The Art and Science of Depiction

Tone and color system

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Color and Tone System

Calvin's skin is a pale green! Yellow flowers are now blue!

Every color is the opposite of what it should be!

Calvin has been transferred to a color film negative!

His only hope is to be processed by a 1-hour photo finisher! I need developer!

Doggone it, Calvin! That's another picture ruined! Can't you look pleasant for y'500th of a second?
Representation systems

- Drawing and projection
- Denotation
- Tone & color
Tone & color system

• (Often a mix)

• Extrinsic

• Intrinsic

• Symbolic
Extrinsic color

- Renzo Piano
- Tjibaou cultural center
- 1991-98
Extrinsic black and white

• Gordon Park, *Red Jackson*  
  *Gang Leader*
Optical intrinsic

- Boticelli *Primavera* 1482
Pure intrinsic colors

- Jawlensky
  *Girl with Peonies*
- +symbolic+harmony
Plan

- Intro
- Shading
- Shadows
- Atmospheric perspective
- Light transfers
- Photography
Why a separate system?

• Willats discusses it only/mainly for the optical denotation system
• But historically it is the major issue with drawing
• It is clearly a different problem from that of dimension and denotation
• Relevant as well for other denotation systems
Denotation system and tone & color

- Silhouette: color of the regions
- Line drawing
  - Line color
  - Line thickness
- Optical
  - Point color & tone
  - Texture
- More an “attribute system” than just tone & color
Denotation system and tone & color
Denotation system and tone & color
Denotation system and tone & color

- Braque Un Poeme Dans Chaque Livre
Denotation system and tone & color
Denotation system and tone & color

- Amedeo Modigliani
  *Tete et buste de profil avec boucle d'oreille*
  1912
Picture color dimensions

- Tone
- Hue
- Saturation
- Simultaneous contrast
- Texture
Beyond color

- Material properties
- Painting
- Gold
- Etc.
Color origin

- Physical extrinsic
- Physical intrinsic
- Symbolic/importance
- Color harmony
- Limitation compensation (or accentuation)
Color and symbol
**Issues**

- **2D/3D**
  - 2D color composition
  - Color linked to the 3D scene
- **Per mark/per primitive**
  - Is the color constant on a mark?
  - Is it constant on a primitive?
  - Does it vary in the mark
Example

• Paul Klee
  *Hoffmanneske Szene*
  1921
Example

Tone & color system
Palette and medium

- Different media permit different ranges of colors
  - E.g. pastels, pencil, watercolor, b/w photo
- The medium can be chosen for the palette
Color and aging

Tone & color system
Restoration

- Michelangelo *The Creation of Adam* 1508-1512
Church and color
Light in the scene

- Intrinsic reflectance
- Different light sources
- Outgoing light
- Shadows
  - Self shadows
  - Cast shadows
- Shading
- Inter-reflection
- Atmospheric perspective
Constancy and scene analysis

- Segmentation into layers
  - Illumination
  - Reflectance
  - Transparency
Light

- Point light source
- Directional light source (sun)
- Extended light source
- Hemispherical light source (sky)
- Ambient light
- Global illumination
Light

- Fall-off
- Attenuation
Light in CG

Tone & color system
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Light and shape depiction

- Shading
- Highlight
- Shadow
- Inter-reflection

Fig. 2

Clair obscur dans un seul objet.
Shading & BRDF

- Bi-Directional Reflectance distribution function
- Ratio of light arriving from one direction bouncing in another direction
- 4D function (2*2 angles)
Shading & BRDF

• 2 main components
  – Diffuse (omni-directional)
  – Specular (directional) : highlight
Shading & BRDF

• Diffuse
  – Depends on angle between light and normal
Shading & BRDF
Shading & BRDF

Tone & color system
Saturation shading

- Andreas Mantegna, Madonna and Child with St John the Baptist and Mary Magdalene, 1495
Saturation shading

- Andreas Mantegna, *Madonna and Child with St John the Baptist and Mary Magdalene*, 1495
Shading and make up

Tone & color system

Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Shading and corrective lighting

Tone & color system

Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Lighting and shading

- Alfred Krupp photographed in 1963 by Arnold Newman
- Because Krupp had benefited from the nazis
- Un-friendly lighting
Plan

• Intro
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• Atmospheric perspective
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Shadow

Plate 18
David Allan,
*The Origin of Painting*
(*The Maid of Corinth*),
1775. Oil on wood,
38.7 x 31 cm. Edinburgh,
National Gallery of Scotland.
Shadow

- Self, cast and attached shadows
  - (or primary and secondary, double shadow, etc.)
- Not local
- Can be distracting
- Have been depicted or not depending on period
- Hard/soft shadow
Self and cast shadow

Tone & color system
Soft shadow
Shadow

- Pozzo
Shadows

• 18th century
Shadows

- 18th century
- Lambert
Shadow

- Raphael vs. Master of the Mornauer
Shadow

- Campin, *Trinity* 1427-32
Shadow

- Caravaggio The Supper at Emmaus 1601
Shadow

- Guardi 1755
Shadow

Shadow

- Rembrandt
Shadow

- Follower of Rembrandt A Man seated reading at a table in a lofty room 1631-50
Shadow & Trompe-l’oeil

• Rembrandt
Shadow & Trompe-l’oeil

Plate 37 Unknown Swabian Artist, Portrait of a Woman of the Hofer Family, 1470. Oil on silver fir, 55.7 x 40.8 cm. London, National Gallery.
Shadow reveal shape
Colored shadow
Shadow reveal
Shadow reveal
Shadow reveal

Plate 52  Grandville, *The Shadows (The French Cabinet)* from *La Caricature*, 1830.
Shadow

- [Waltz 75]
Plan

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- Atmospheric perspective
- Light transfers
- Photography
Atmospheric perspective

- Saturation
- Hue
- Precision
Atmospheric perspective

- Leonardo
Atmospheric perspective

- Titian, *Bacchus*
Atmospheric perspective

• R. Earlam, *Pastoral Scene*, 1774
Plan

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Global illumination

- Light inter-reflection
- Each surface is a secondary light source
- Crucial for indoor scenes
Global illumination
Global illumination
Global illumination
Global illumination

Tone & color system
Global illumination
Counter-example: painting with light

Tone & color system

Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Global illumination & production

- Mostly unused
- Because artists want local control
Global illumination & production

Tone & color system
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Three Point Lighting

- Key light
  - Main and visible lighting

- Fill light
  - Fill-in shadows

- Back light
  - Emphasize silhouette
  - Make subject stand out

- Independent lighting
Portrait lighting

Main light

Fill-in light

Accent light

Background light

Tone & color system

Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Filter for black and white

Tone & color system  
Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Dodging and Burning

- Clearing Winter Storm
Haze filtering

- Haze is bluish

No filter  Blue filter  Red filter

Tone & color system  Snapshot-Perspective-Speed, aperture-Filter-Lighting-Processing & Print-Make up-Retouching
Example

- Edgar Degas
  *Ballet Dancer in Position facing 3/4 front*
  1872
Example

• Tom Purvis 1935

Tone & color system