The Art and Science of Depiction

**Representation Systems**

Fredo Durand

MIT- Lab for Computer Science

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**Rouen revisited**

- Paul Debevec

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**Assignments for Monday 23.**

- Solso *Cognition and the Visual Arts*
  - Chapter 7
- Essay
  - Peer review
  - Final essay
- Final project
  - subject

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**Plan**

- A paradigm: Cartography

- Representation systems
  - Drawing and projection
  - Denotation
  - Tone & color

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**Digression: infamous “Paradigm”**

- A personal pet-subject
- Paradigm:
  - An outstandingly clear or typical example or archetype
- After Thomas Kuhn, *The Structure of Scientific Revolutions*
  - A philosophical and theoretical framework of a scientific school or discipline within which theories, laws, and generalizations and the experiments performed in support of them are formulated
- Vocabulary inflation (see also “framework”)

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**A paradigm: Cartography**

- A map is a depiction of a reality
- Can be more efficient than photo
- There is no perfect universal solution

- However, quantitative is more important than for most pictures
- The systems are usually explicit
- And same issues as studied before (Gestalt, etc.)
- Amount of detail
Map making

- Which information will be represented
- Projection
- Which kind of symbols will be used
- Color codes

Projection

- Buckminster Fuller
Projection & distortion

Distortion and politics

Geographical map

Topological map

Topological map
Metaphoric Projection

Error: Columbus's map

Error/choice/distortion
- Descelier, 1546
- E.g. huge elephant

Map making
- Which information will be represented
- Projection
- Which kind of symbols will be used
- Color codes

Denotation
**Map making**

- Which information will be represented
- Projection
- Which kind of symbols will be used
- Color codes

**Symbols: dimension & tone, color**

<table>
<thead>
<tr>
<th>Type of symbol</th>
<th>Visual dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Color codes</td>
</tr>
<tr>
<td></td>
<td>Color saturation</td>
</tr>
</tbody>
</table>

**Color: elevation**

![Map of elevation]

**Color: geology**

![Map of geology]

**Color: influence of cities**

![Map of influence of cities]

**Ambiguity: color or denotation?**

![Ambiguity map]
A complex example

- Population of the Bay Area

Plan

- A paradigm: Cartography

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Goals and context

- Coarse-grain description of style
- Independent systems, independent decisions
- Description and comparison
- Synthesis (NPR)

This is an exploratory system!
  - In progress
  - Incomplete
  - Different categories may overlap
- More a vocabulary

Representations systems

- John Willats
  Art and Representation: New Principle in the analysis of pictures
  1997

Goals and context

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Representation systems

- Drawing and projection
- Denotation
- Tone & color

The two first systems are classical
Because painting was the only recognized art form

Drawing system

- Linear perspective
- Orthographic
- Topological
- Other
**Drawing system**

- Linear perspective
  - *Interior of St Bavo's church at Haarlem*, Pieter Jansz Saenredam, 1648
- Orthographic
- Topological
- Other

**Drawing system**

- Linear perspective
- Orthographic
  - Brooks-Greaves *St Paul's Cathedral* 1928
- Topological
- Other

**Drawing system**

- Linear perspective
- Orthographic
- Topological
  - Paul Klee *Another Camel* 1939
- Other

**Drawing system: symbolic**

- Linear perspective
- Orthographic
- Topological
- Other
  - Piero de la Francesca *Mercy*

**Representation systems**

- Drawing and projection
- Denotation
- Tone & color

**Denotation system**

- Silhouette:
  - 2D (regions)
- Line Drawing
  - 1D (lines)
- Optical
  - 0D (points)
**Denotation system**

- **Silhouette**:
  - 2D (regions)
  - Picasso, *Rite of Spring*
- **Line Drawing**
  - 1D (lines)
- **Optical**
  - 0D (points)

**Limitations: contrast & palette**

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**Silhouette**

- 2D (regions)

**Line Drawing**

- 1D (lines)
- Picasso, *Portrait of Stravinsky*

**Optical**

- 0D (points)

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**Silhouette**

- 2D (regions)

**Line Drawing**

- 1D (lines)
- Picasso, *Paul as Arlequin*

**Optical**

- 0D (points)

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**Representation systems**

- Drawing and projection
- Denotation
- Tone & color

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**Tone & color system**

- (Often a mix)
- Extrinsic
- Intrinsic
- Symbolic

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**A fourth denotation system**

- **Sculpture**
  - 3D (volume)
  - Picasso, *Head of a Woman (Fernande)*, 1909
- **Silhouette**
  - 2D (regions)
- **Line Drawing**
  - 1D (lines)
- **Optical**
  - 0D (points)
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

Next sessions
- Linear perspective
- Canonical view
- Drawing systems
- Distortion and constraints