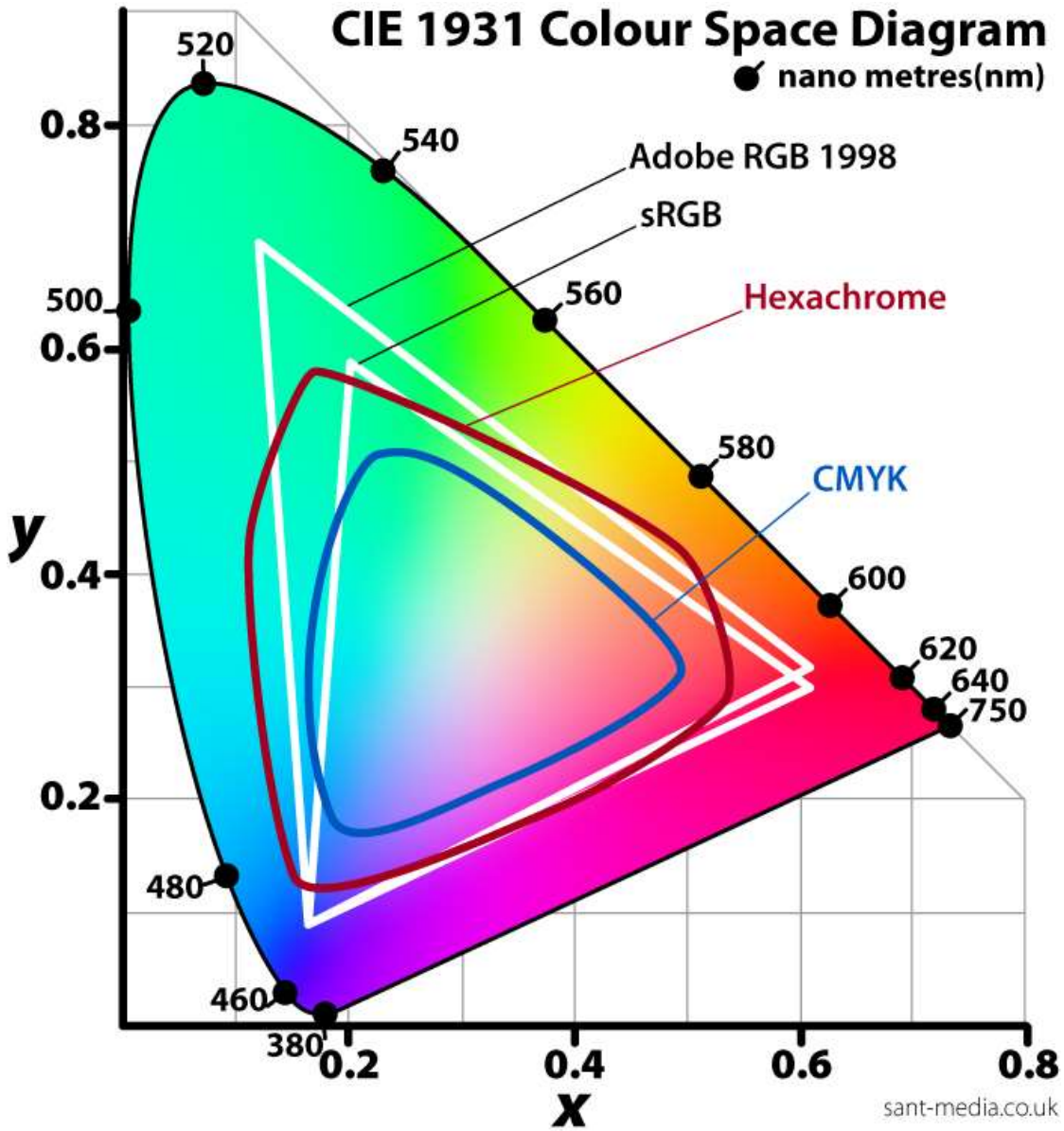
Profiling - No Two Color Recording/Transmitting/Printing Devices See Color The Same



Color Management In Depth



Color Space


CIE 1931 Colour Space Diagram
nano metres(nm)
520
540
560
580
600
620
640
750
500
480
460
380
Adobe RGB 1998
sRGB
Hexachrome
CMYK
0.8
0.6
0.4
0.2
y
0.2
0.4
0.6
0.8
x
sant-media.co.uk

Color Depth – *Very* Simplified

Dynamic Range – Why & When Important

- 2 bit depth: 2 tones (black and white)
  - *per pixel*
  - *no shades of grey possible*

- 8 bit depth:

  - 2^8 That's 2 to the 8th power (2x2x2x2x2x2x2x2)

  = 256 tones/steps from black to white
  - Or shades of red or green or blue pixels
  - 256 shades of red x 256 shades of green x 256 shades of blue >

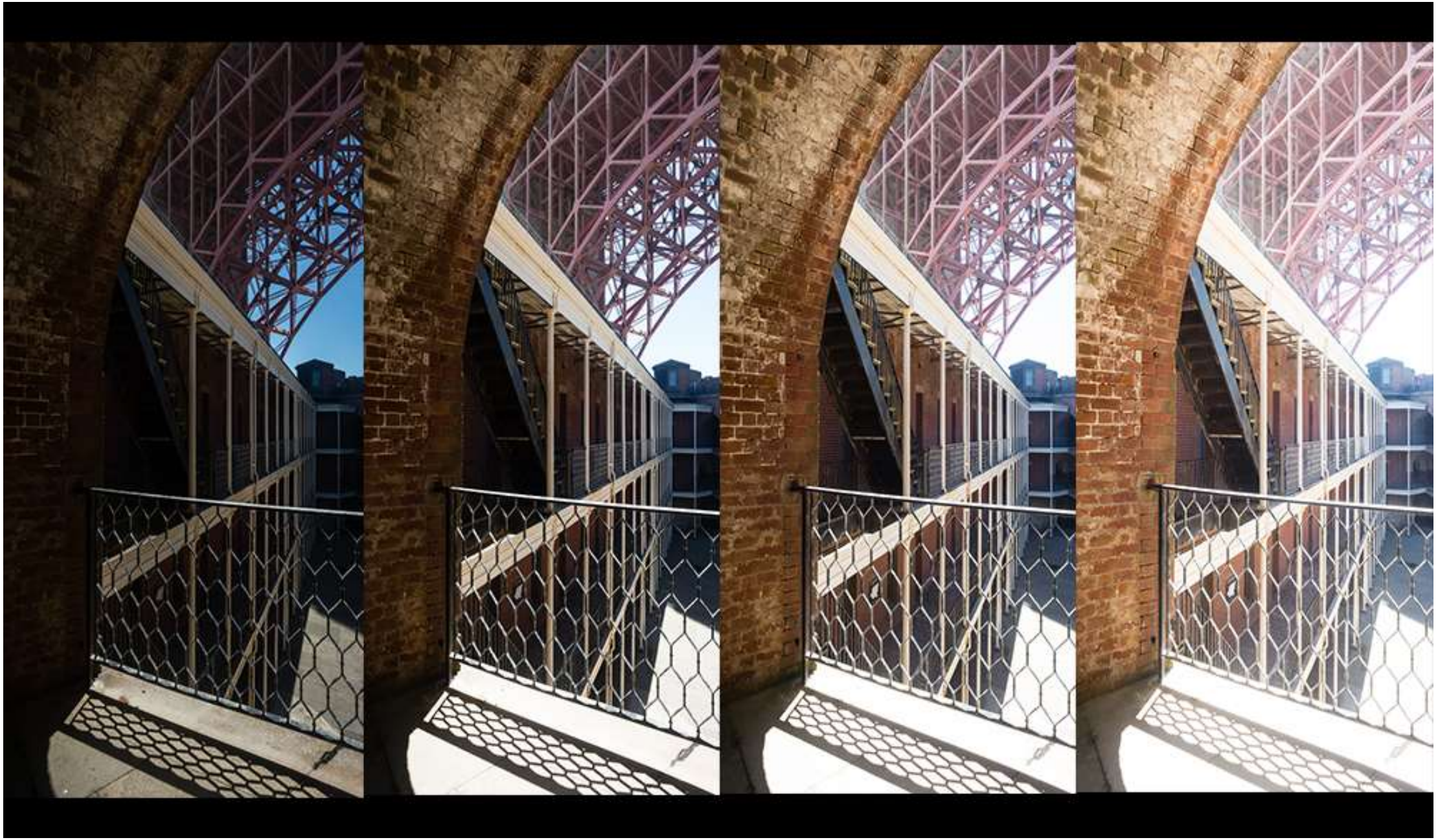
16 Million Shades of Color!

Greater Bit Depths

- 14 bit depth: 16,384 tones per pixel
  - Camera raw
  - 4+ Trillion Shades

- 16 bit depth: 65,536 tones per pixel
  - Photoshop interpolation from 14 bit RAW

Human eye capability ?



When Does Bit Depth Make a Difference?

- When Editing!
  - Enlarging
  - Color corrections

Want More?

Sign up for the Olli *Composition and Story Telling* Series

The End