Computer Science E-7
Exposing Digital Photography

Lecture 12: Artifacts
April 27, 2009

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Image from http://en.wikipedia.org/wiki/Visible_spectrum

Review | The Eye
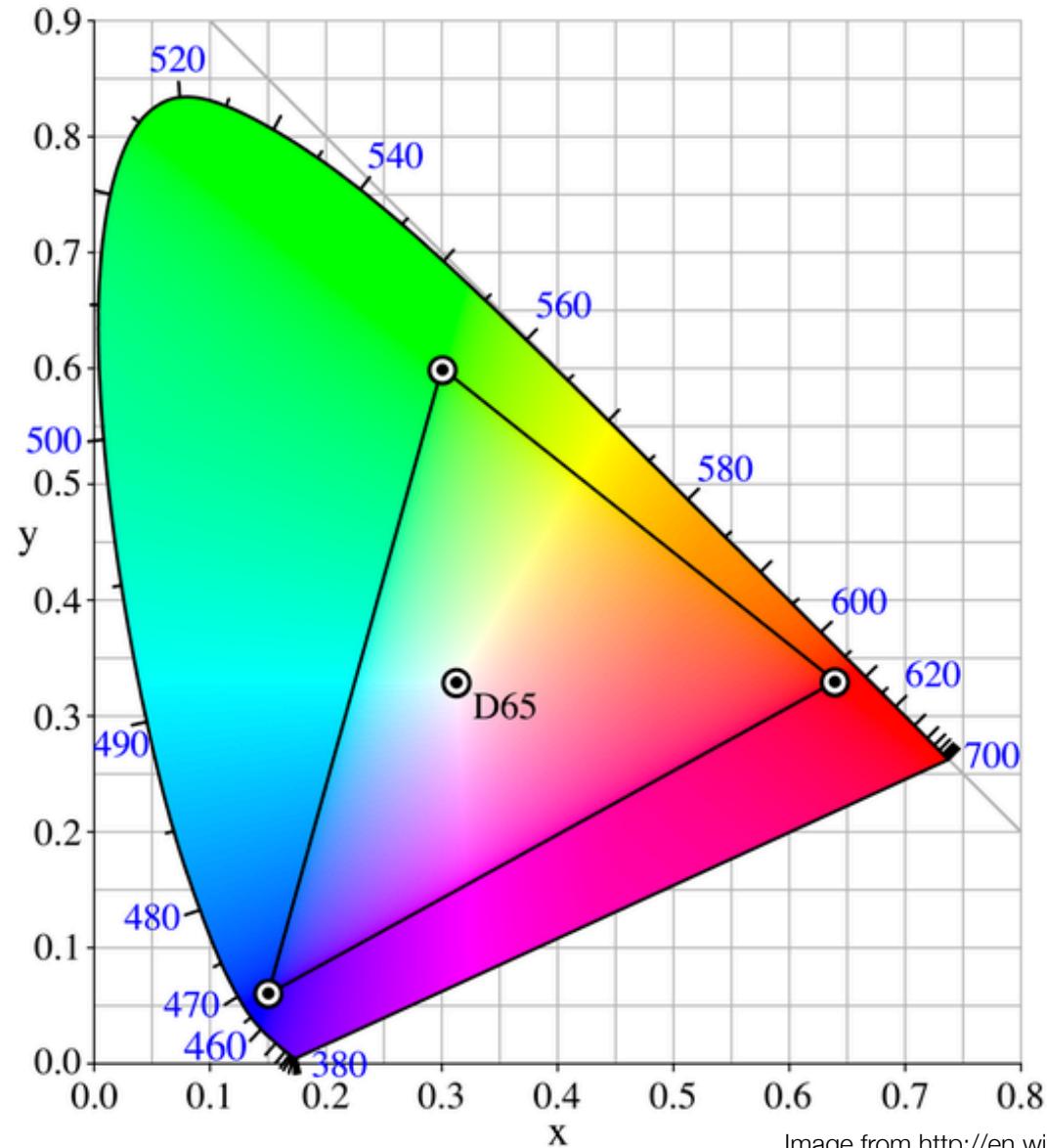
Image from http://en.wikipedia.org/wiki/SRGB_color_space

Review | sRGB

Gamut mapping

Perceptual

Large gamut

color spaces

Small gamut

Maintains low saturation colors.
Compresses out-of-gamut colors
and some in-gamut colors.
Reversible (*mostly;* best with 48-bit color)

Colorimetric

Maintains in-gamut colors.
Clips out-of-gamut colors.
Not reversible.

Review | Color Mgmt Gamut Mapping

Simulated GretagMacbeth™ ColorChecker Color Rendition Chart
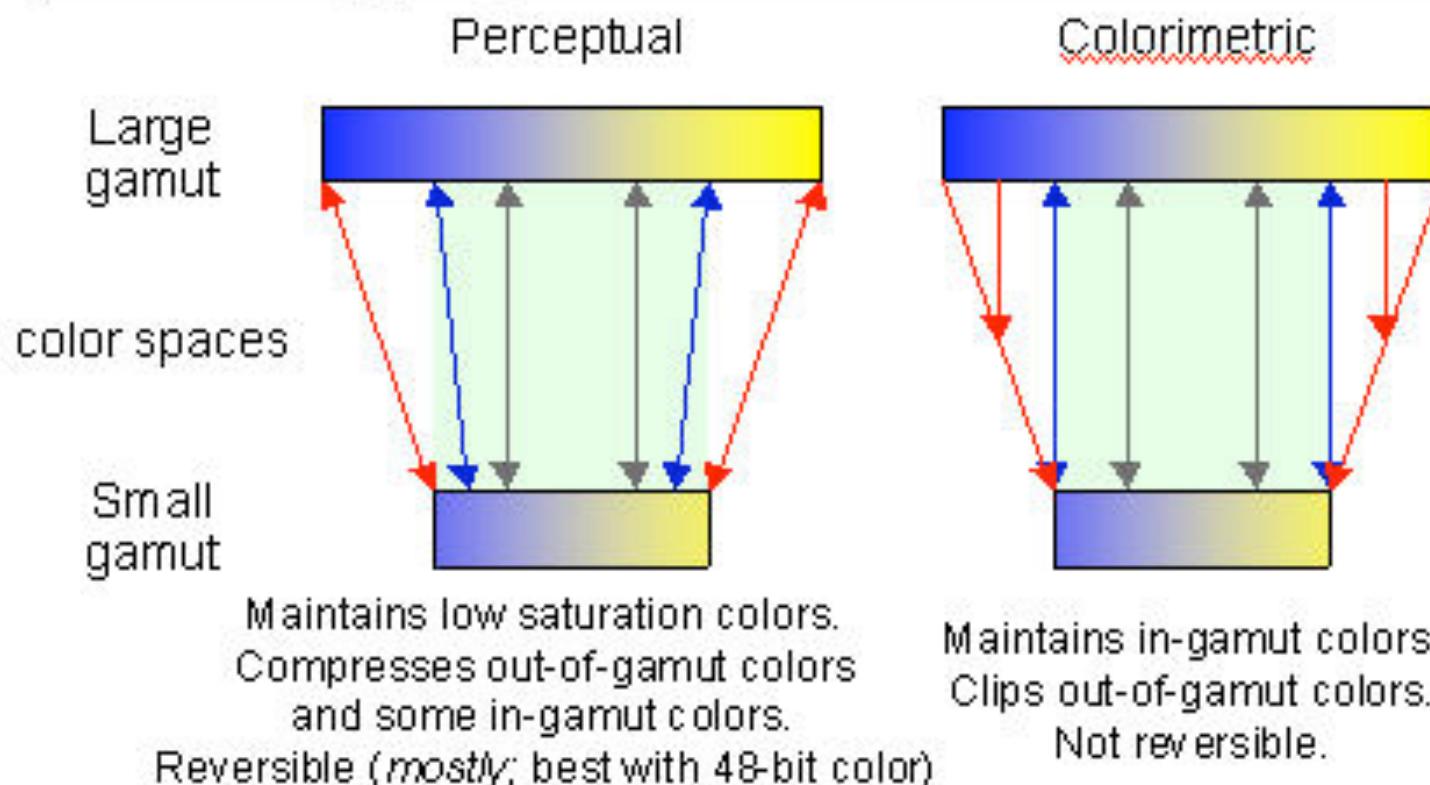
Image from http://www.normankoren.com/color_management_2A.html

Review | Monitor Profiling
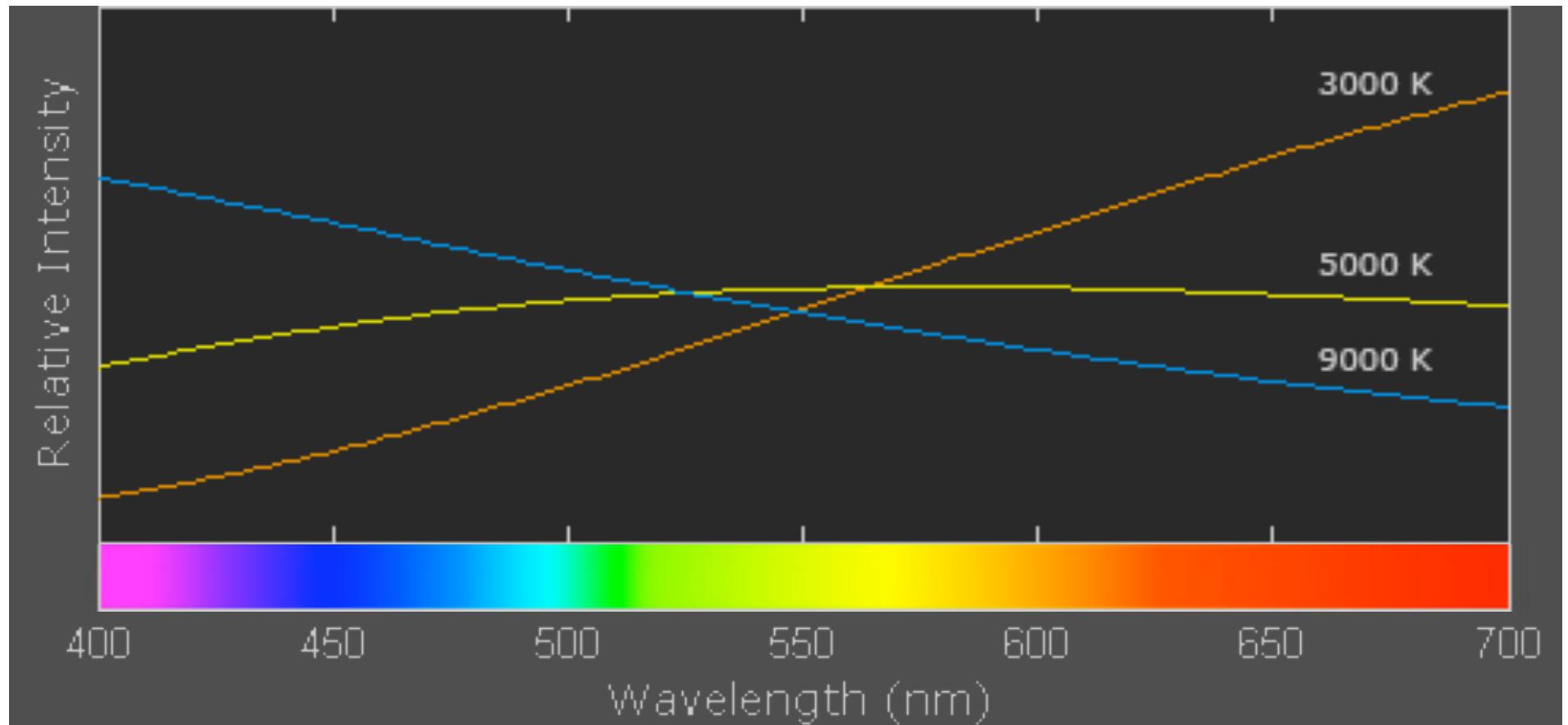
Image from http://www.cambridgeincolour.com/tutorials/white-balance.htm

Review | White Balance

	RAW	JPEG
Bit depth	10-, 12-, 14-bit	8-bit
Tonal Curve	Not applied	Applied
White Balance	Not set	Set
Compression	Lossless	Lossy
Portability	Nonstandard	Standard
Post-Processing	Required	Optional

Review | RAW vs JPEG!
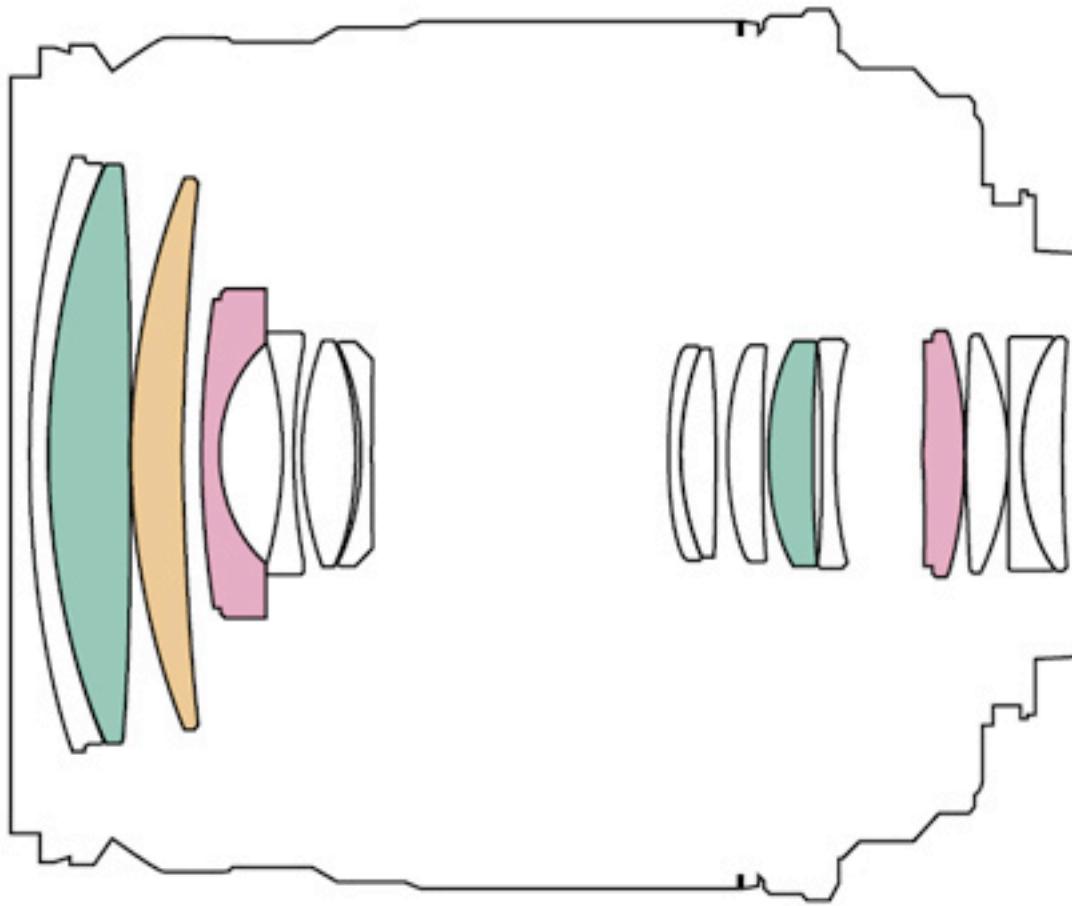
Artifacts | Optical Aberrations
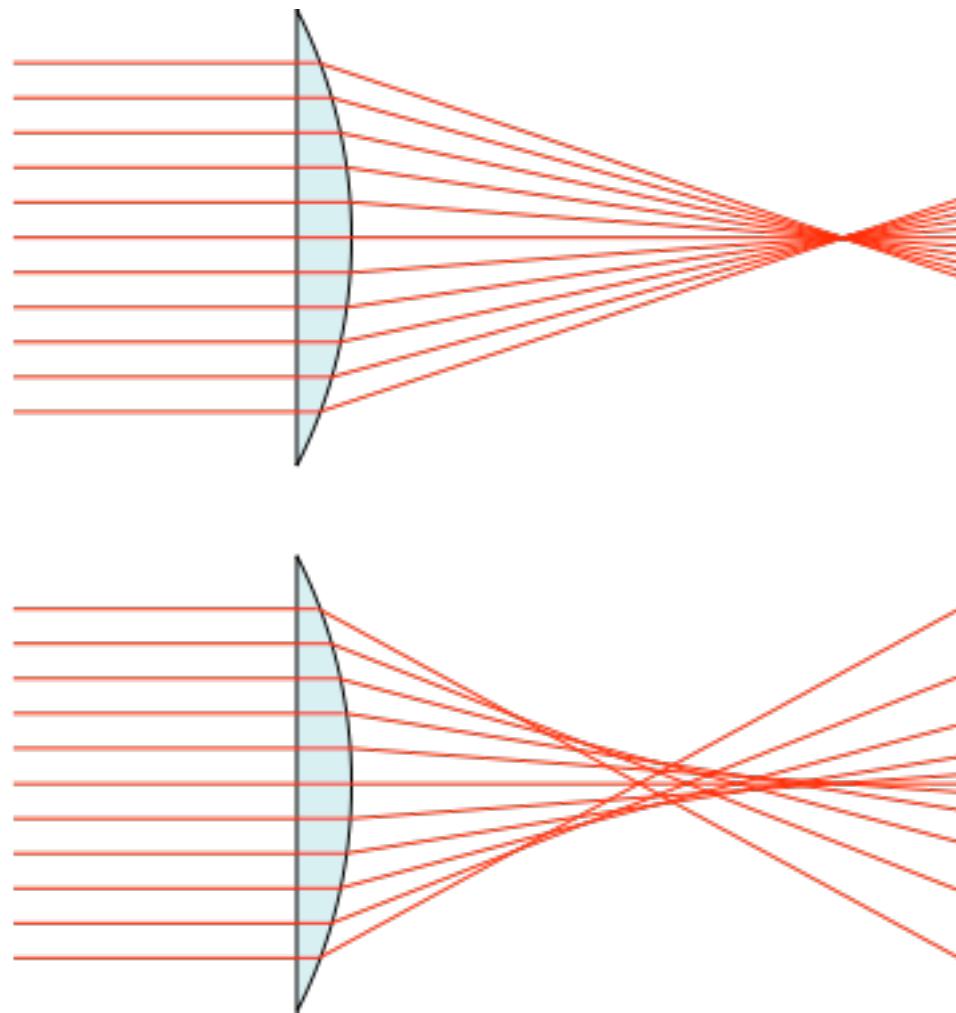
Optical Aberrations | Spherical Aberration
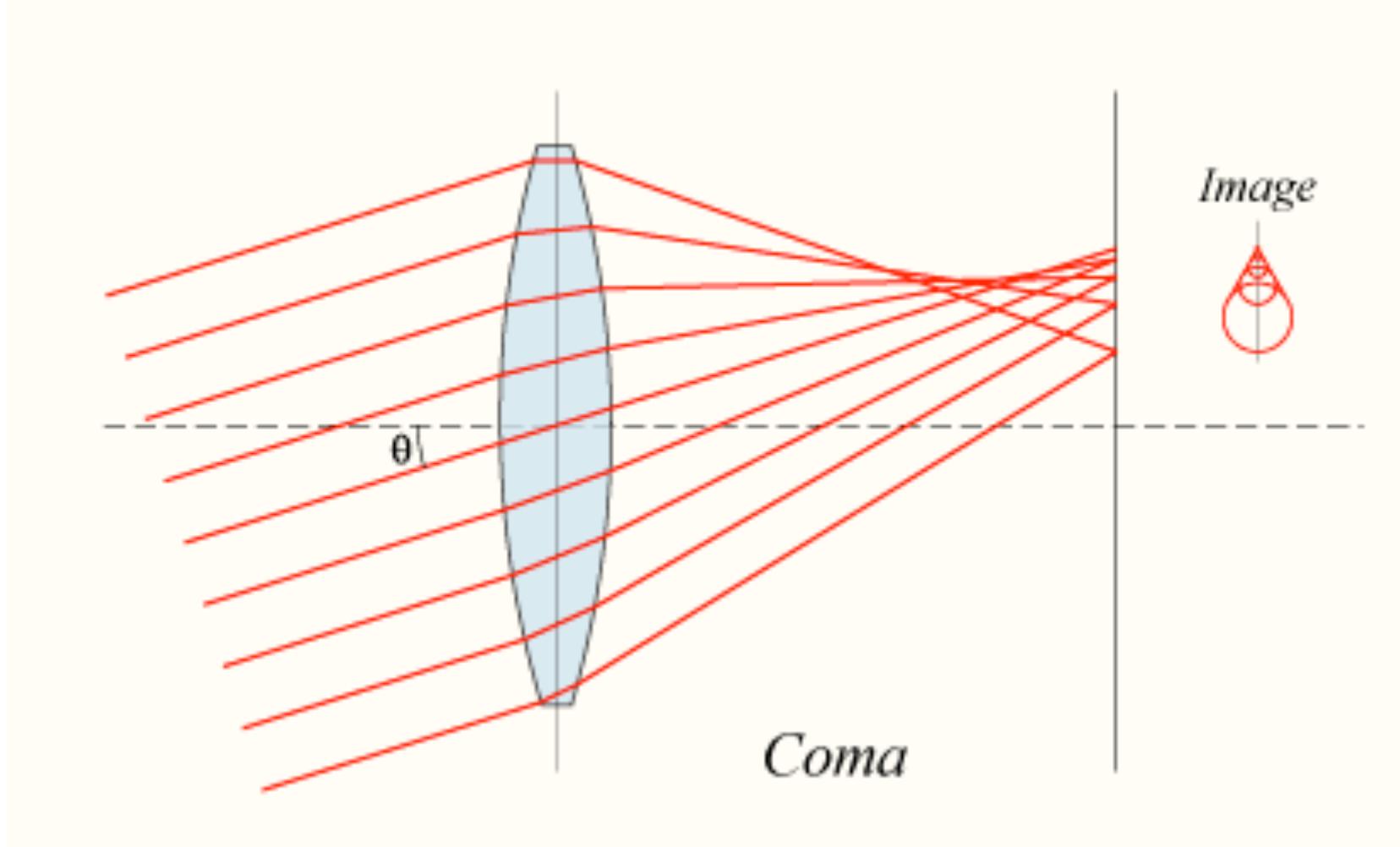
Coma

Image

Optical Aberrations | Coma

Off-Axis Comatic Aberration
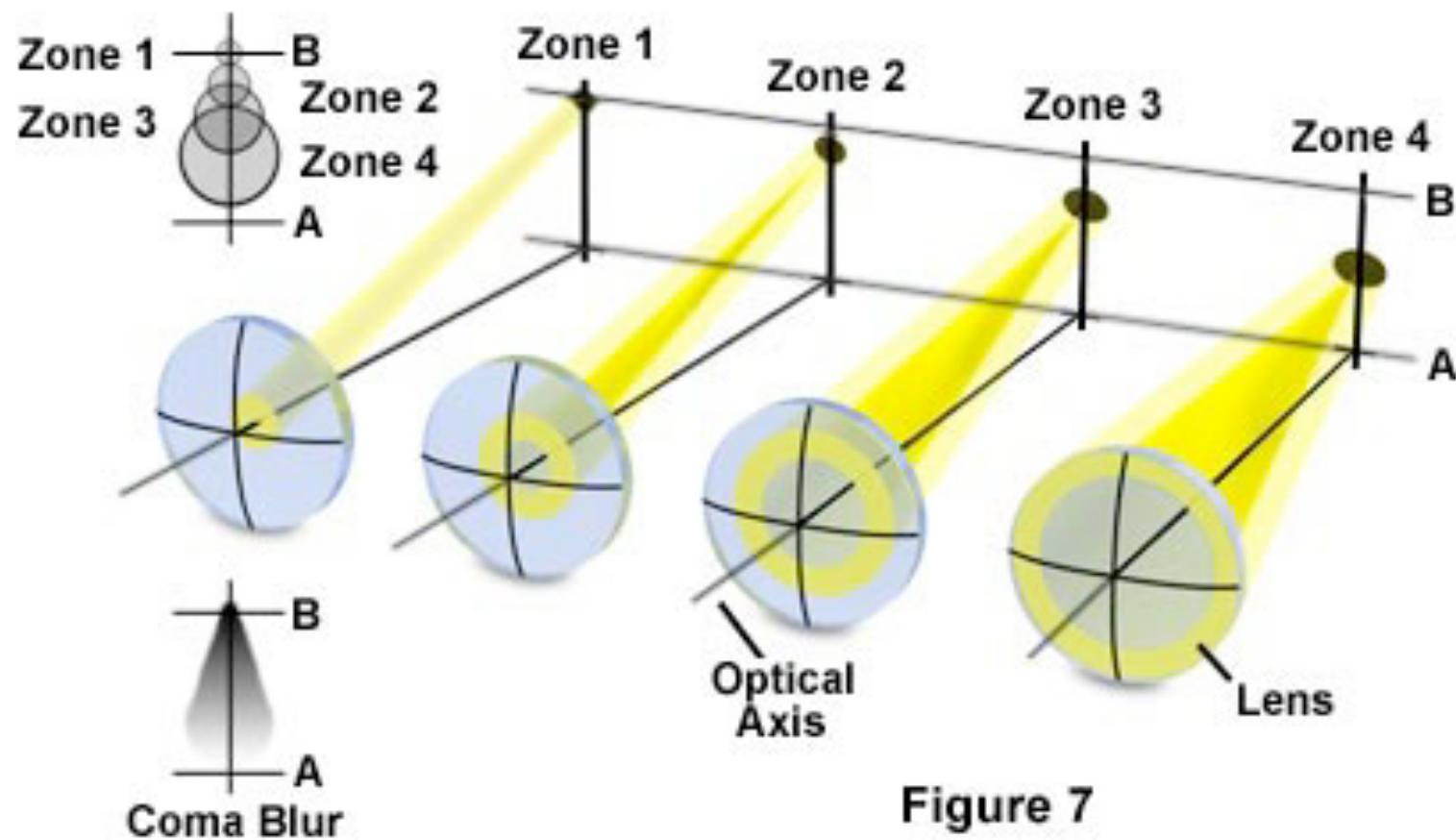
Figure 7

Image from http://www.olympusmicro.com/primer/anatomy/aberrations.html

Optical Aberrations | Coma
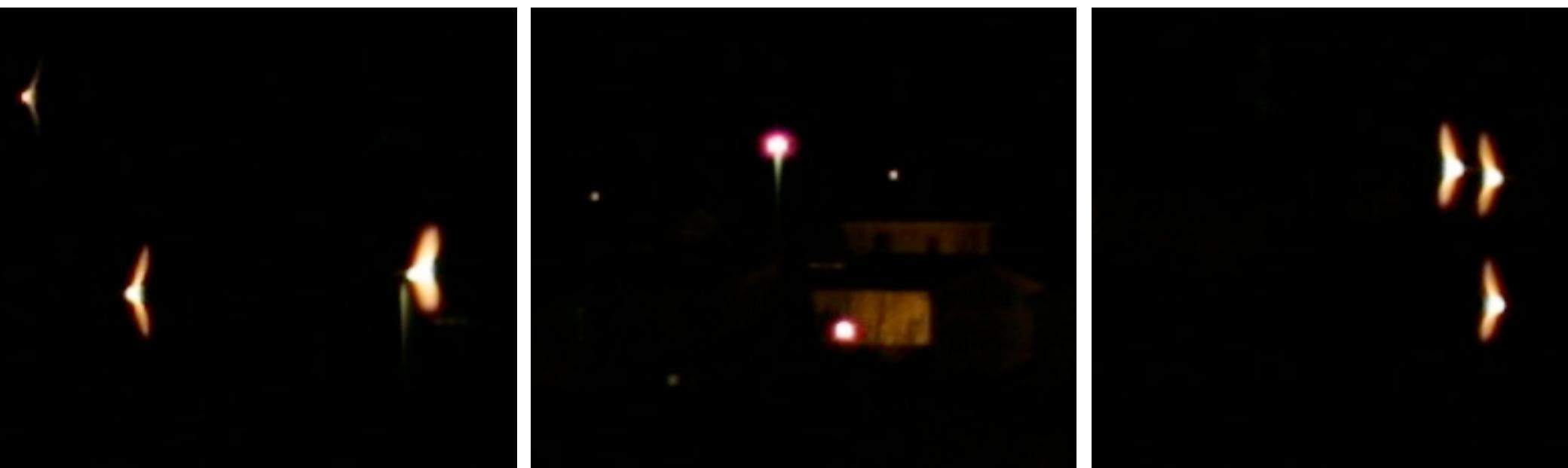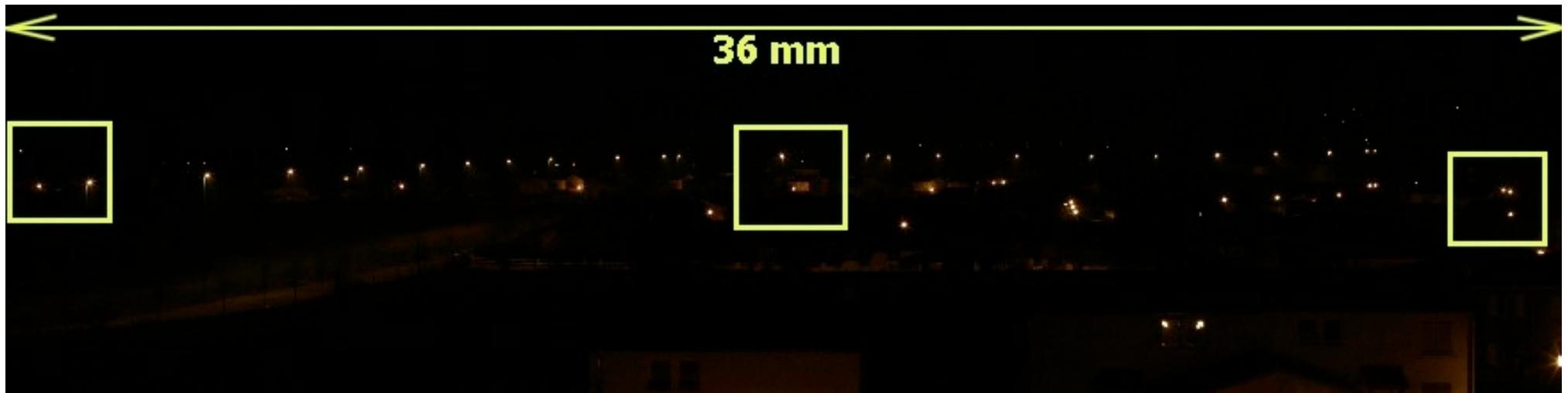
Image from http://www.astrosurf.com/buil/50mm/test_us.htm

Optical Aberrations | Coma
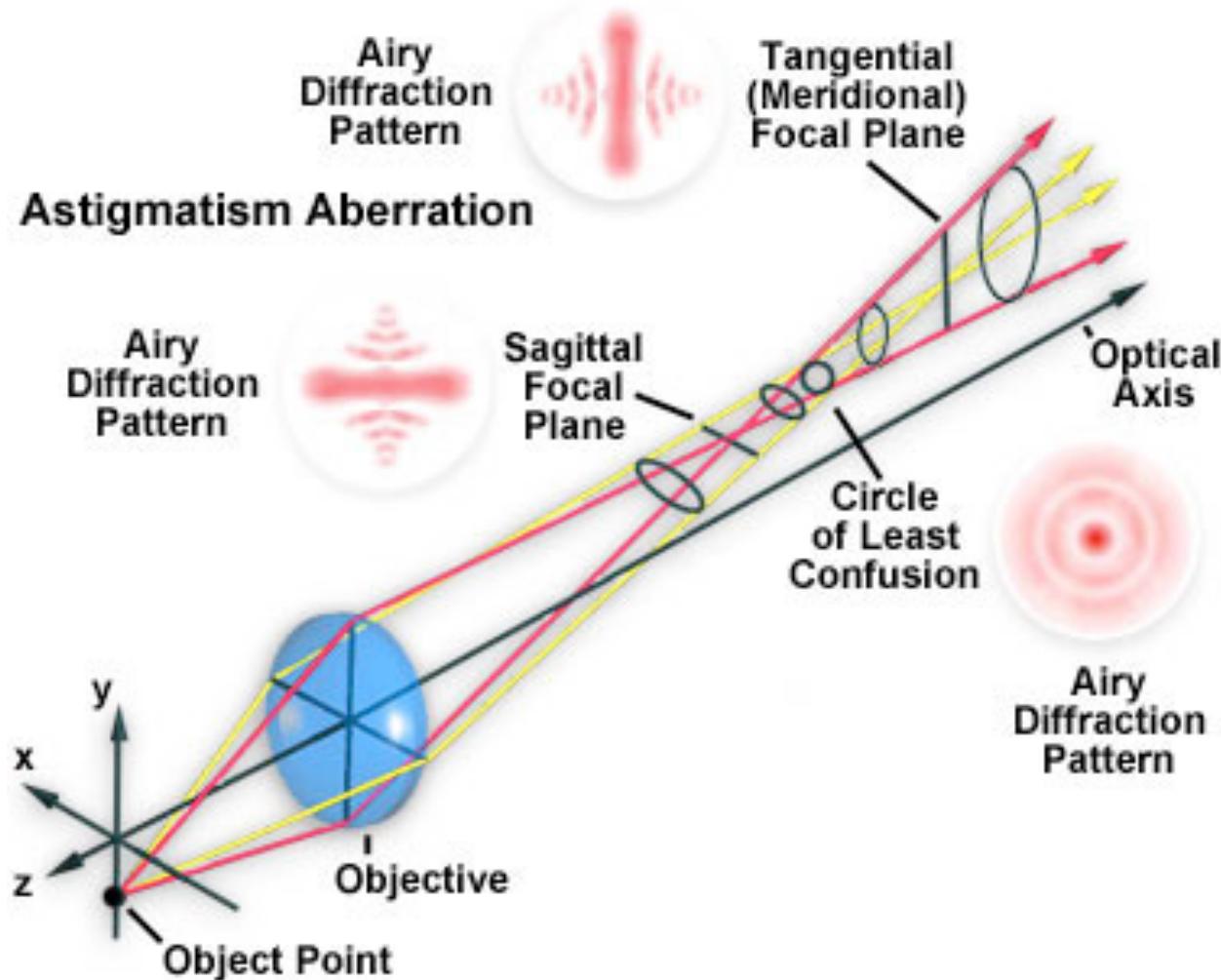
Optical Aberrations | Astigmatism

Image from http://www.vanwalree.com/optics/vignetting.html

Optical Aberrations | Vignette

Image from http://www.vanwalree.com/optics/vignetting.html

Optical Aberrations | Vignette

Image from http://www.vanwalree.com/optics/vignetting.html

Optical Aberrations | Optical Vignette

Image from http://www.vanwalree.com/optics/vignetting.html
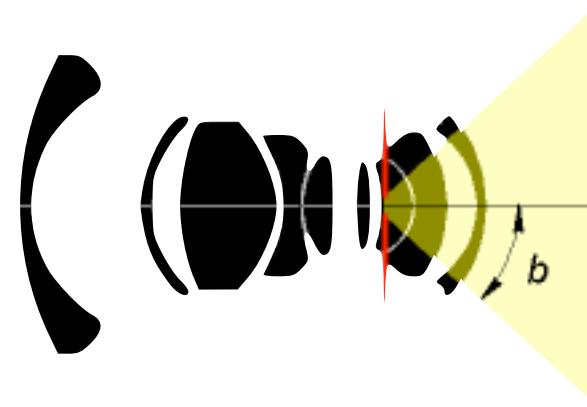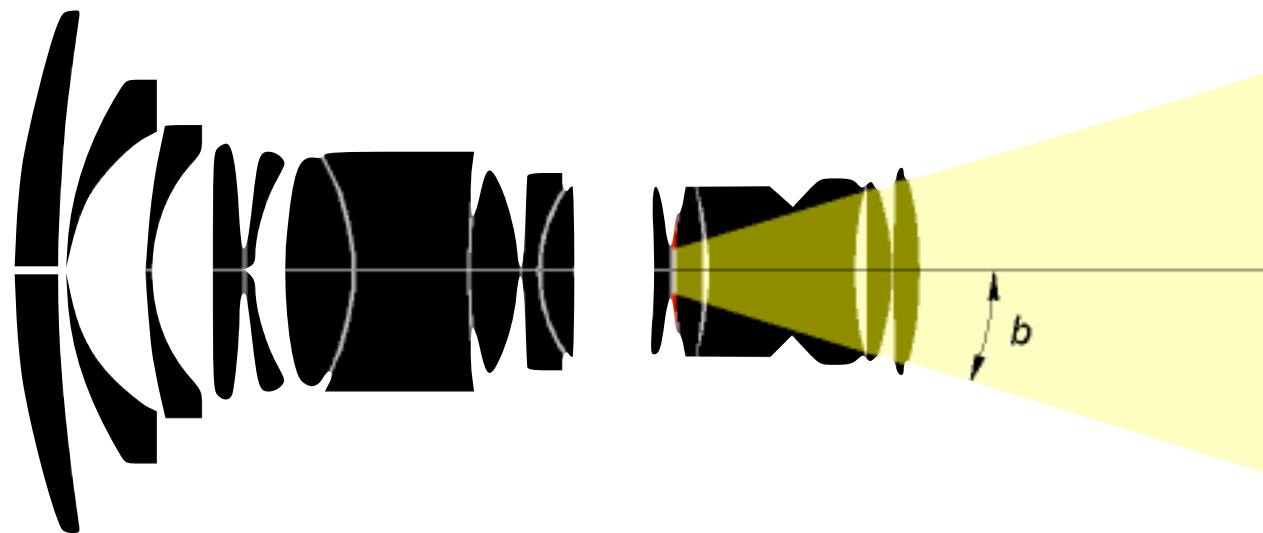
Optical Aberrations | Natural Vignette

Object

Barrel shaped

Cushion shaped

Distorted image
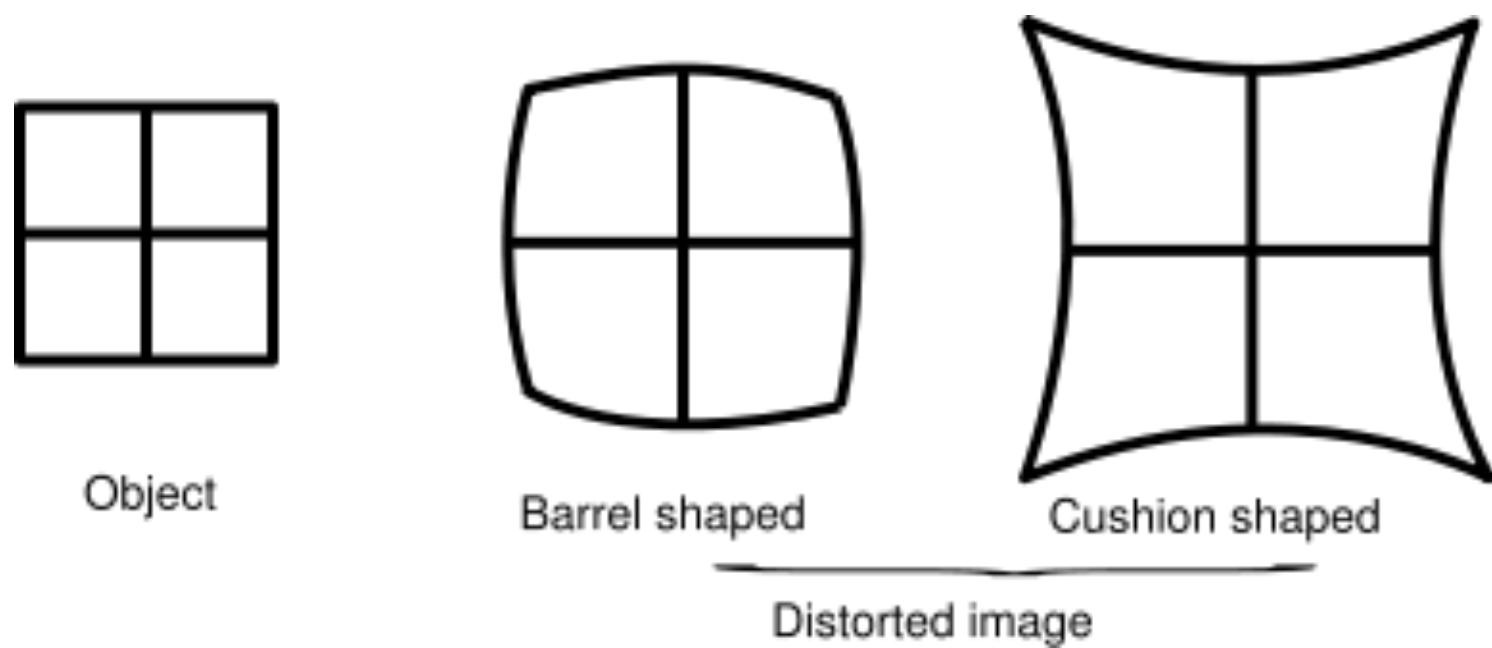
Optical Aberrations | Distortions

Images from http://www.dpreview.com/learn/?/Glossary/

Optical Aberrations | Distortions
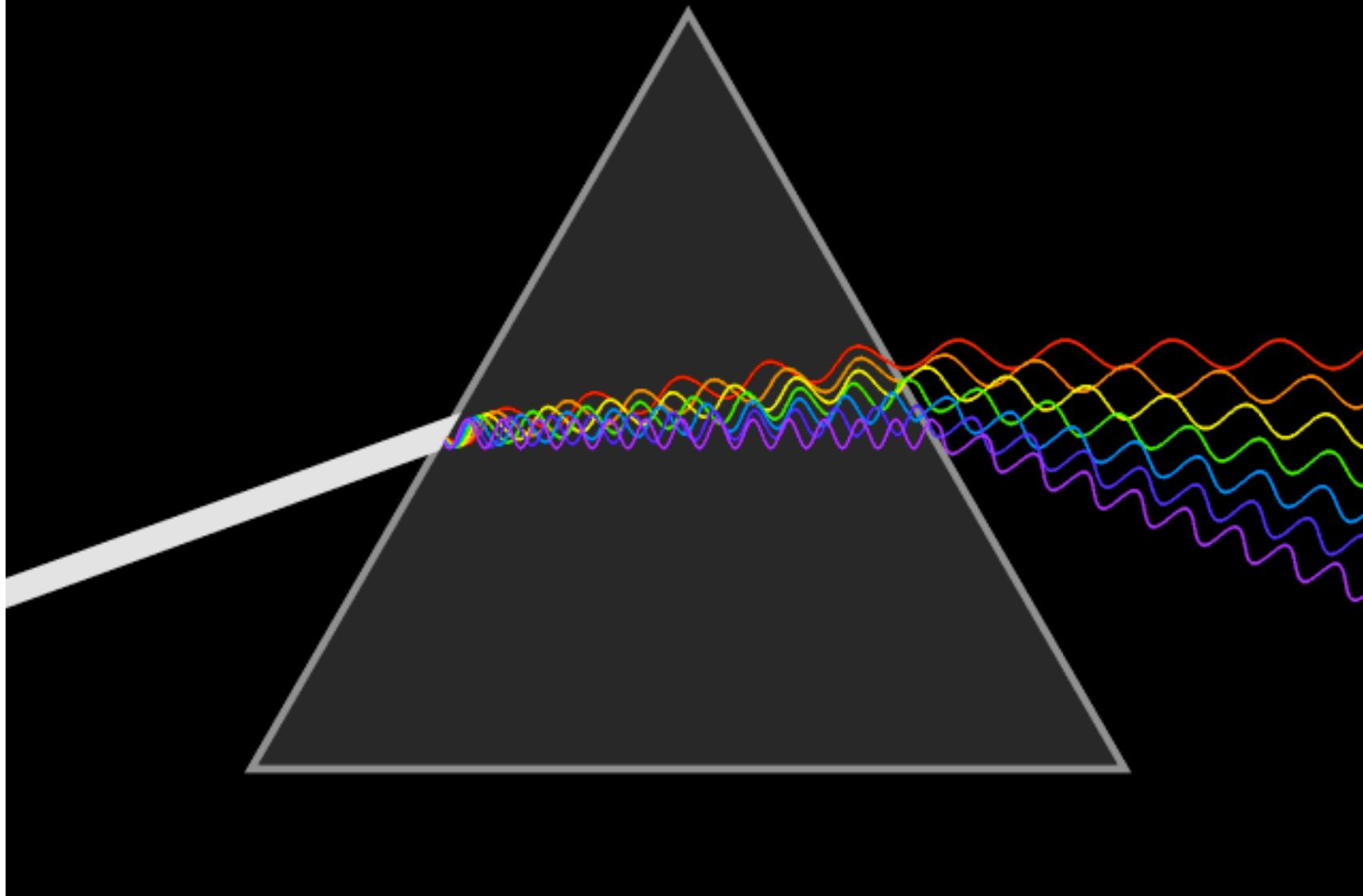
Animation from http://en.wikipedia.org/wiki/Prism_%28optics%29

Optical Artifacts | Refraction
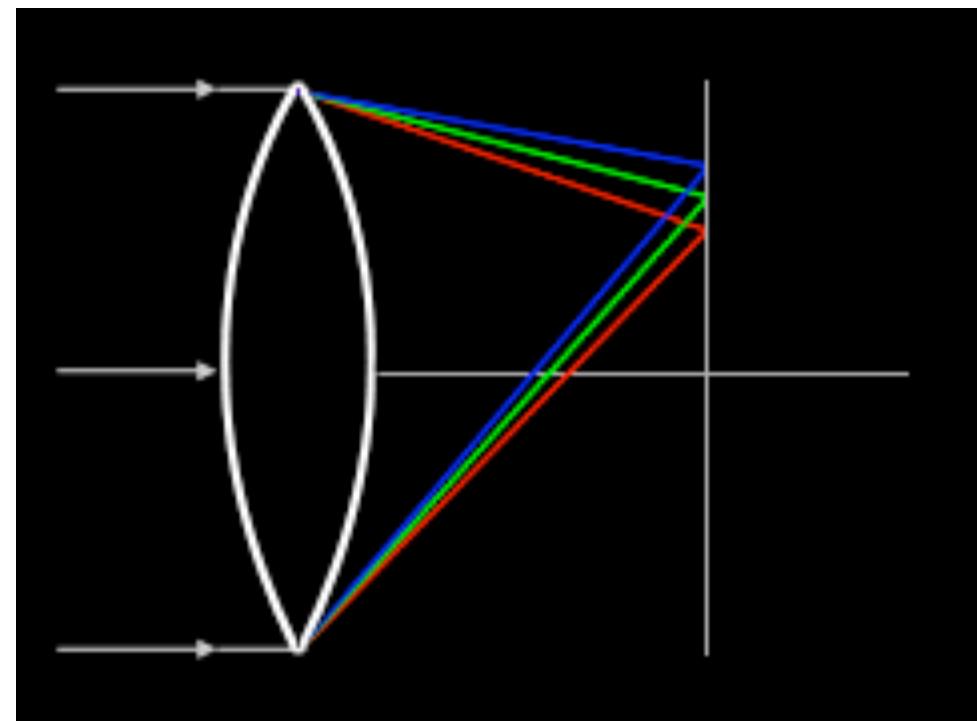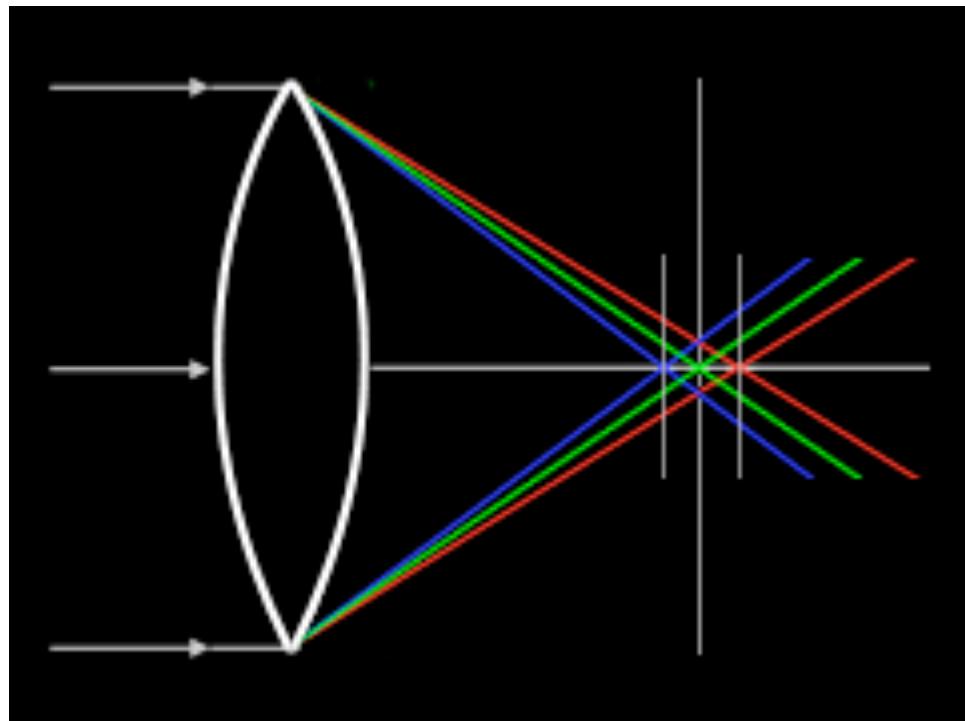
Images from http://www.dpreview.com/learn/?/Glossary/Optical/chromatic_aberration_01.htm

Aberrations | Chromatic

Images from http://en.wikipedia.org/wiki/Chromatic_aberration

Aberrations | Chromatic

Image from http://en.wikipedia.org/wiki/Chromatic_aberration

Chromatic Aberrations | Fringing

Image

Coma

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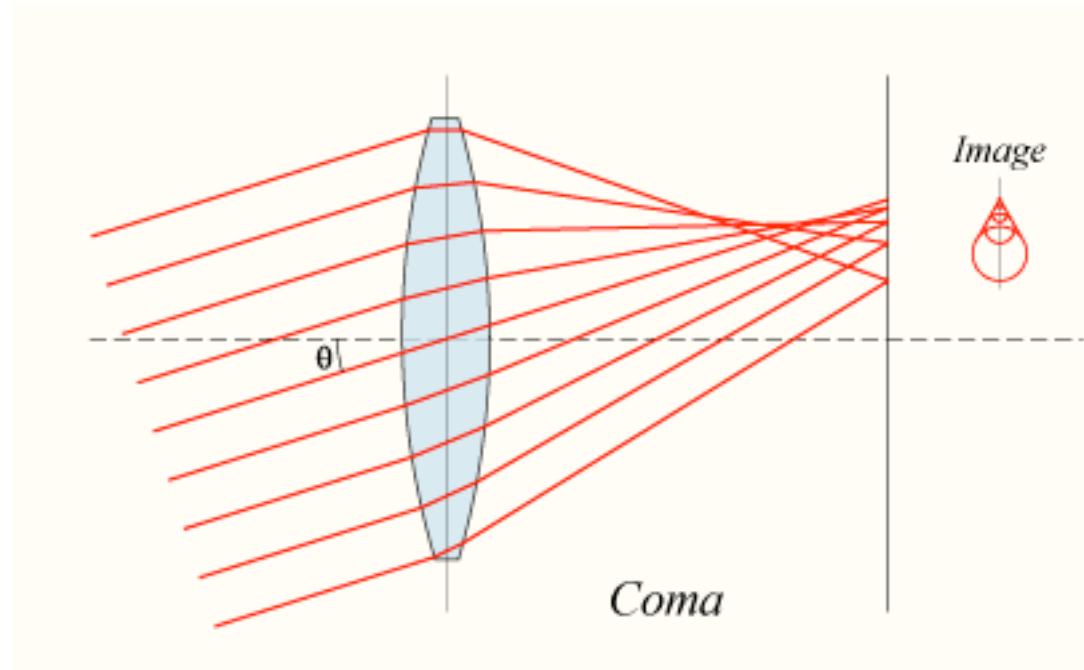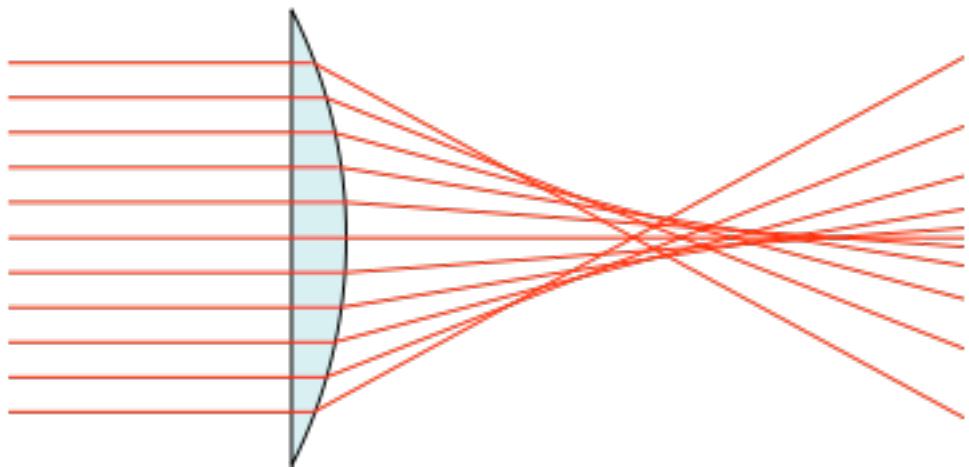
Optical Aberrations | Correcting?

Image from http://en.wikipedia.org/wiki/Diffraction

Optical Artifacts | Diffraction

Laser

Image from http://en.wikipedia.org/wiki/Diffraction
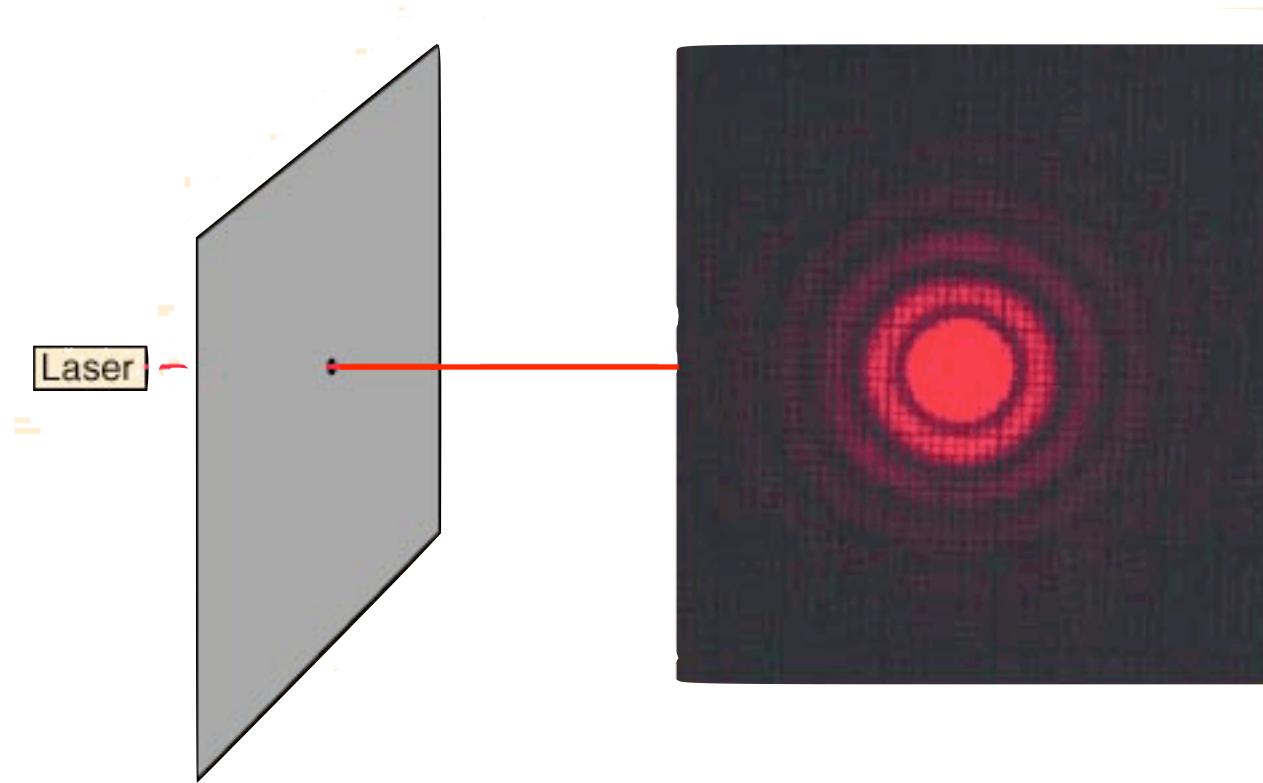
Optical Artifacts | Diffraction

f/5.6

f/45

Image from http://www.luminous-landscape.com/tutorials/understanding-series/u-diffraction.shtml

# Optical Artifacts | Diffraction

Image from Digital Photography Review, http://www.dpreview.com

Artifacts | Digital

Alias
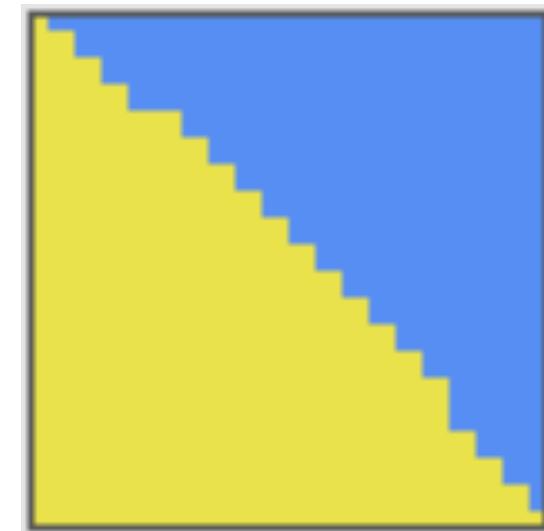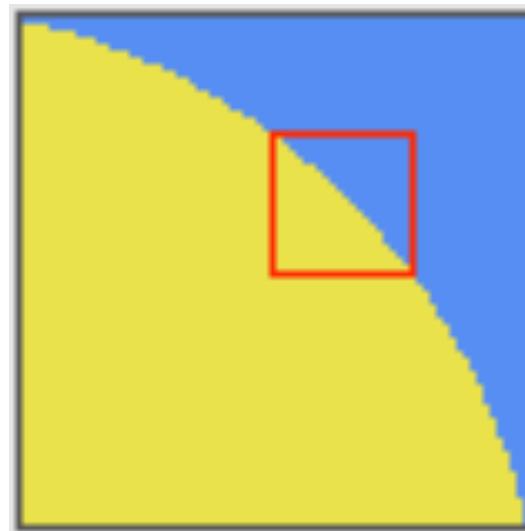
Anti-Aliased
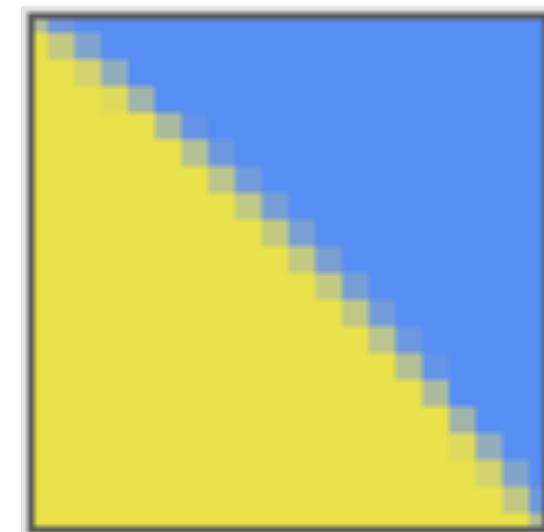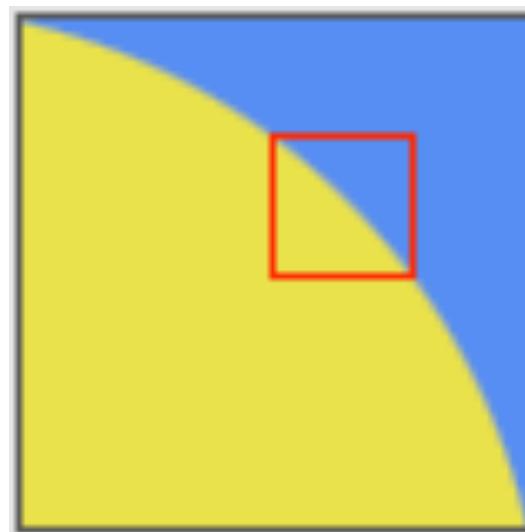
Image from http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Aliasing_01.htm

Digital Artifacts | Aliasing
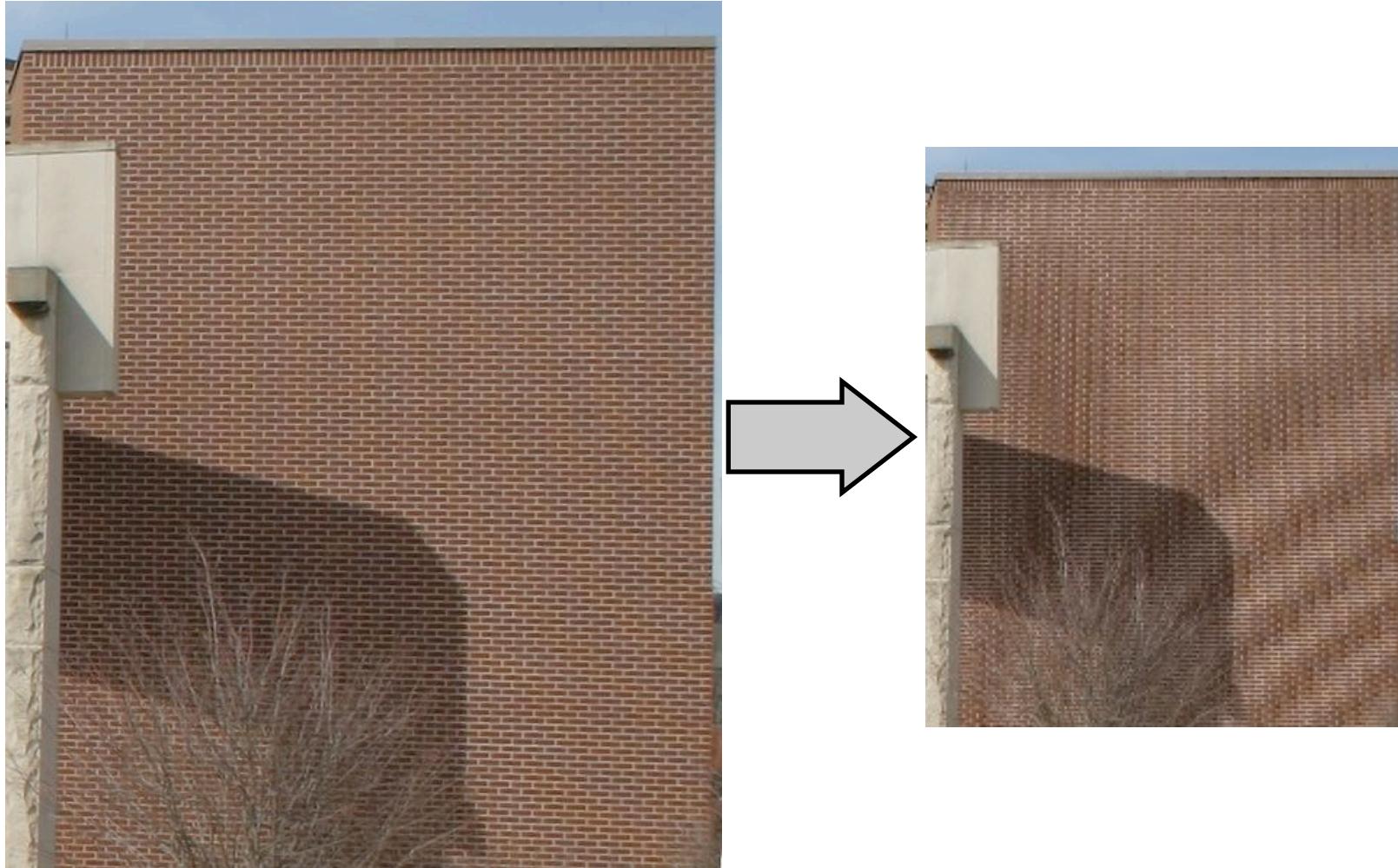
Image from http://en.wikipedia.org/wiki/Moiré_pattern

Digital Artifacts | Moiré

Images from http://www.ddisoftware.com/reviews/sd9-v-bayer/ and http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Moire_01.htm

Digital Artifacts | Moiré & Maze Patterns
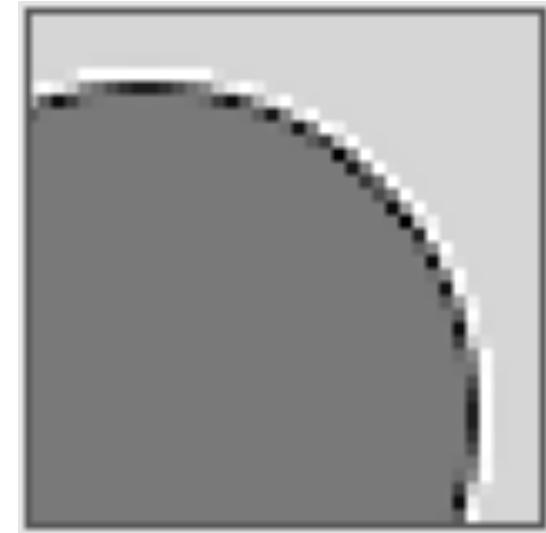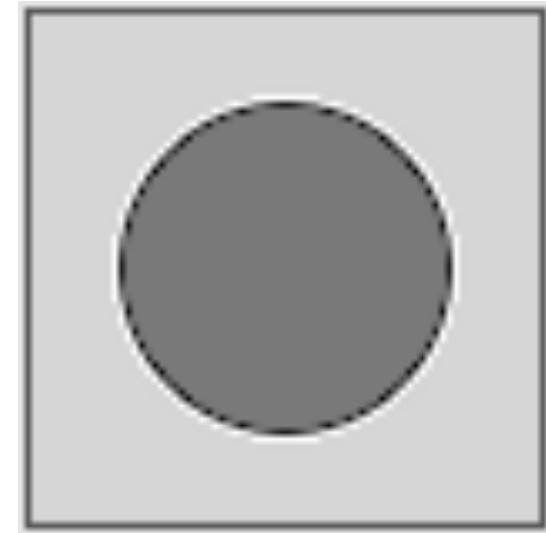
Digital Artifacts | Sharpening Halos

100% Quality

10% Quality

Image from http://www.dpreview.com/learn/?/Glossary/Digital_Imaging/Aliasing_01.htm

Digital Artifacts | Compression Artifacts

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