

Vantage Point, Cameras, Filters and Film

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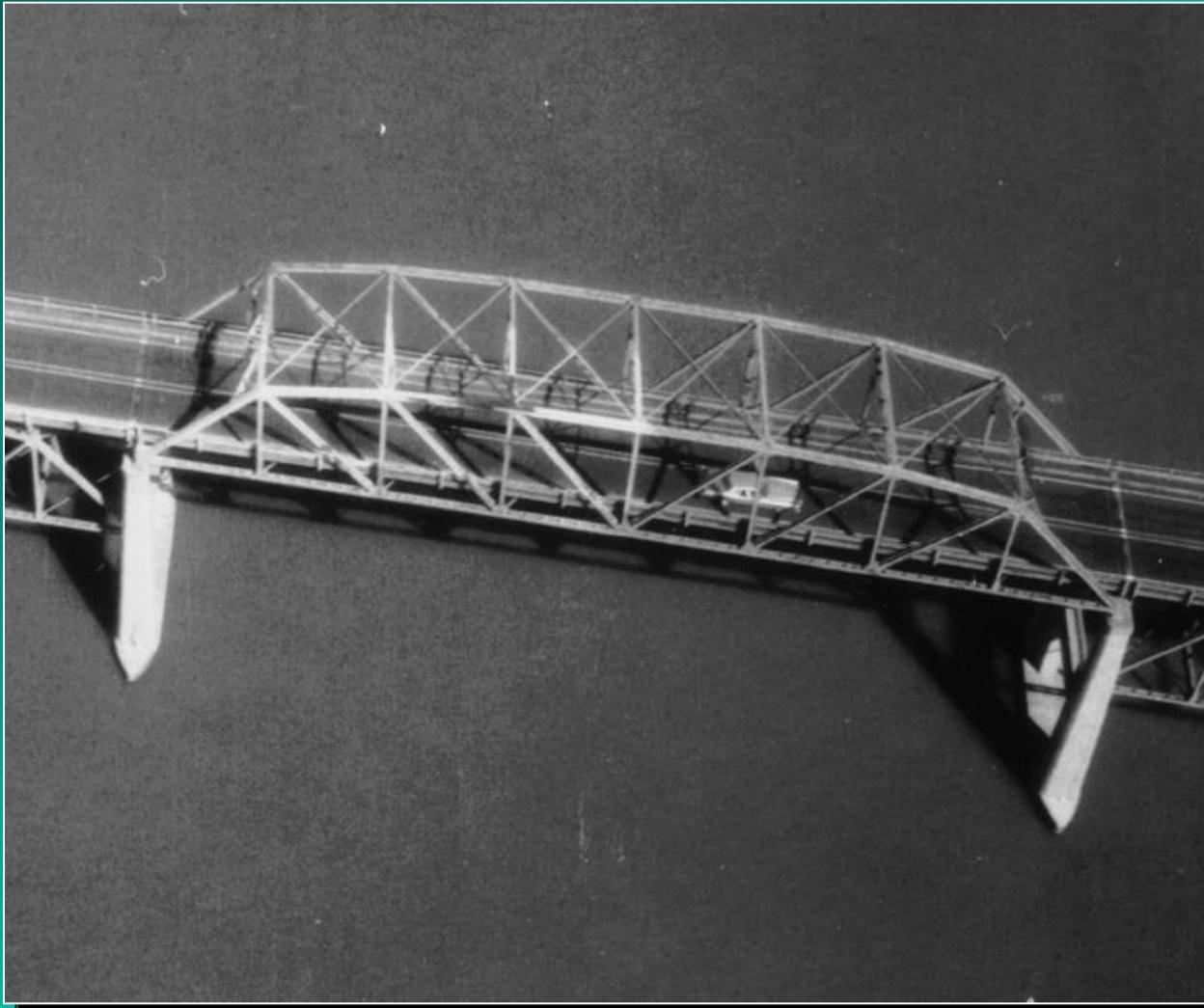
Panchromatic



Black and White Infrared



Low Oblique Aerial Photograph



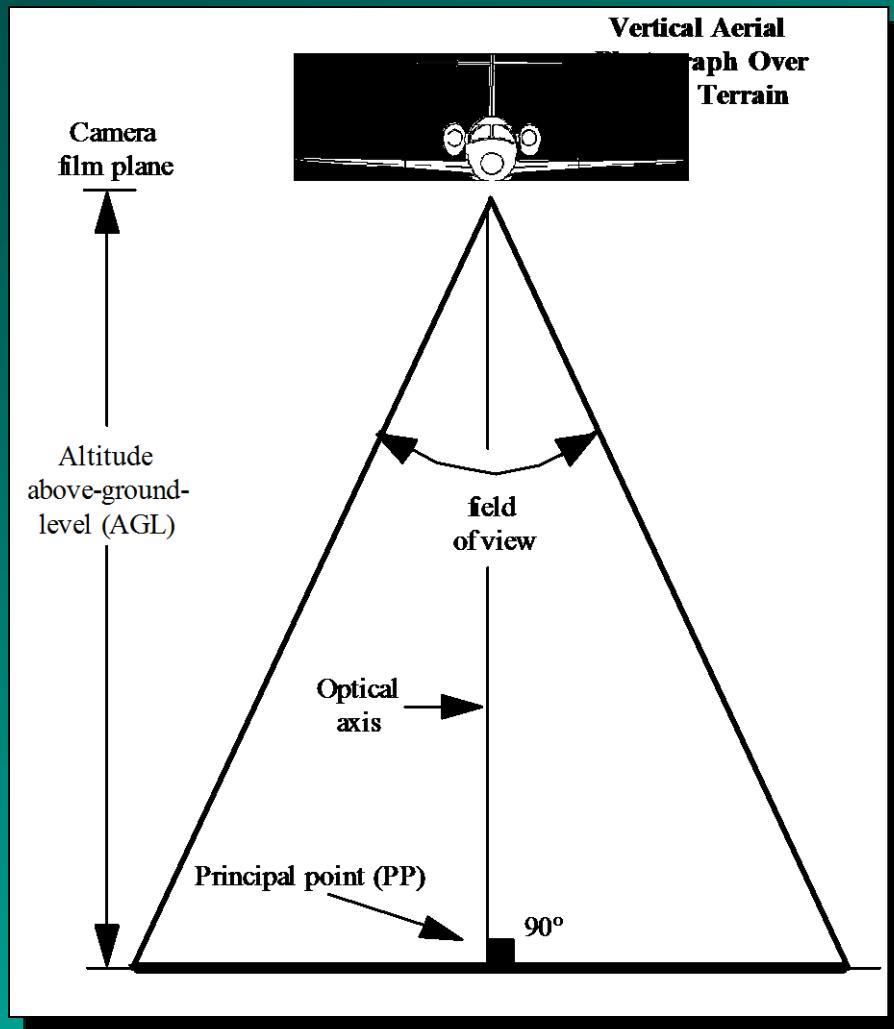
High Oblique Aerial Photograph



Vertical Aerial Photograph



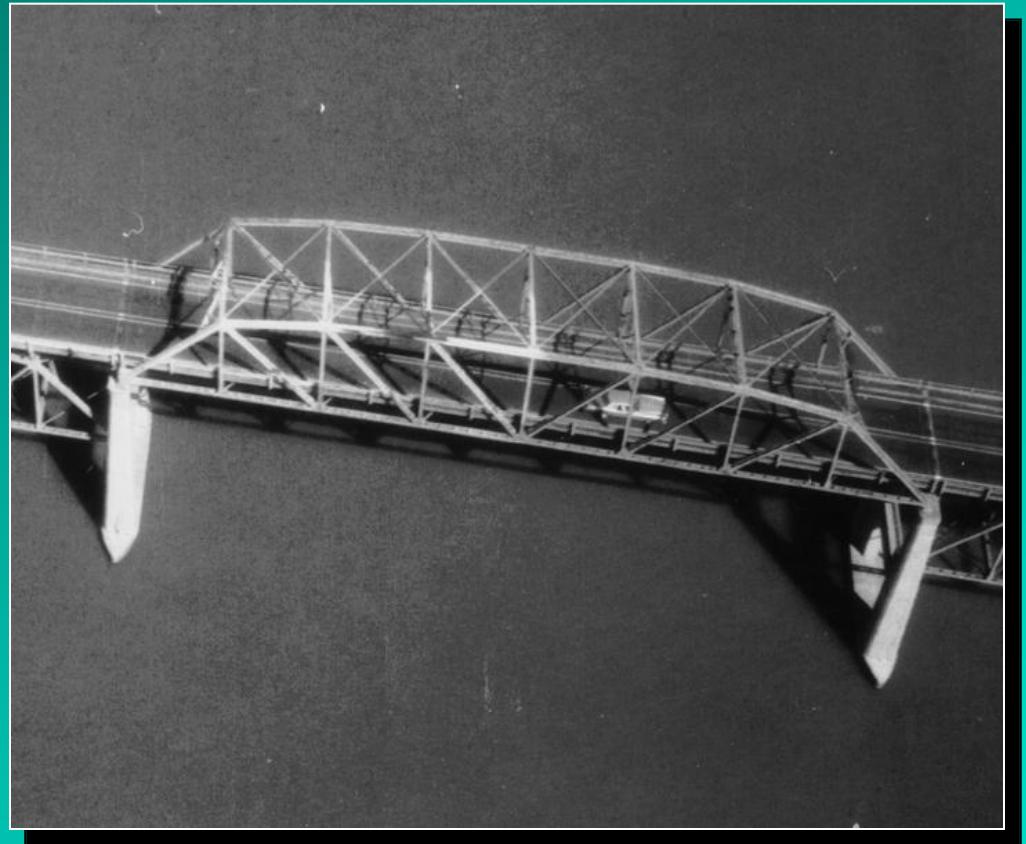
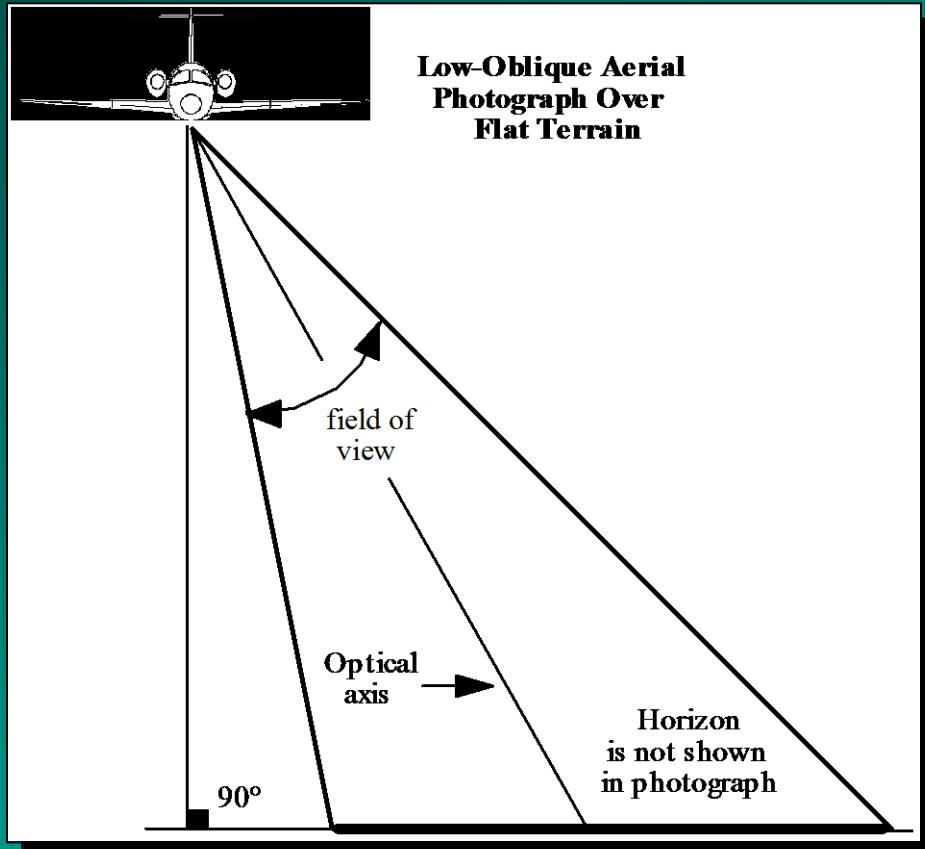
Vertical Aerial Photography



Goosenecks
of the San
Juan River
in Utah

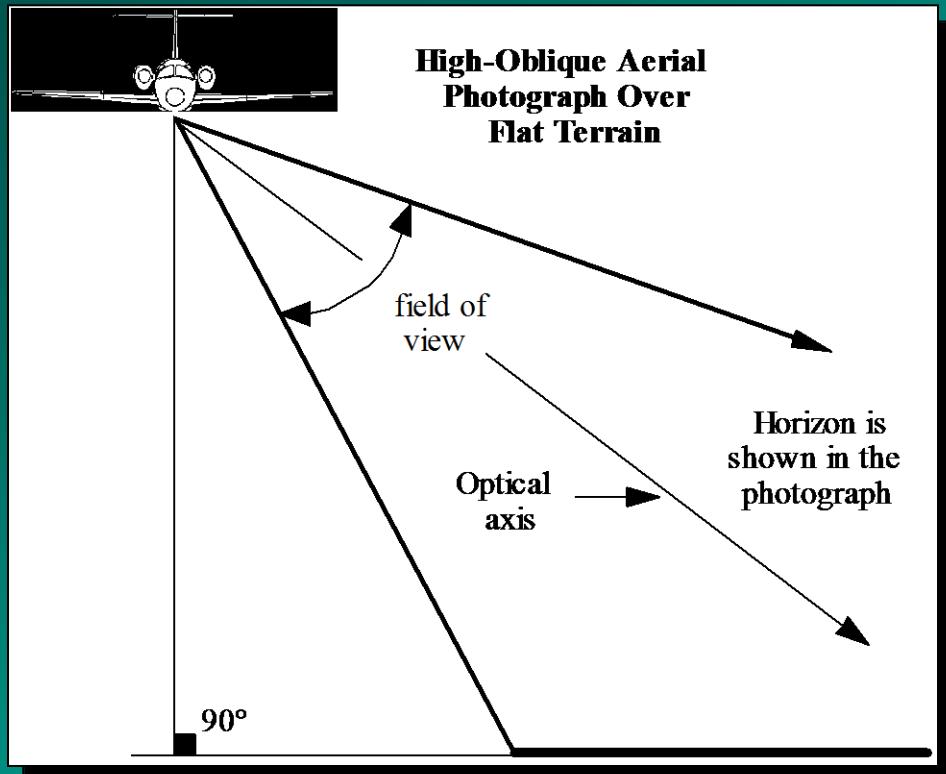
Jensen, 2000

Low-oblique Aerial Photography

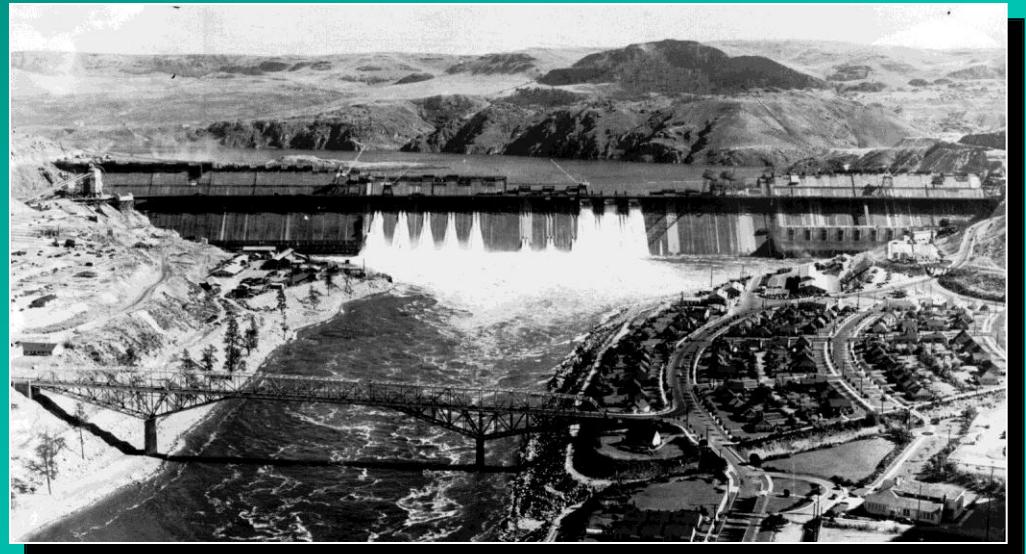


Low-oblique photograph of a bridge on the Congaree River near Columbia, SC.

High-oblique Aerial Photography



Low-oblique photograph of the grand Coulee Dam in Washington in 1940



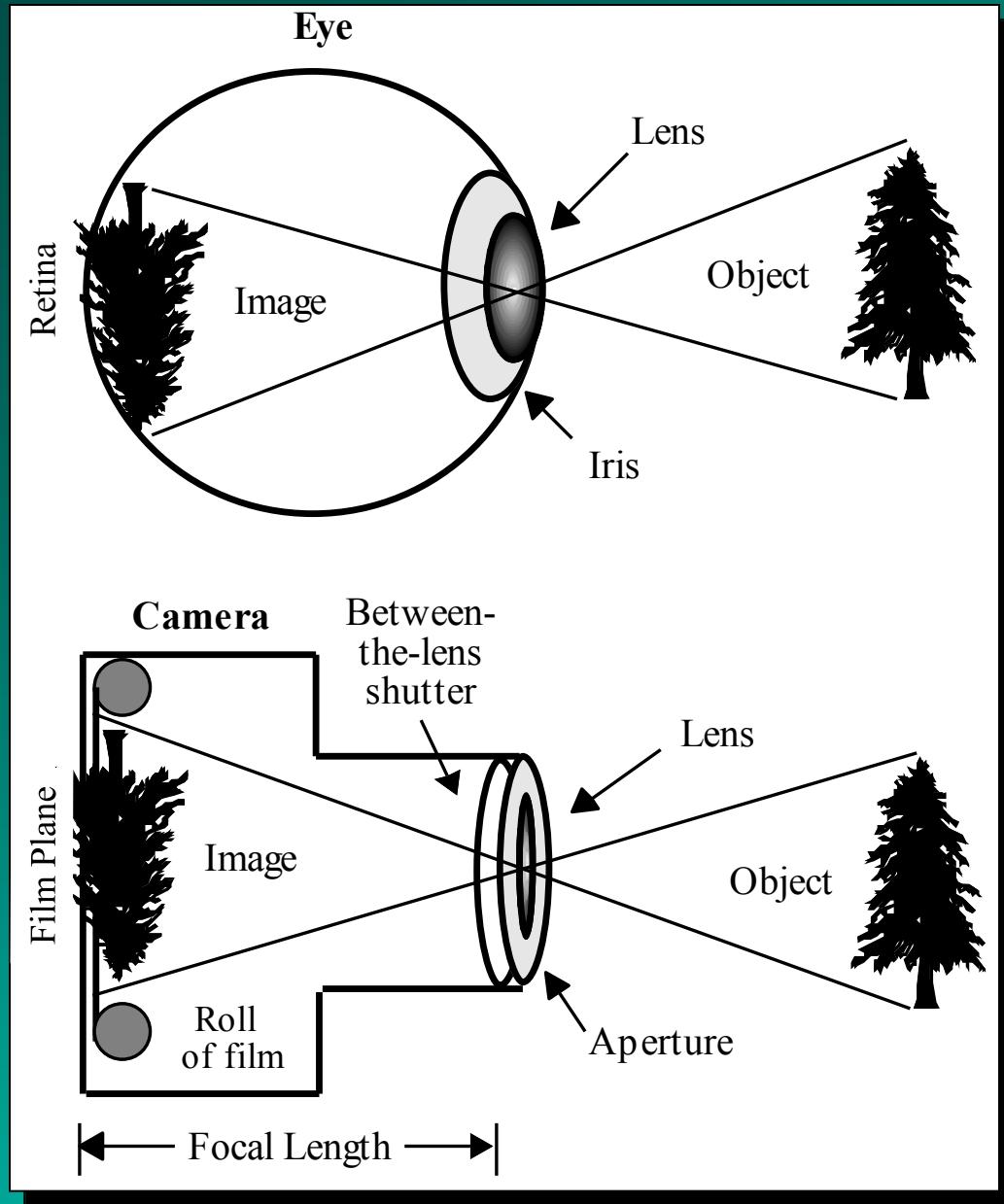
Jensen, 2000

Box Camera



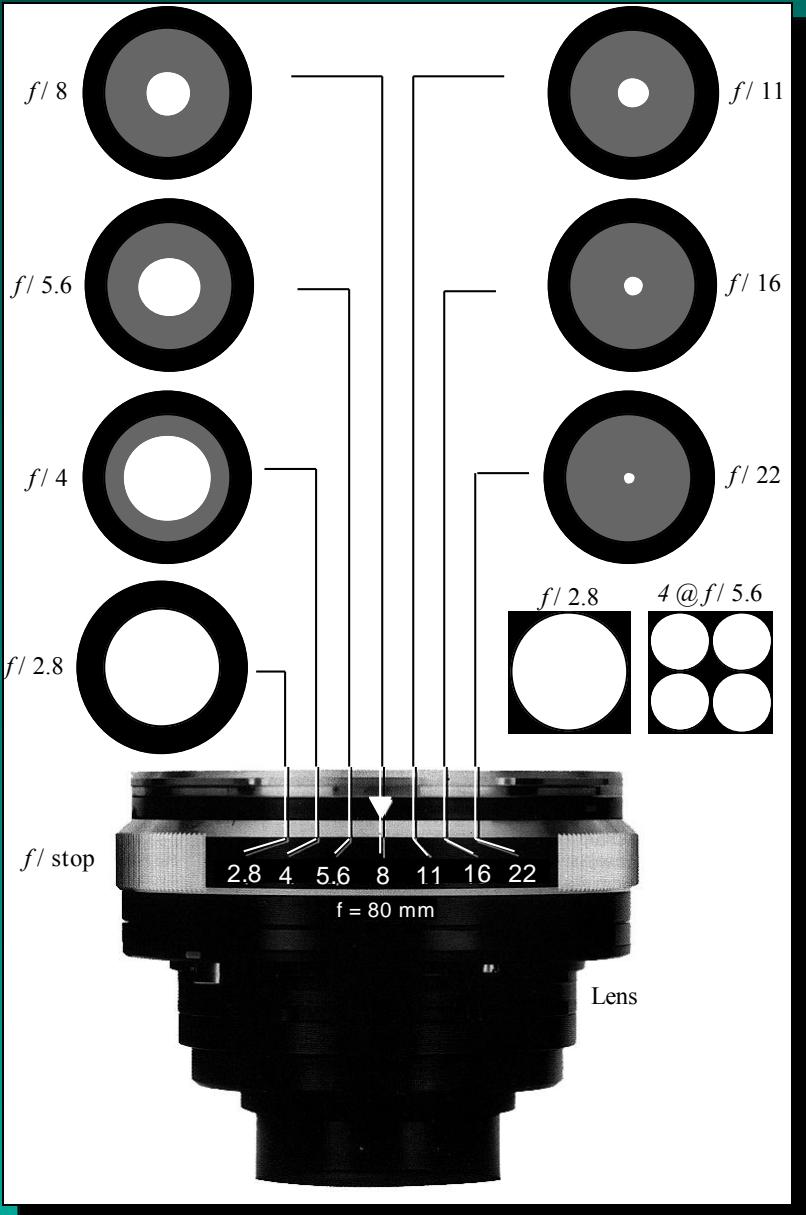
One of the first commercially available box cameras created for Louis Daguerre by Samuel F. B. Morse, inventor of the Morse code.

Jensen, 2000



Comparison of the Optical Components of the Simple Camera with those of the Human Eye

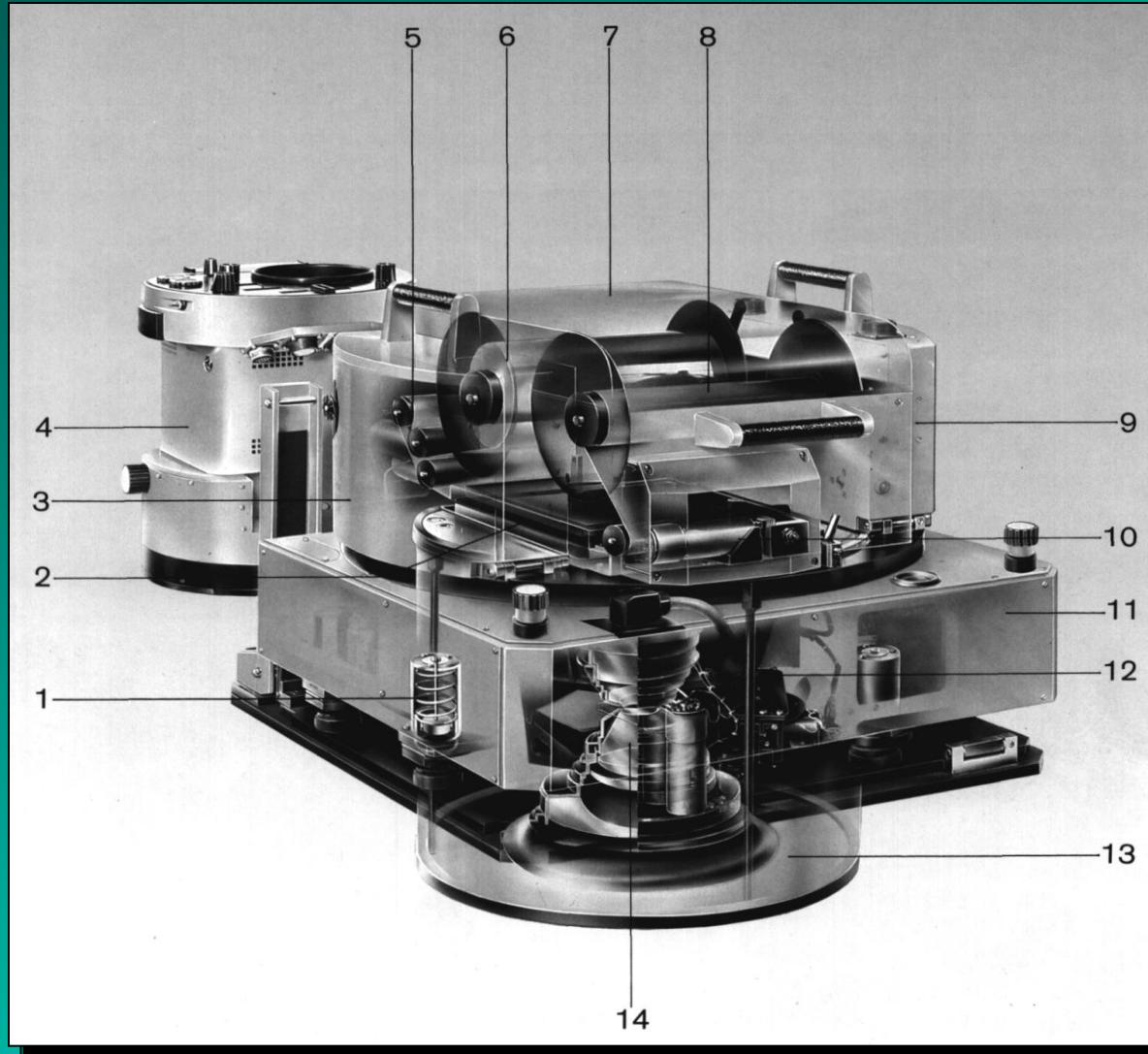
Jensen, 2000



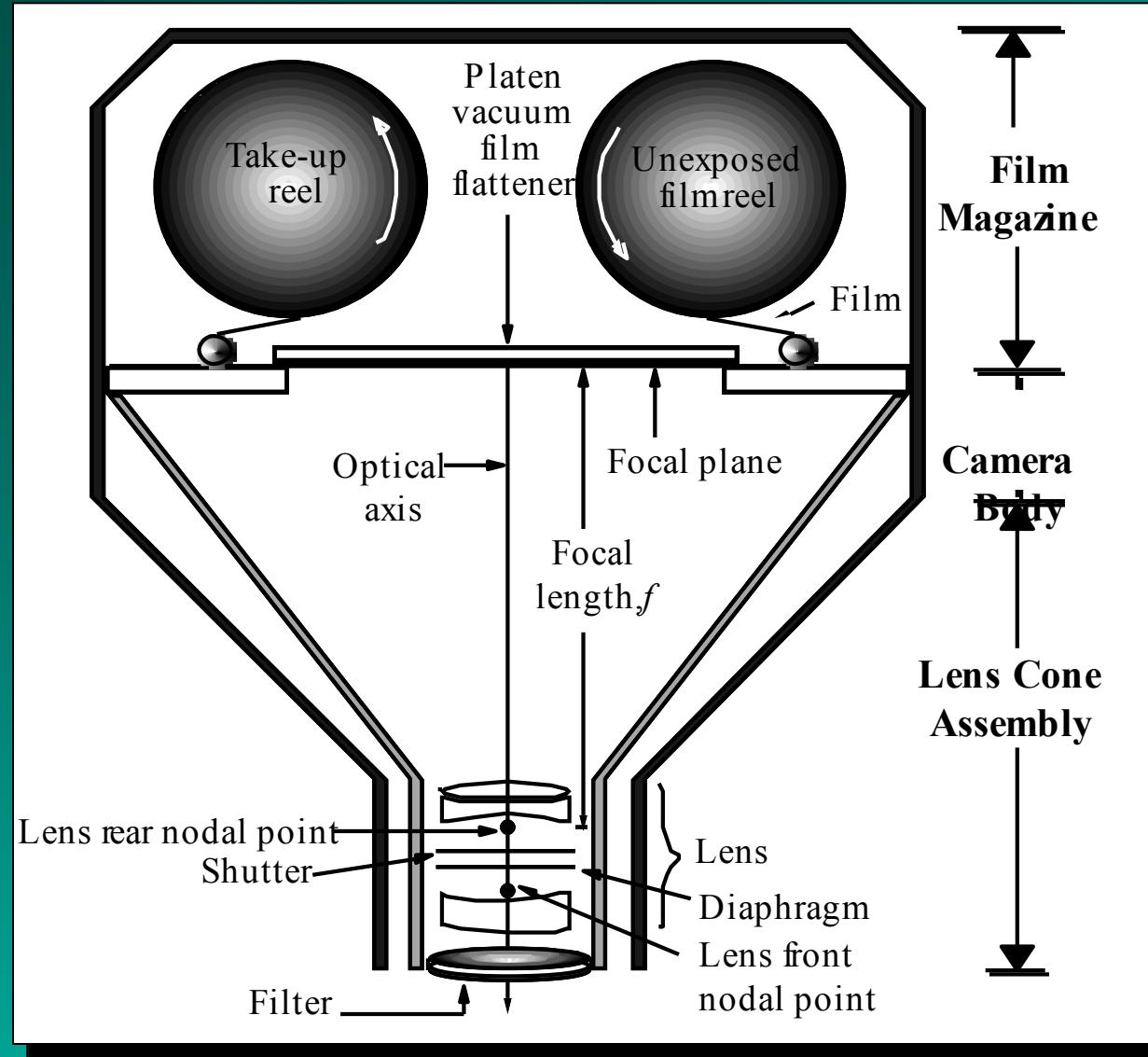
The *f*/stops for a Camera Lens and the Size of the Aperture Openings

Jensen, 2000

Photogrammetric Aerial Frame Camera

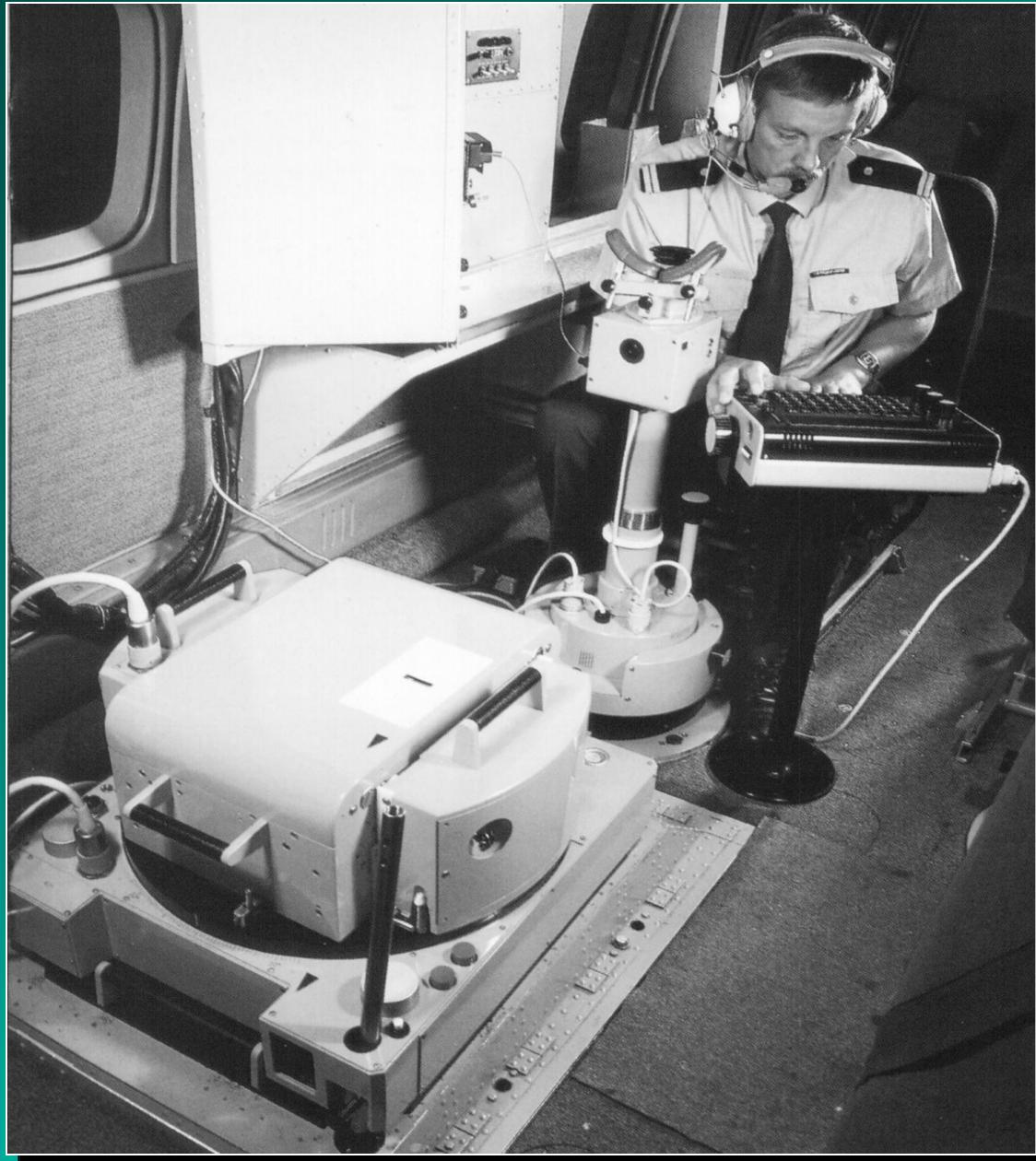


Jensen, 2000



Profile View of A Metric Camera and System Components

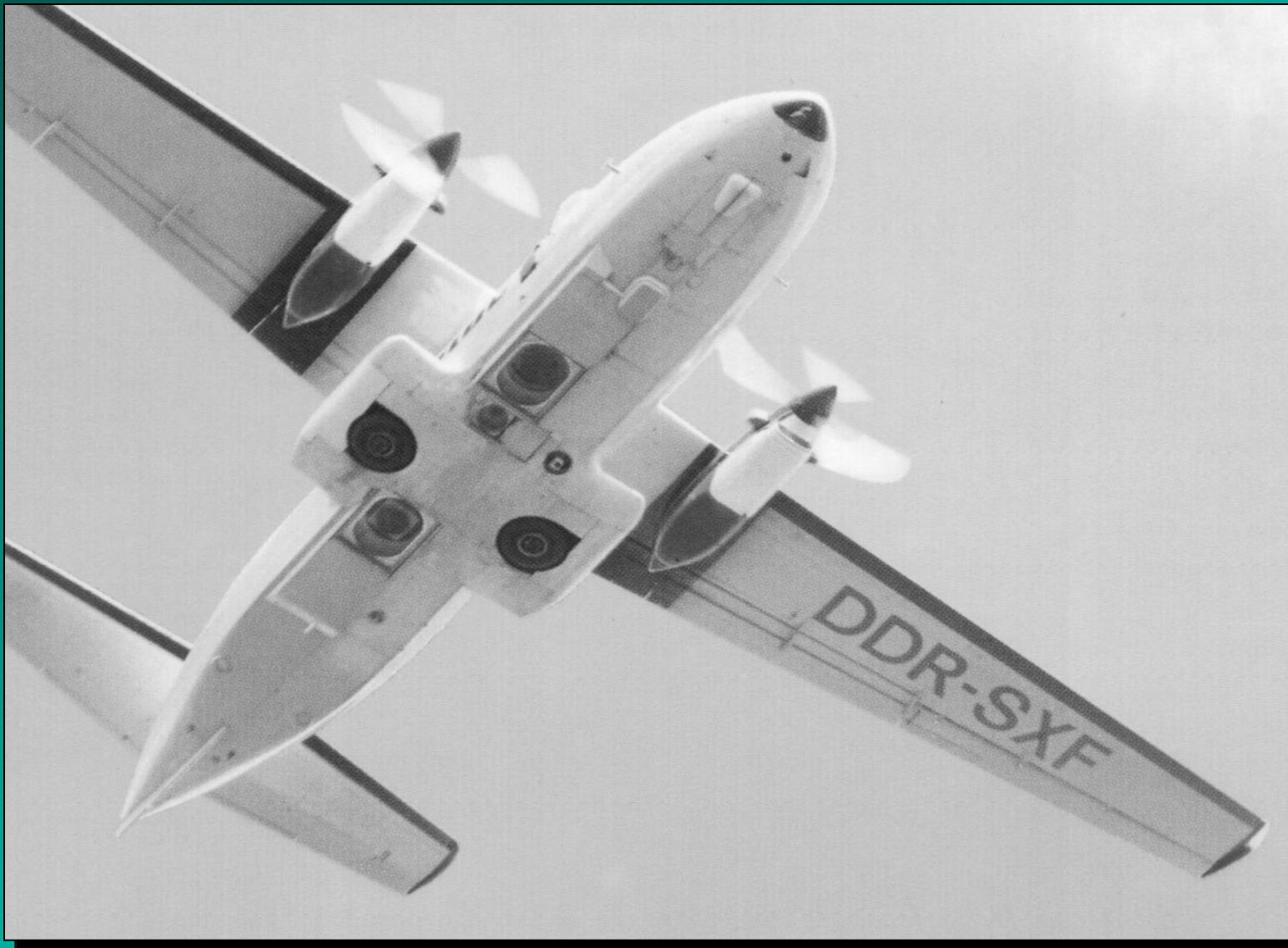
Jensen, 2000



Photogrammetric Aerial Frame Camera

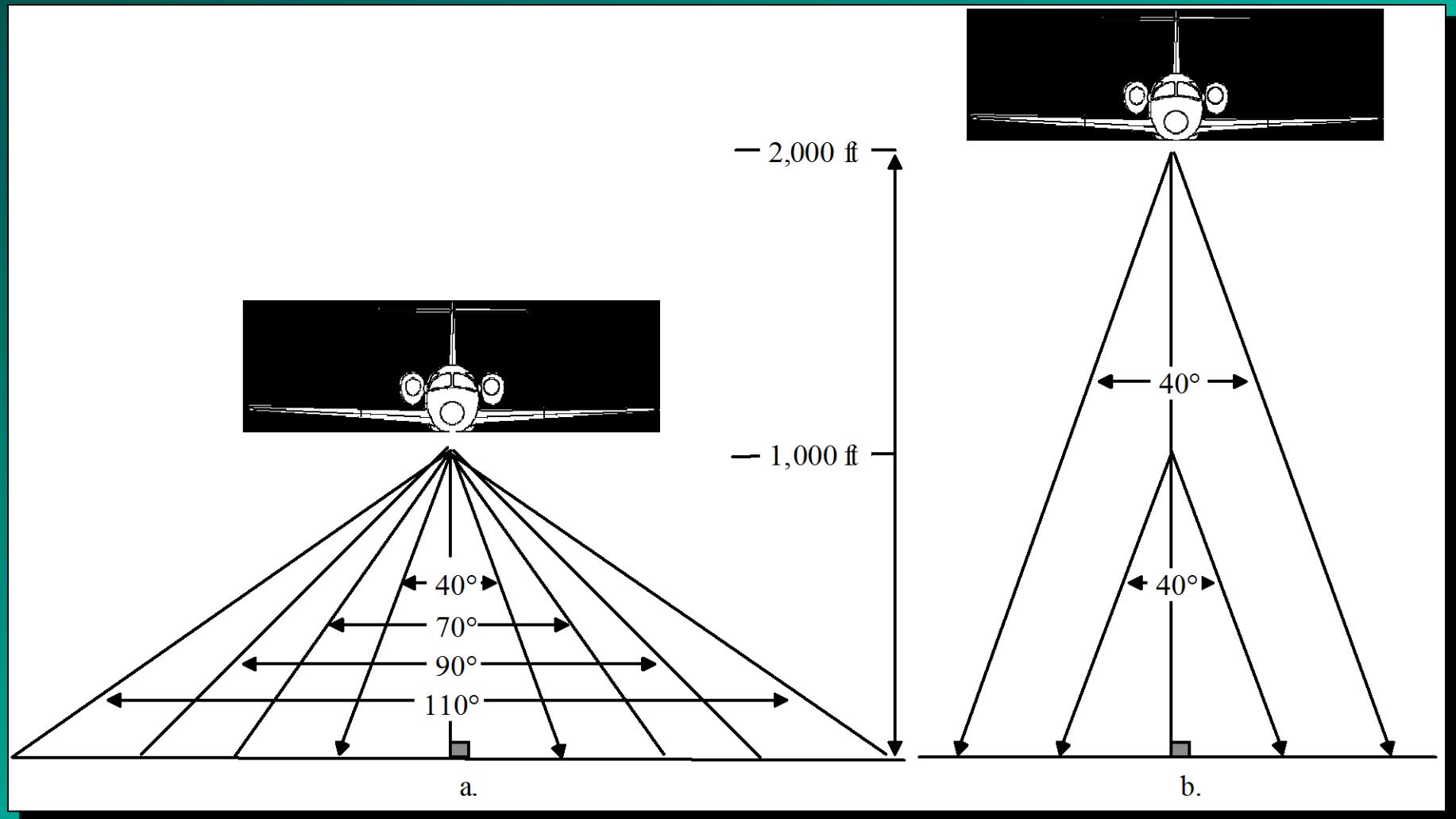
Jensen, 2000

Two Frame Cameras Mounted in the Fuselage of a Plane

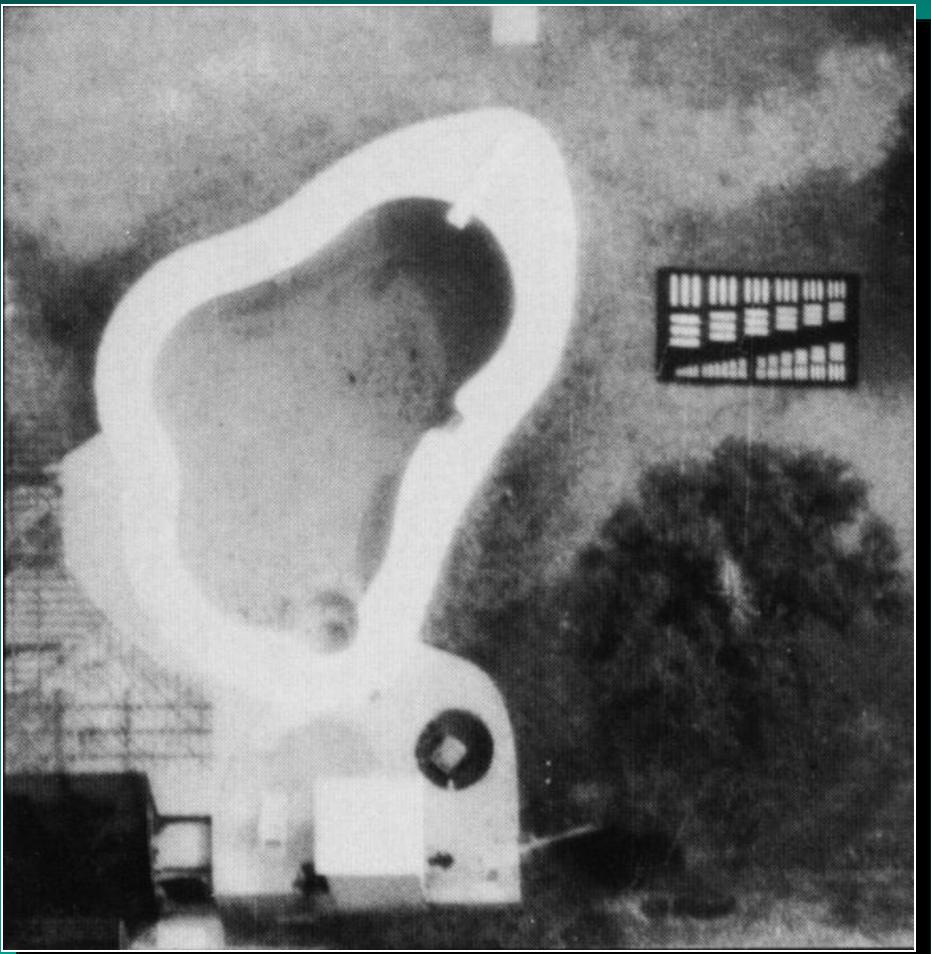


Jensen, 2000

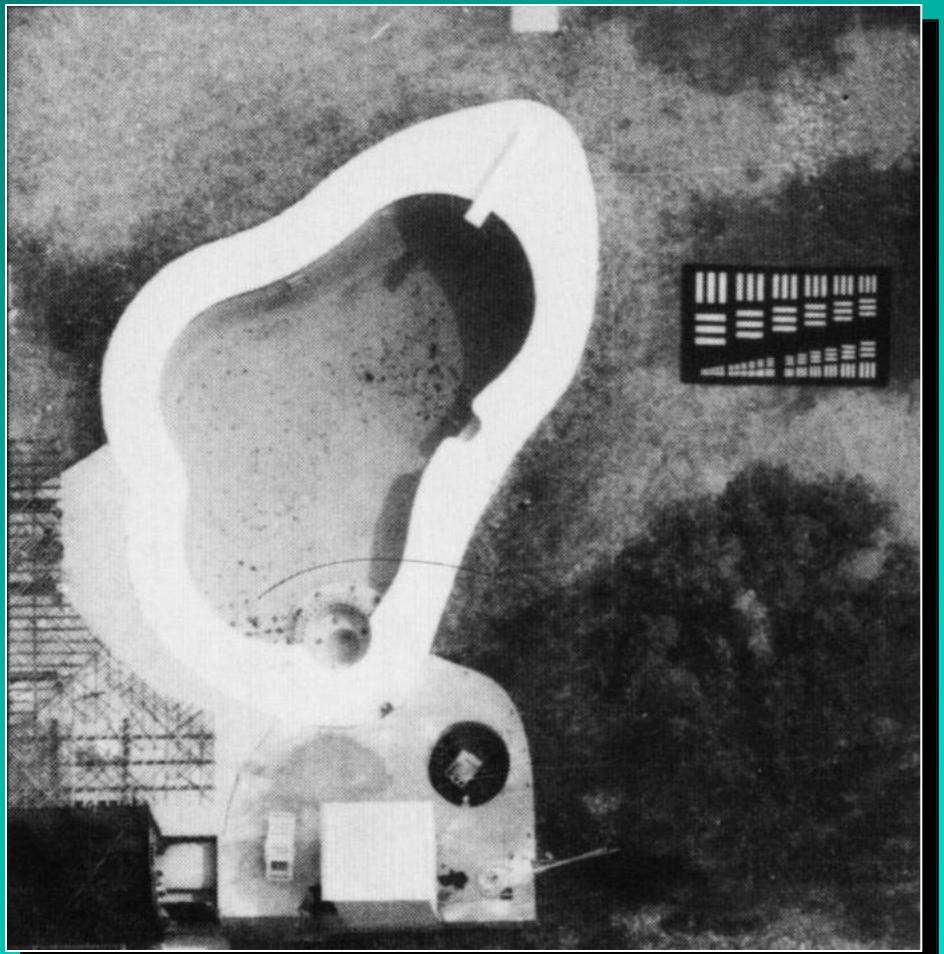
Aerial Camera Lens Angle-of-View



Forward Image Motion Compensation

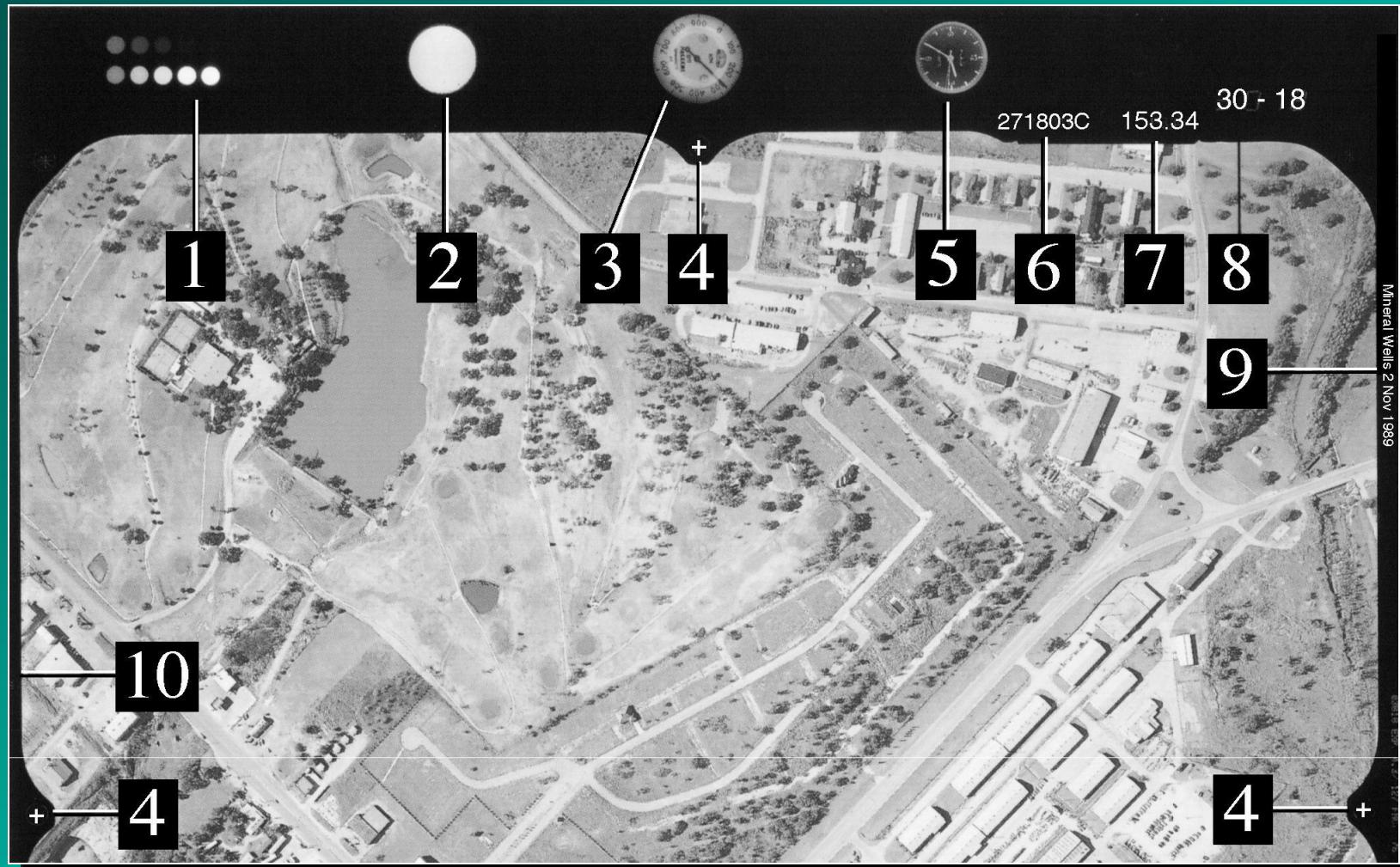


Without image motion compensation



With image motion compensation

Annotation on the Perimeter of An Aerial Photograph



Jensen, 2000



Four 70-mm
Hasselblad
Cameras Arranged
to Obtain
Multiband Aerial
Photography

Four 70-mm Hasselblad Cameras Arranged to Obtain Multiband Vertical Aerial Photography



Near-infrared (0.7 ?1.0 μm)



Red (0.6 ?0.7 μm)



Green (0.5 ?0.6 μm)



Blue (0.4 ?0.5 μm)

Century City,
Los Angeles

Jensen, 2000

Analog and Digital Cameras

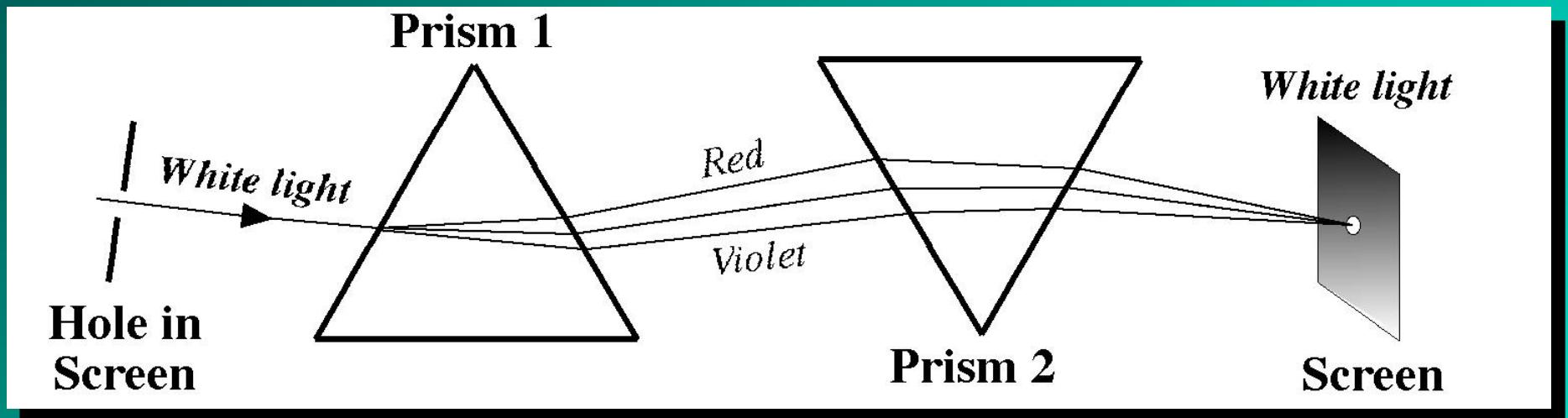


Hasselblad 70-mm camera



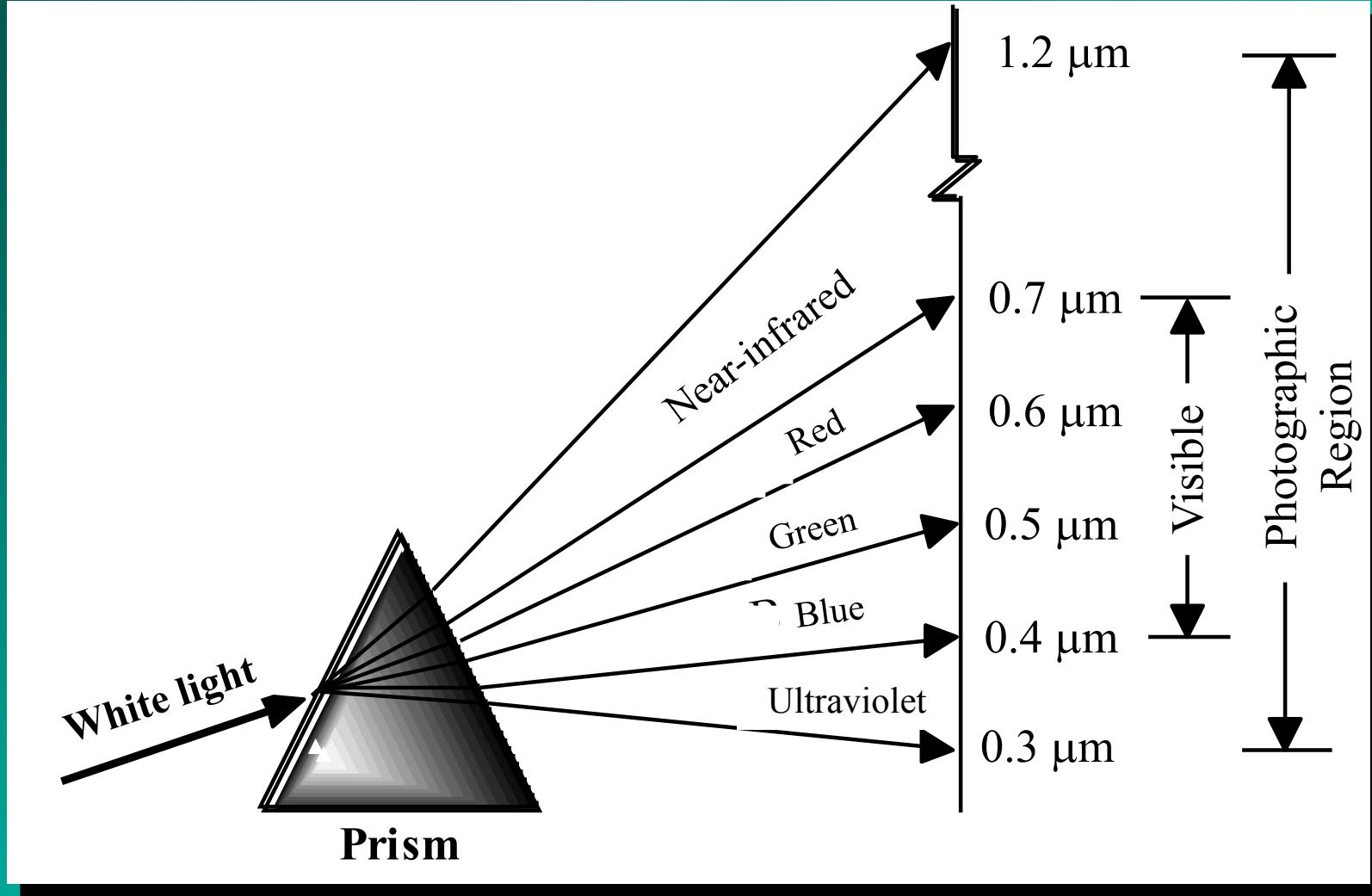
Kodak DCS 420 Digital Camera
with a Nikon camera lens and body

Sir Isaac Newton's Experiment in 1666

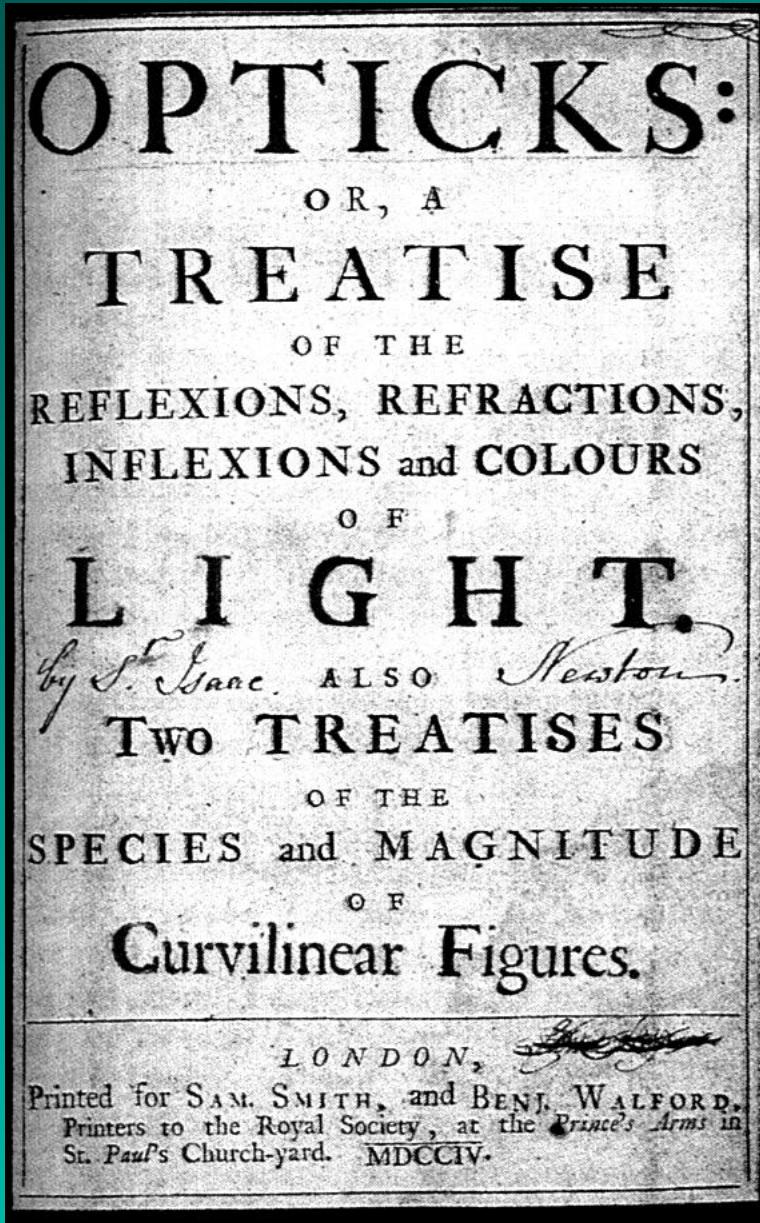


Jensen, 2000

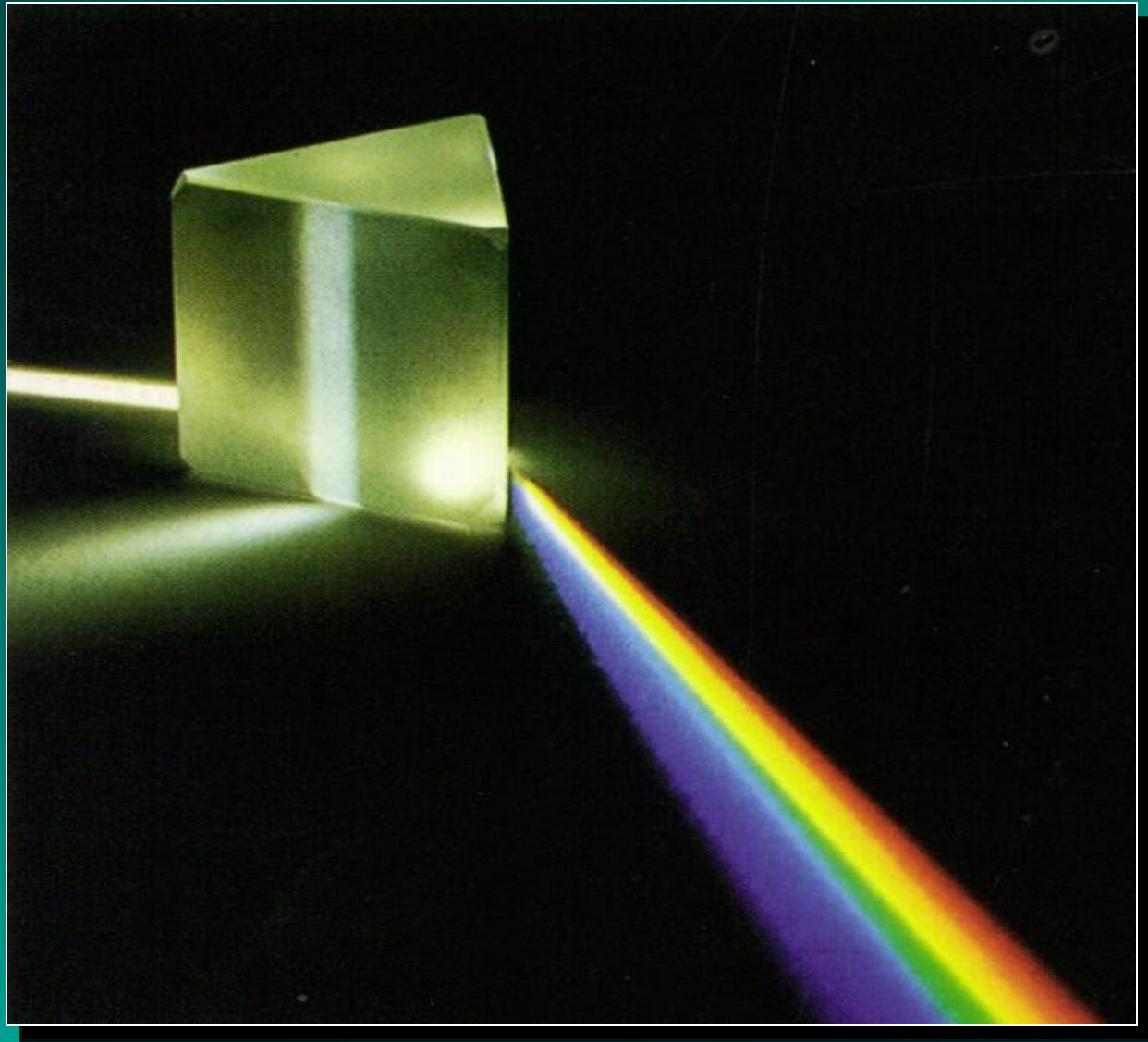
White Light Separated into its Spectral Components Using a Prism



Jensen, 2000



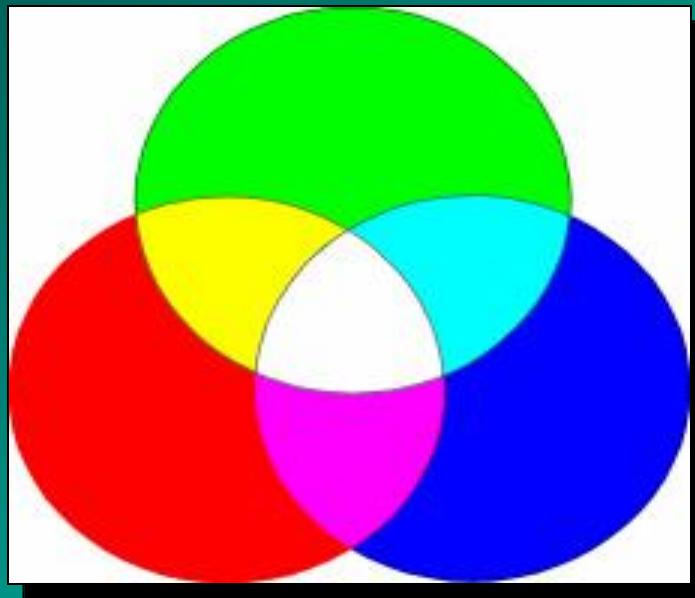
Sir Isaac Newton
Published *Opticks*
in 1704



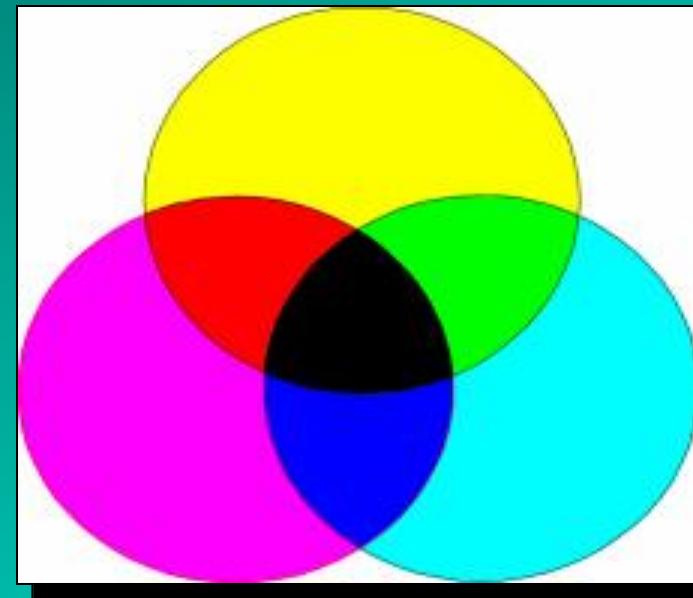
Sir Isaac Newton discovered that white light could be dispersed into its spectral components by passing it through a prism

Jensen, 2000

Color Theory

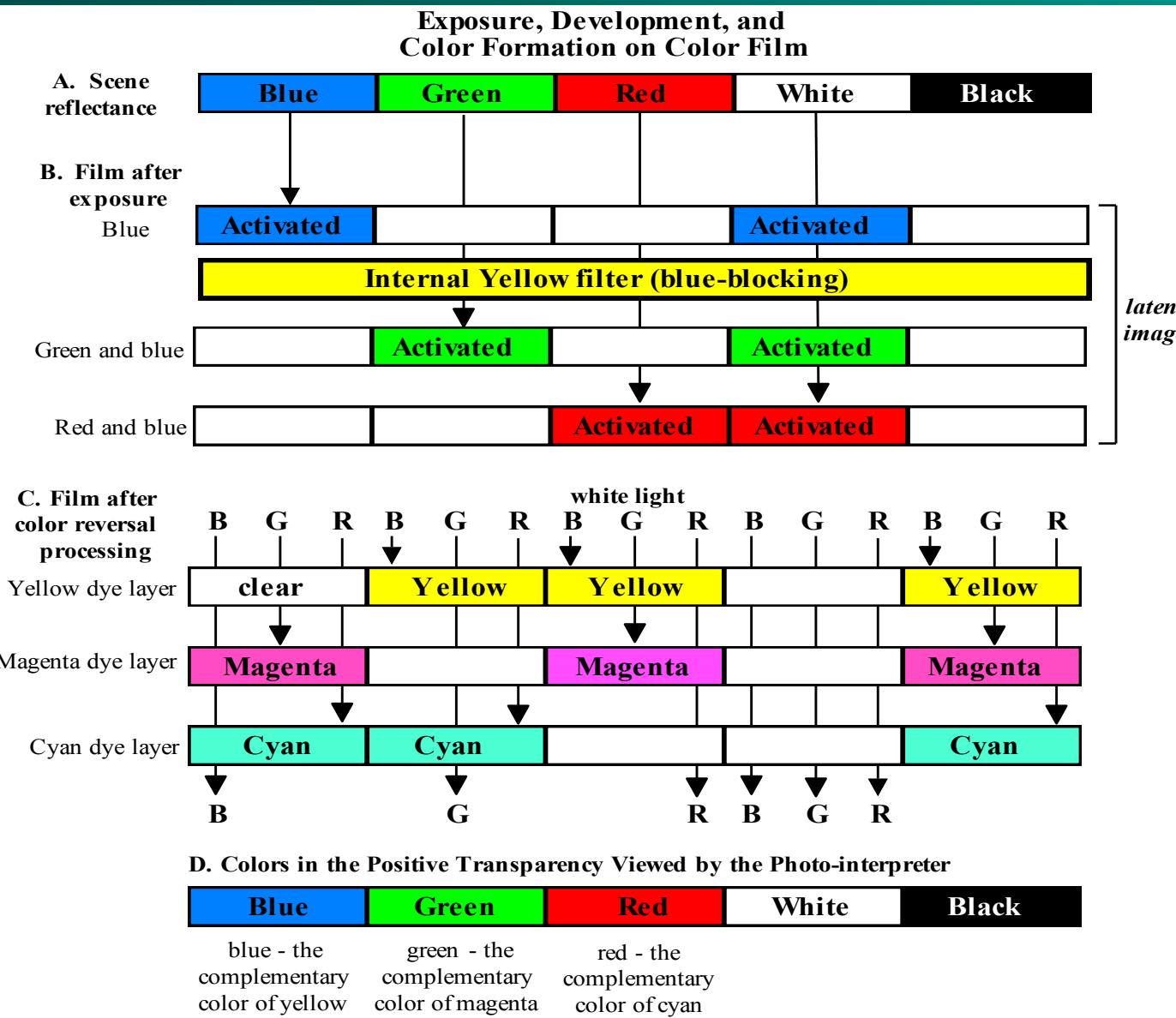


Additive Color



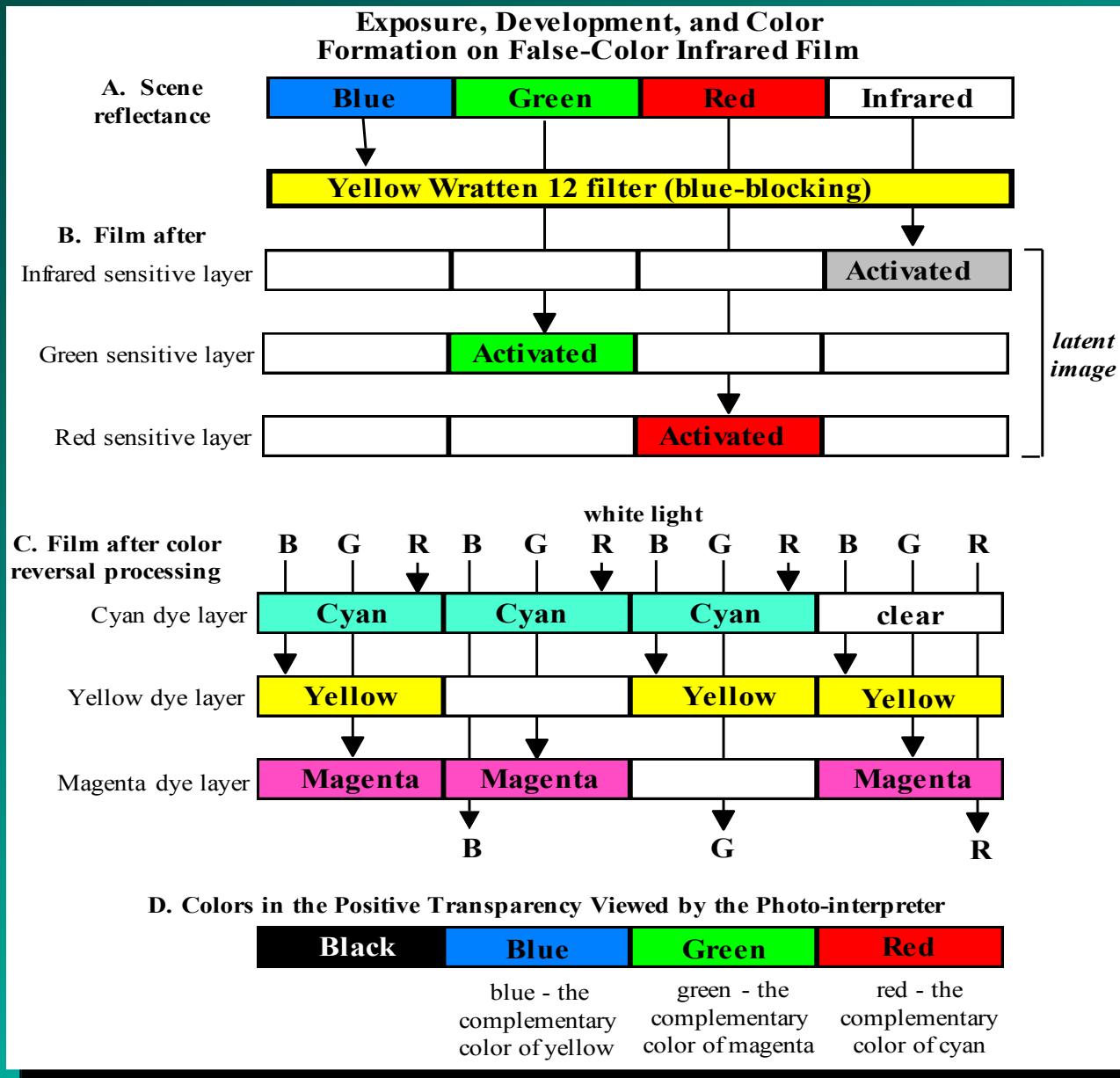
Subtractive Color

Normal Color Film



Jensen, 2000

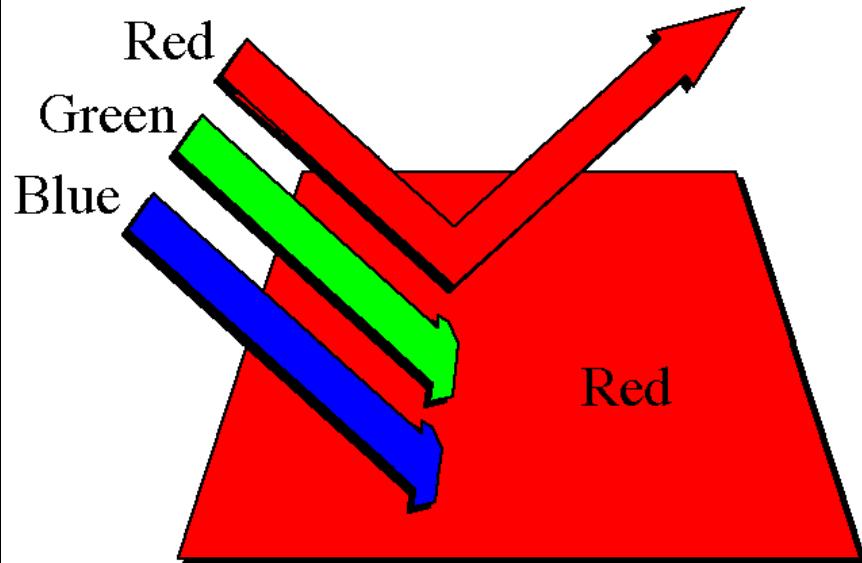
Color-Infrared Film



Jensen, 2000

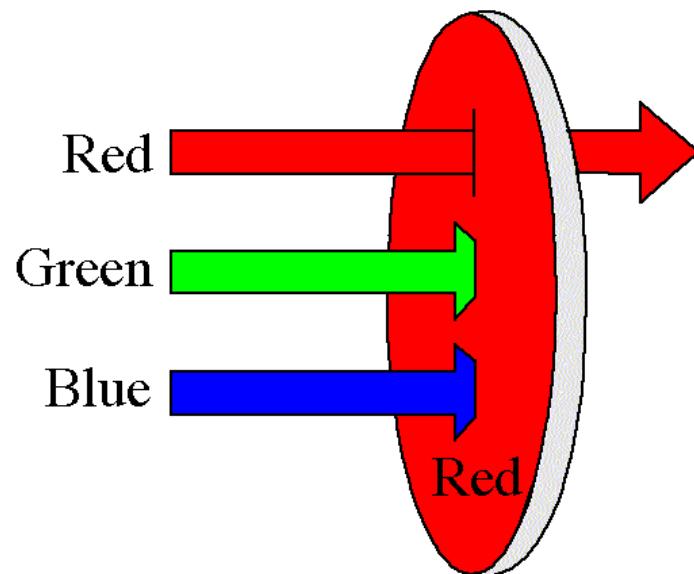
Reflection and Transmission

Reflection



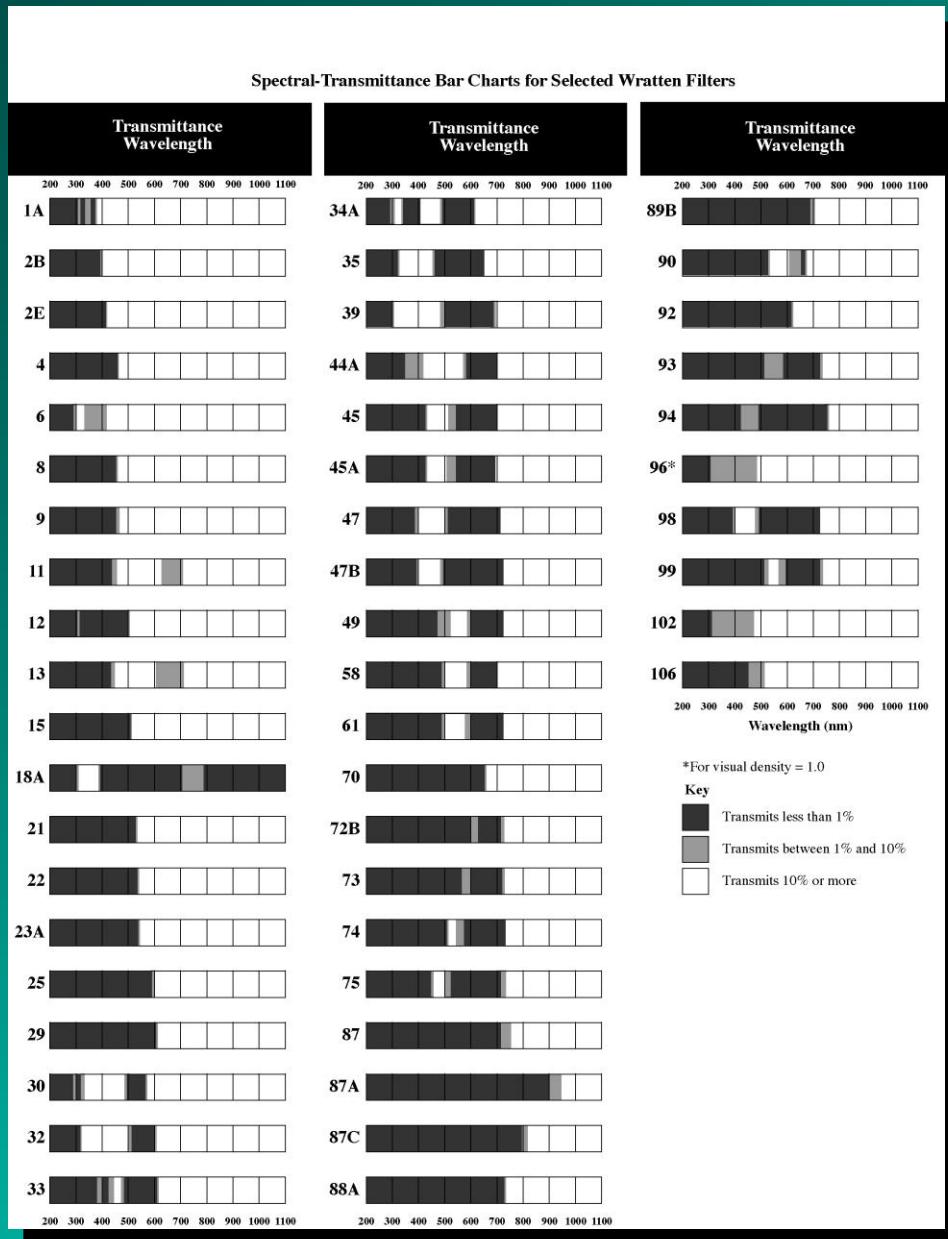
Red object absorbs green
and blue light, looks red.

Transmission



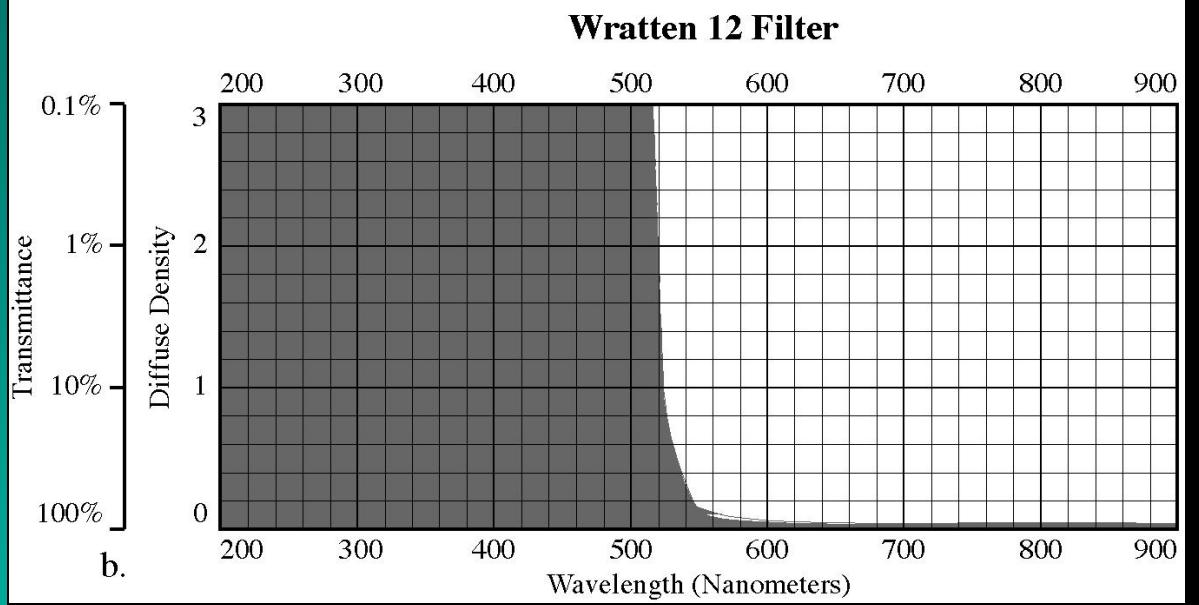
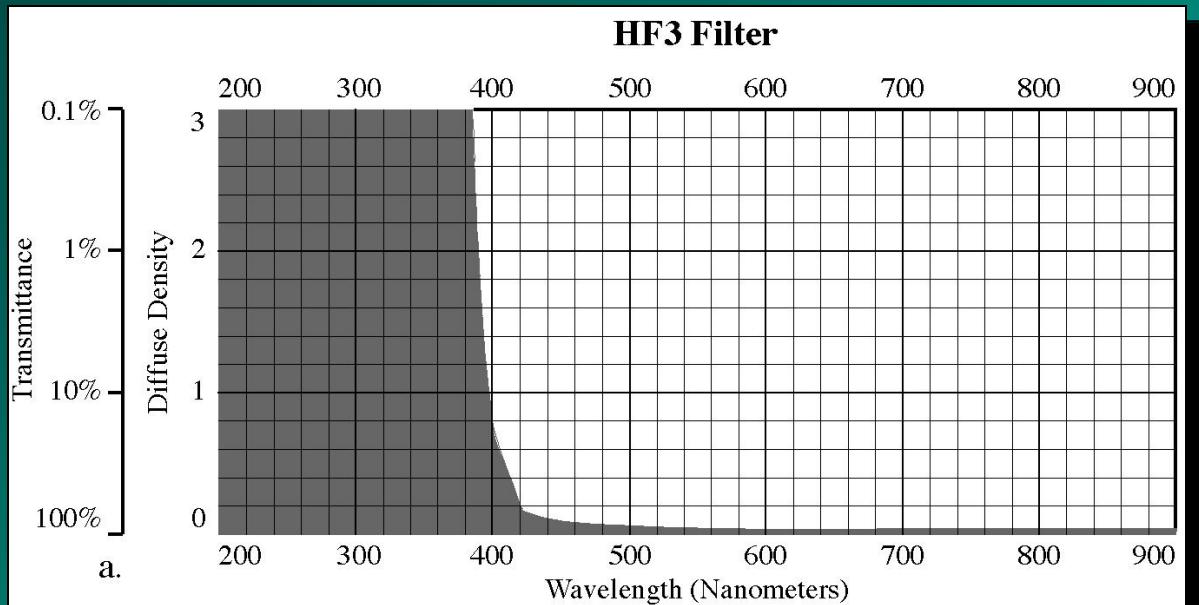
Red filter absorbs green
and blue light, looks red.

Transmission Characteristics of Selected Kodak Wratten Filters



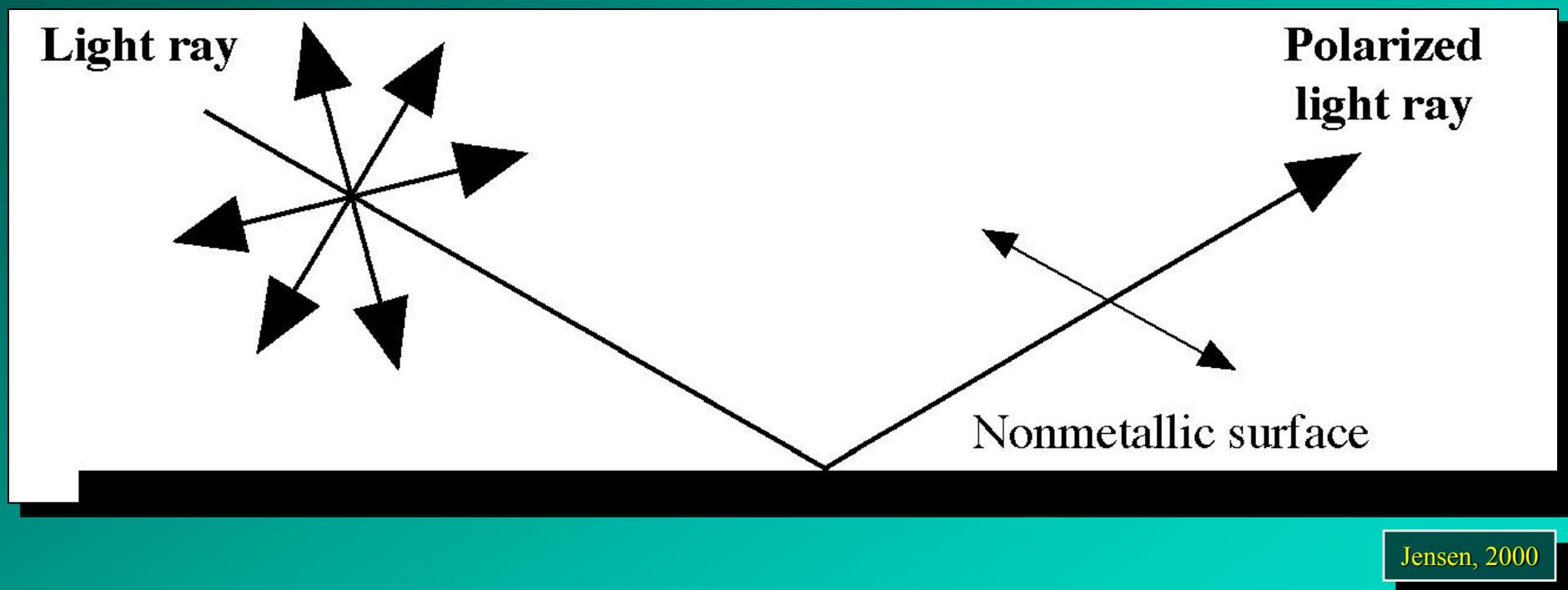
Jensen, 2000

Transmission Characteristics of Selected Kodak Wratten Filters



Jensen, 2000

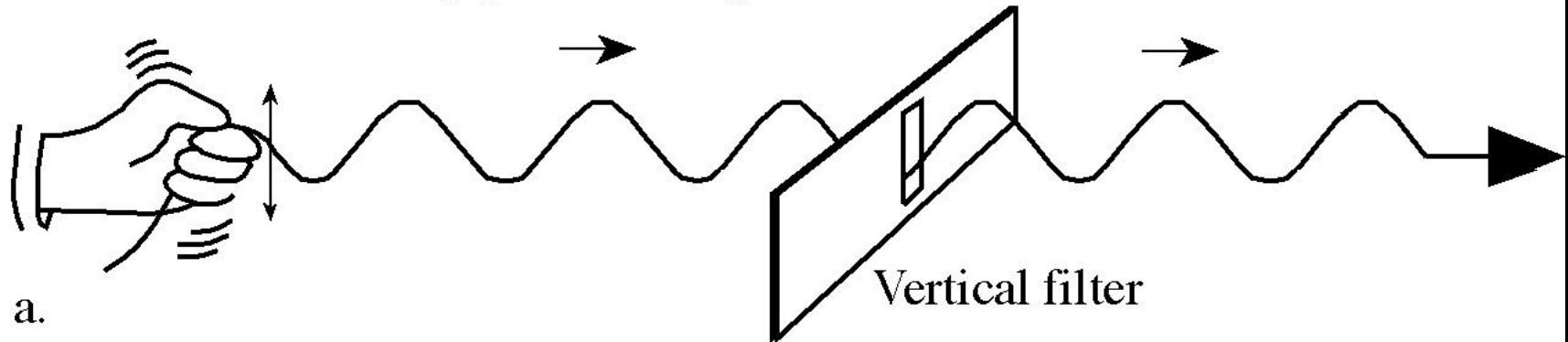
Polarized Light



Jensen, 2000

Polarized Light

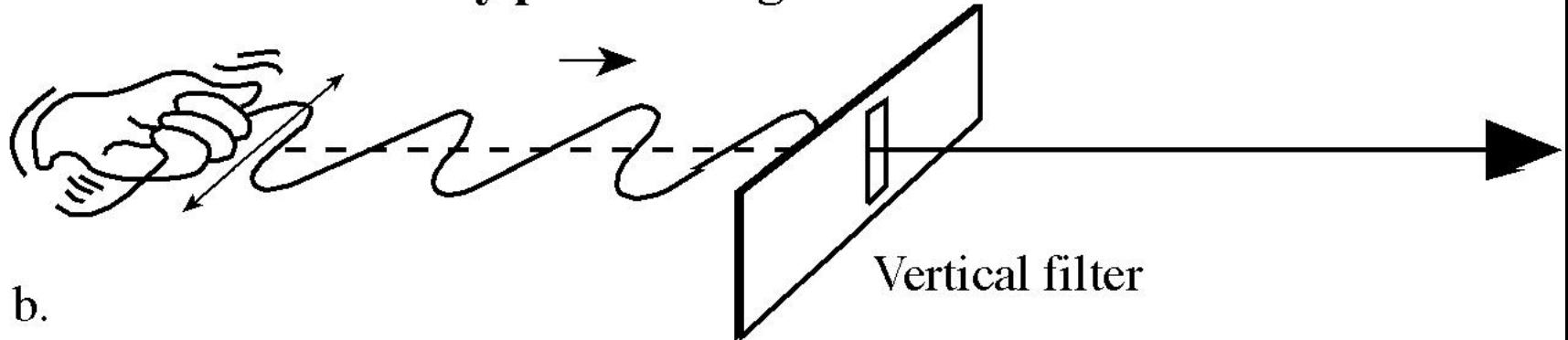
Vertically polarized light



a.

Vertical filter

Horizontally polarized light

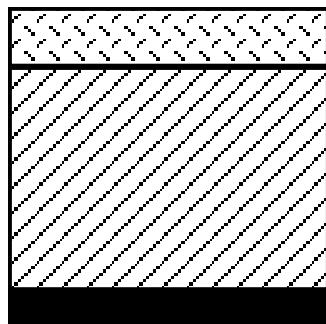


b.

Vertical filter

Generalized Cross-sections of Black & White Panchromatic, Black & White Infrared, Color, and Color-infrared Film

Black-and-White Film



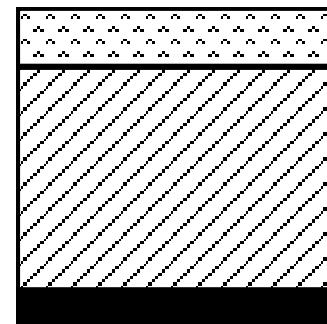
Panchromatic ?blue, green,
and red sensitive emulsion
of silver halide crystals

Base

Anti-halation layer

a.

Black-and-White Infrared Film



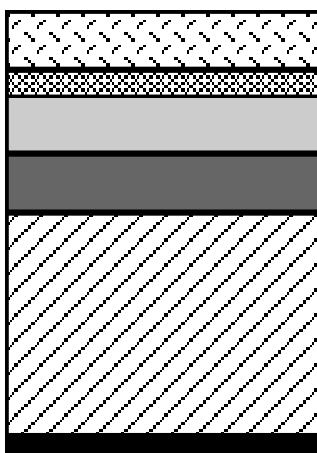
Near-infrared
sensitive layer

Base

Anti-halation layer

b.

Normal Color Film



Blue sensitive layer
[yellow dye-forming layer]

Yellow internal filter blocks blue light

Green (and blue) sensitive layer
[magenta dye-forming layer]

Red (and blue) sensitive layer
[cyan dye-forming layer]

Base

Anti-halation layer

c.

Color-Infrared Film



Near-infrared (and blue) sensitive
layer [cyan dye-forming layer]

Green (and blue) sensitive layer
[yellow dye-forming layer]

Red (and blue) sensitive layer
[magenta dye-forming layer]

Base

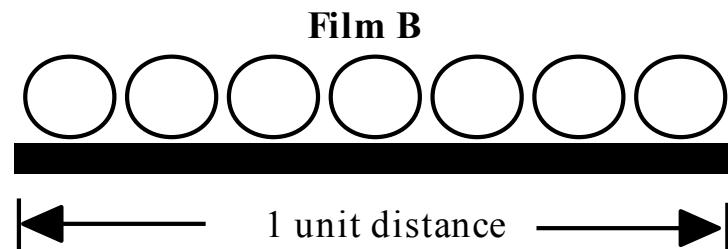
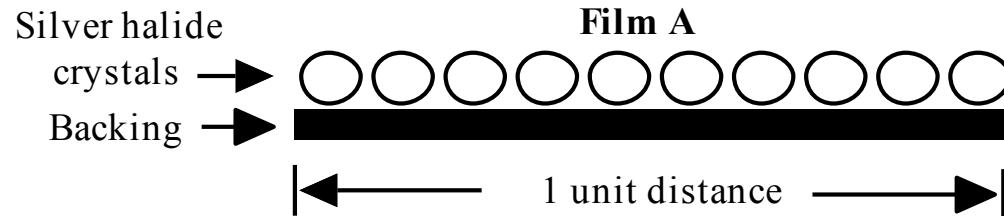
Anti-halation layer

d.

Jensen, 2000

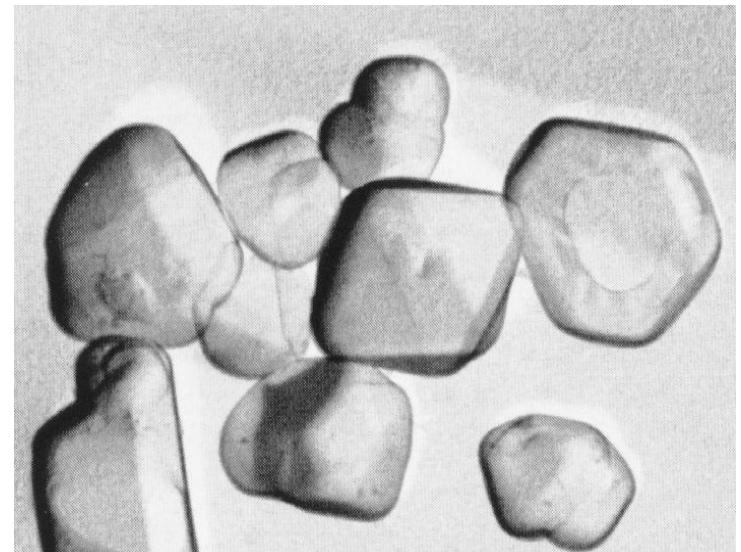
Density and Size of Silver Halide Crystals

Two Films with Different Sizes and Densities of Silver Halide Crystals



a.

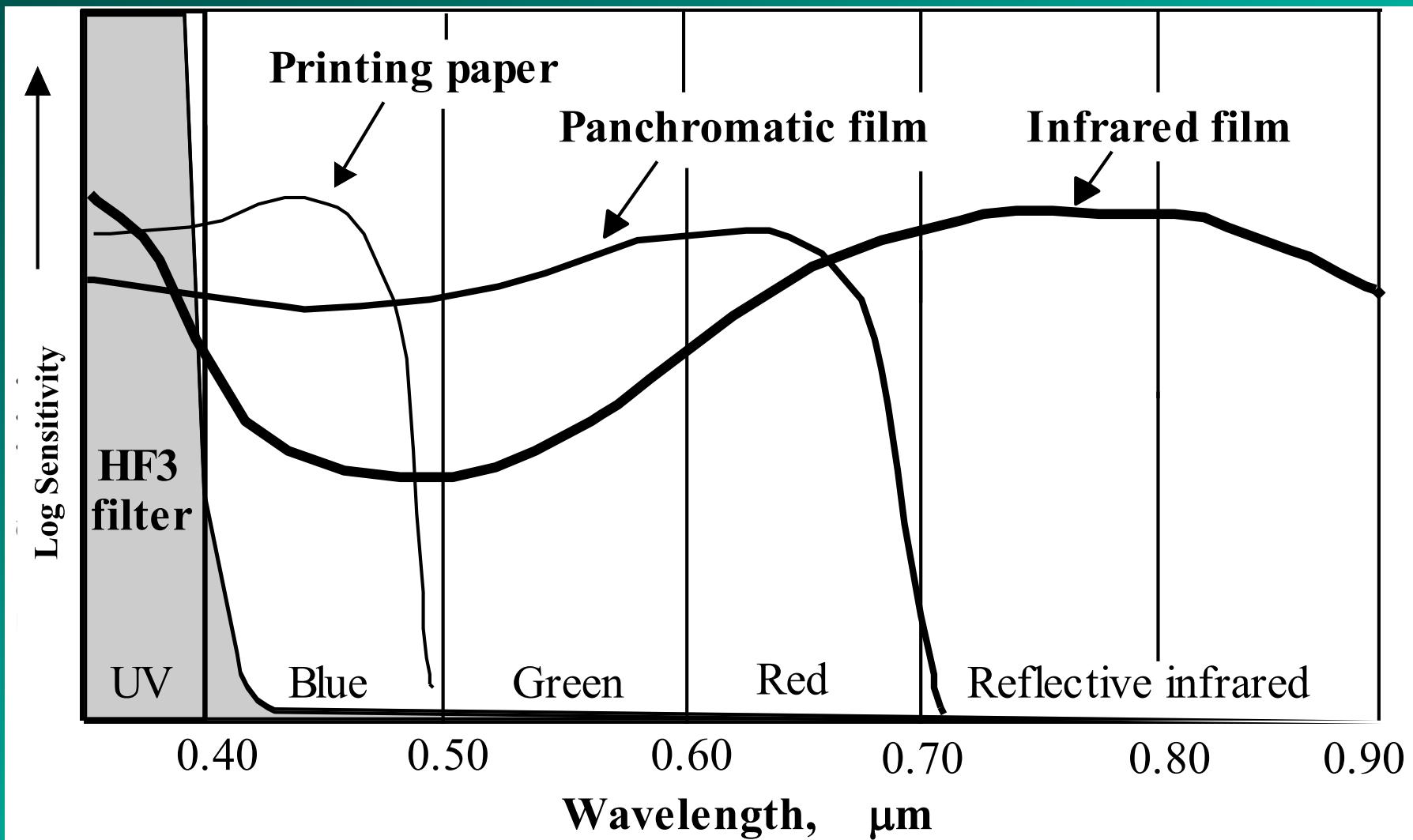
Electron Microscope Photograph of Silver Halide Crystals



b.

Jensen, 2000

Sensitivity of Selected Black & White Films and Printing Paper



Panchromatic



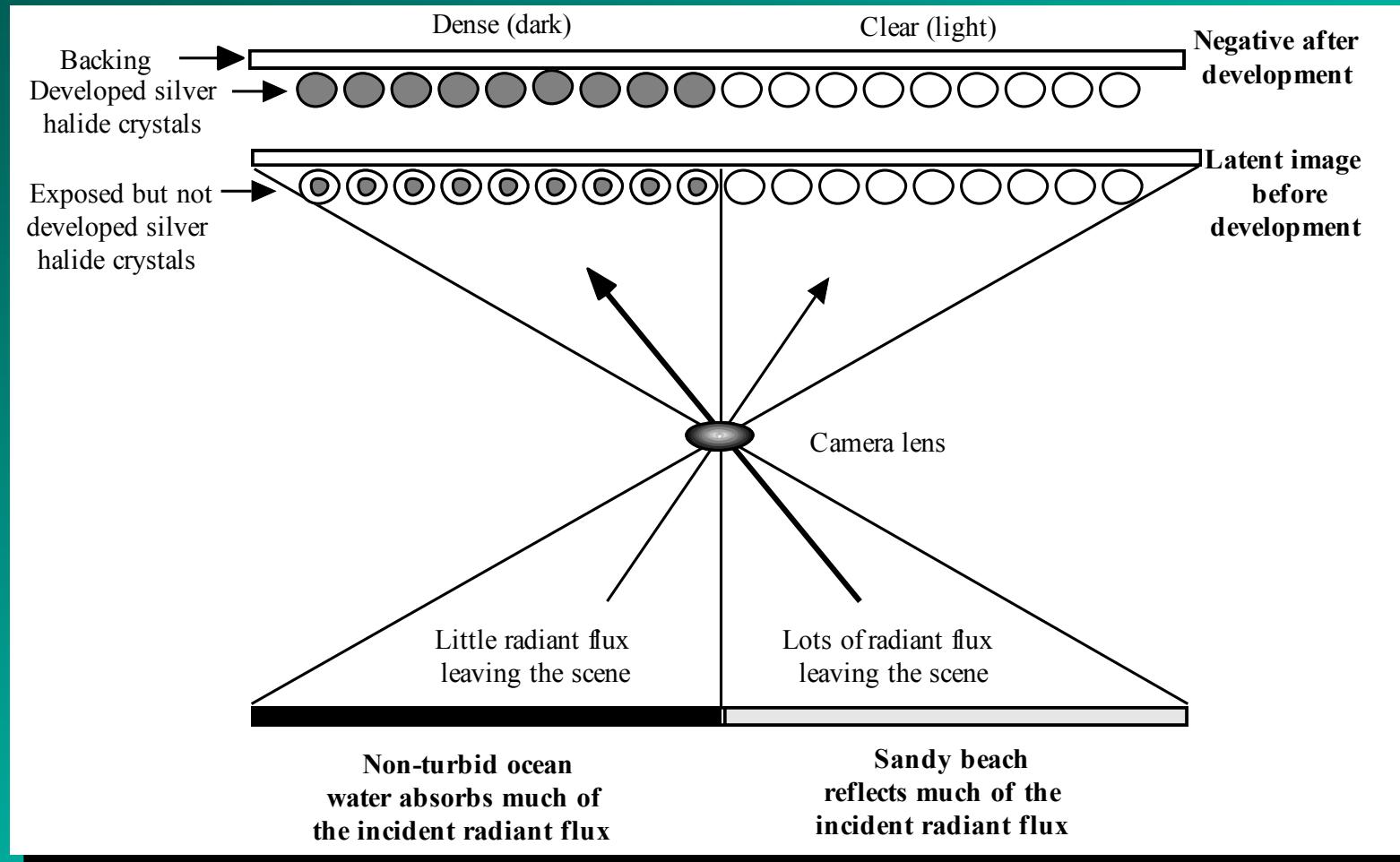
Black & White Infrared



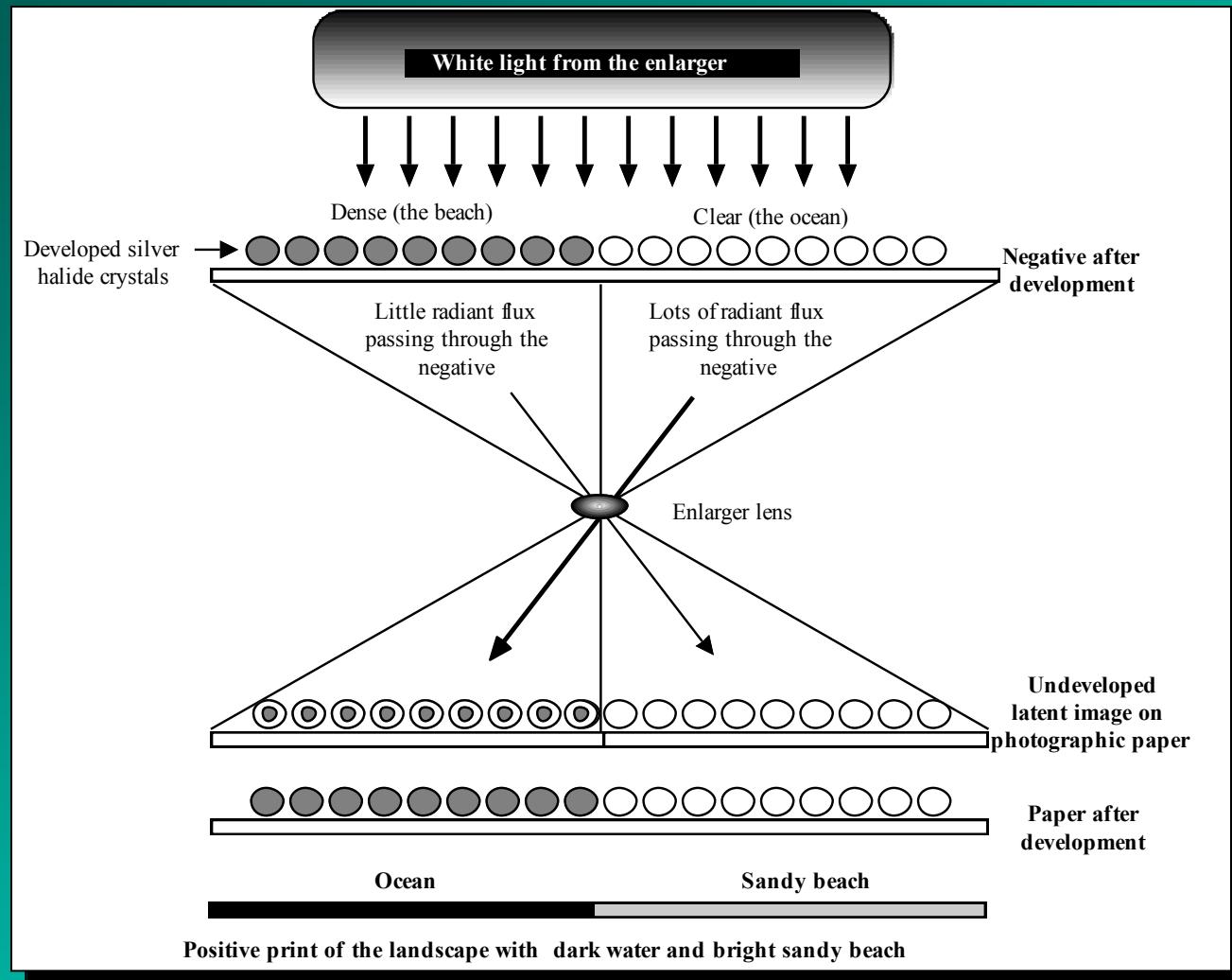
Tivoli North Bay on the Hudson River, NY

Jensen, 2000

Creation of An Aerial Photography Negative by Exposing and then Developing Silver Halide Crystals

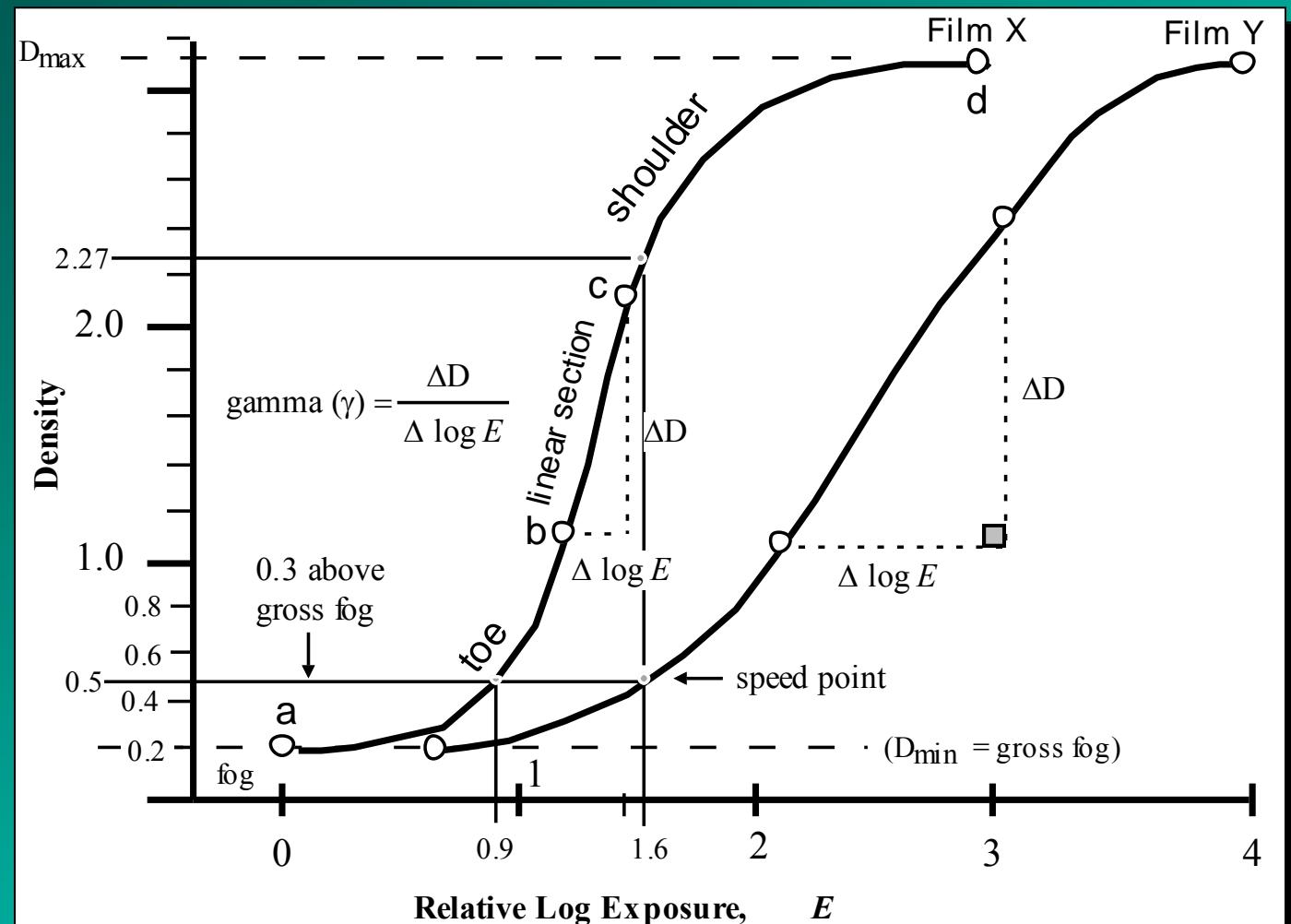


Creation of A Positive Print from an Aerial Photography Negative



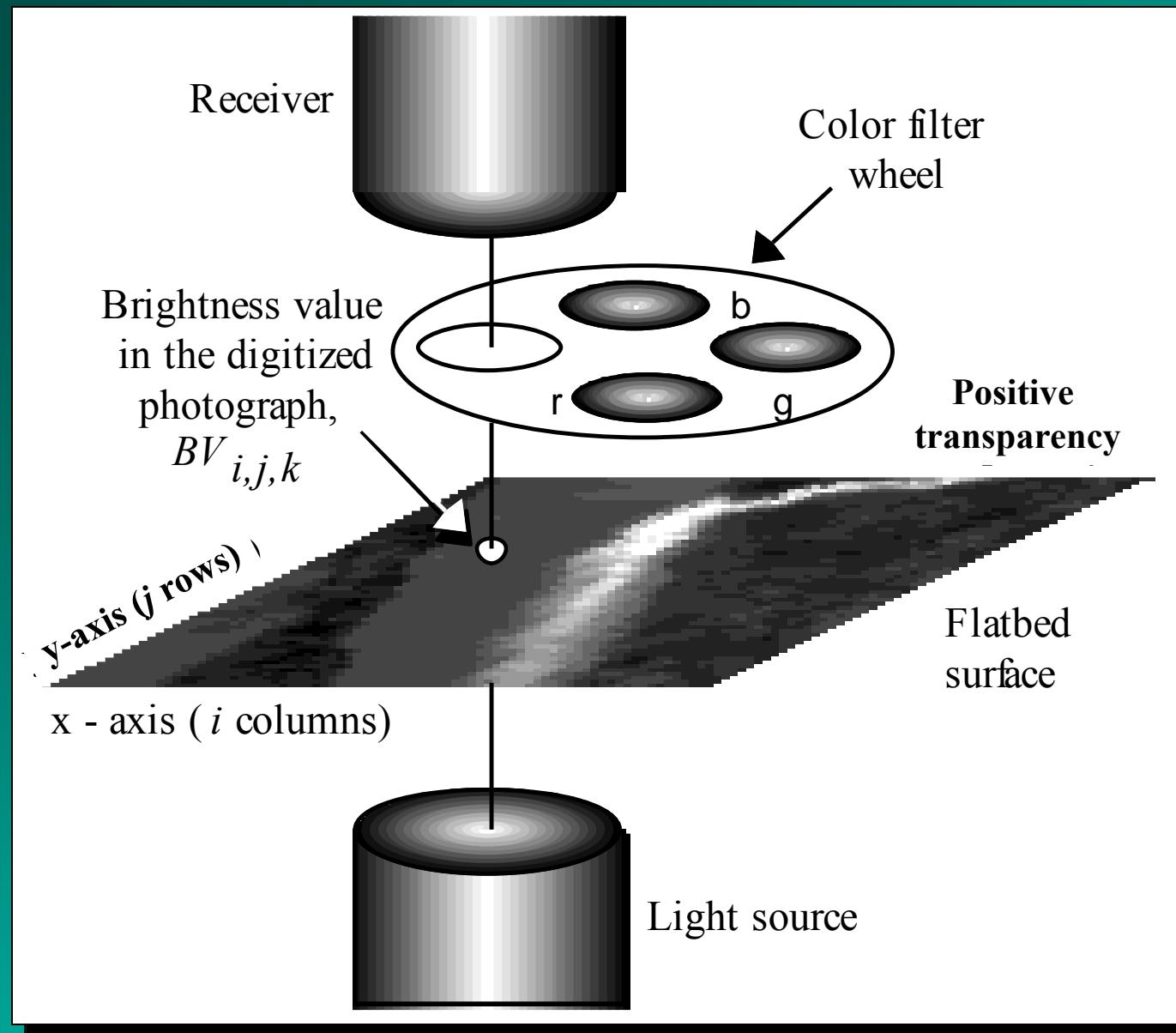
Jensen, 2000

Characteristic Curves of Two Films



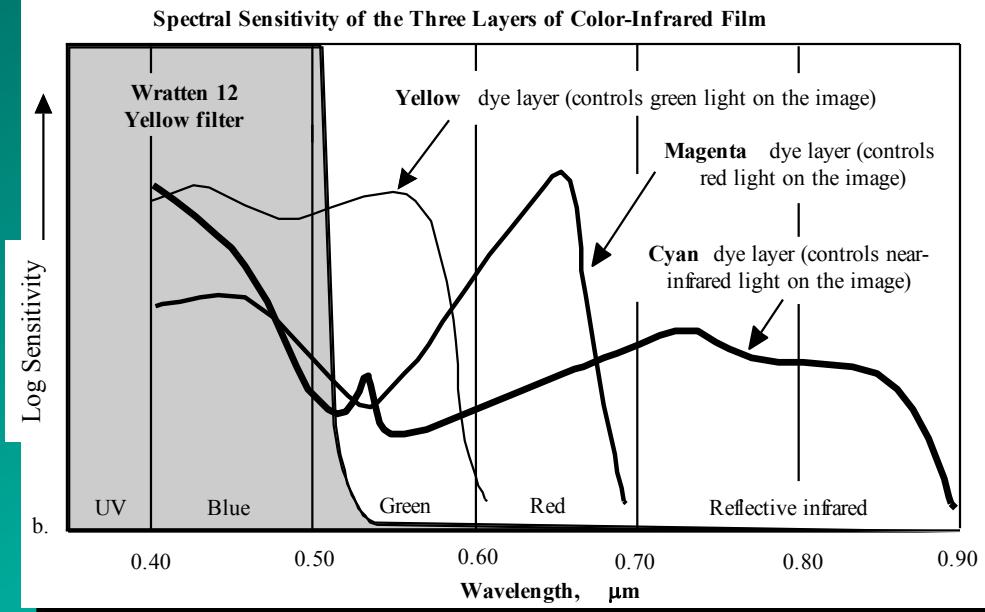
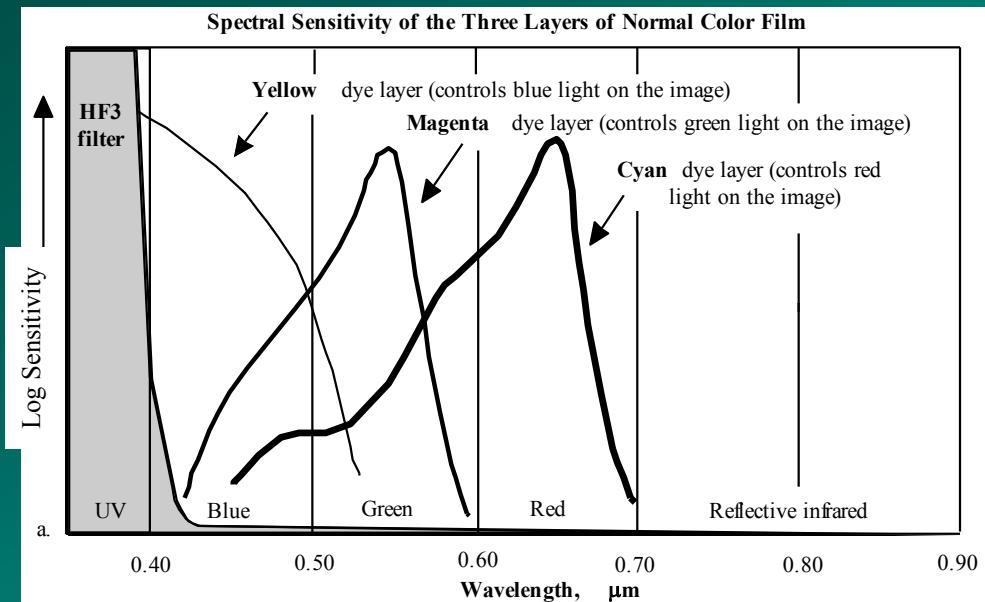
Jensen, 2000

Flatbed Microdensitometer



Jensen, 2000

Spectral Sensitivity of Normal Color and Color-Infrared Film



Jensen, 2000

Aerial Photography

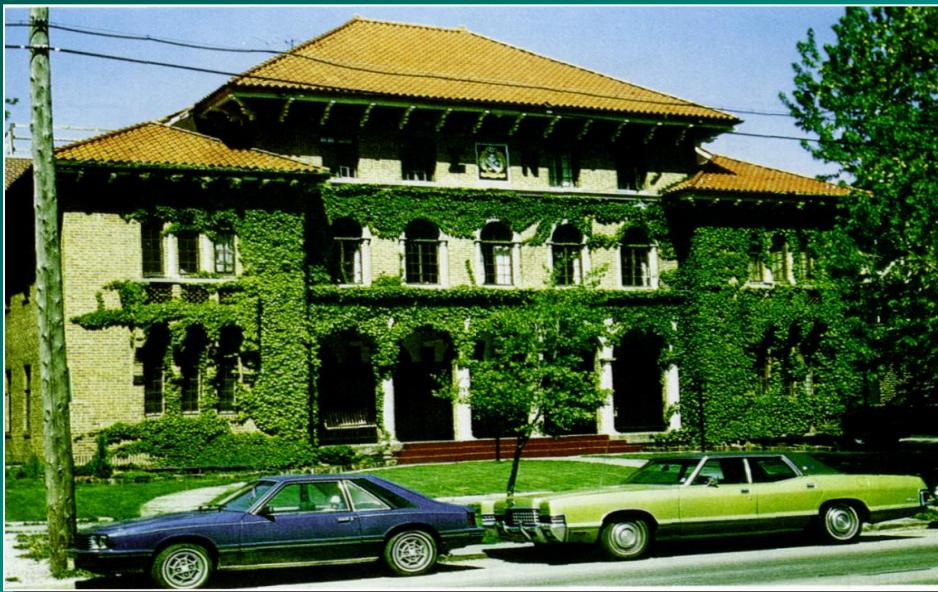


Normal Color

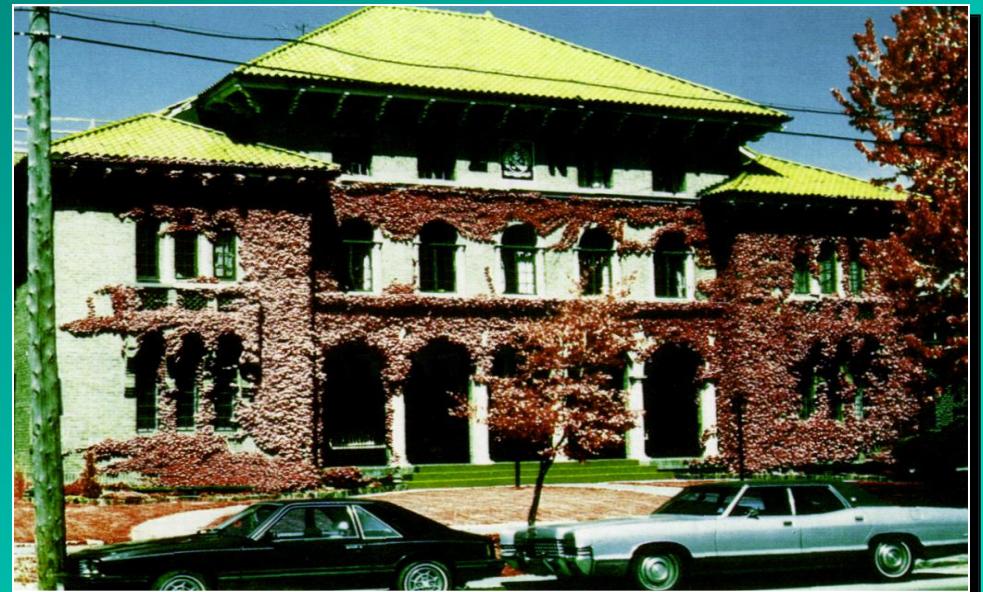


False-color Infrared Using
Wratten #12 filter

Terrestrial Photography



Normal Color



False-color Infrared Using
Wratten #12 filter