the art in cartography

design issues
cartographic license
the art of visual “deceit”

The deadly couch cobra – coiled and alert in its natural habitat.
why cartographers are still in business...

map making and visualization
thematic maps are...

“products of art clarified by science”
Max Eckert (1908)
art...

Levy (1990)
Van Gogh,
Vase of Roses, 1890
location

Jean Arp (1916)

Edgar Degas (1877)

Nonomura Sotatsu (16-17th century)
visual balance

• some items are heavier than others
• heaviness affected by
  size
  value
  location
  shape
size

Leibovitz (photo)
color: hue vs. value vs. saturation

Eakins, The Concert Singer (1892)
color (hue) harmony

Renoir, Mme Renoir, 1910

Chagall, The Painter and his wife, 1969
color conventions

Texture

Dufy, Regatta at Cowes, 1934

Klimt, Expectation, 1905-09
shape

Picasso, Girl before a Mirror, 1932

Renoir, Mme Renoir, 1910
orientation

Gaugain, The Day of the God, 1894

Johnson, Going to Church, 1940-41
the visual variables

- Jacques Bertin’s Sémiologie Graphique (1967, 1999)

Picasso, Girl before a Mirror, 1932
depth cues...

- eye position in human’s face
  - stereo vision: 3D effect

- scattering of sun light
  - sharp edges closer to viewer

- size changes
  - large sizes closer to viewer

...affect our depth perception!
visual communication

art: visual emotions

thematic mapping: visual data relationships
thematic maps are...

“products of art clarified by science”
Max Eckert (1908)
principles of perceptual organization

“all features are equal, but some are more equal than others”

Gestalt Laws of Organization

1. figure and ground
   • a figure
     - part of the visual field
     - has meaning, stands out from the rest
   • the ground
     - part of the visual field
     - has less relevance, remains in background
   • including grouping, closure, good continuation, common fate, etc.
this means for cartography...

- **figure-ground**: the three map planes
  - foreground
  - middle ground
  - background

- **visual and semantic hierarchies**
  - visual: darker features stand out
  - semantic: roads are most important on a road map

- **foreground**
  - most important visual plane

Source: Dent
map design

abstraction
- information encoding
- information processing

symbolization
- semiotics

constraints
- conceptual
- mechanical

generalization
- modeling

knowledge

production
- mapping

meaning

aesthetics

redrawn from B. Buttenfield
map abstraction process

- based on feature characteristics
- levels of measurements
- visual variables

- semantic generalization
- semiotic generalization

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the visual variables

- Jacques Bertin’s Sémiologie Graphique (1967, 2000)

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<th>Zones</th>
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<td><img src="image3.png" alt="Image" /></td>
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**Quantitative (magnitude)**
- Q : proportion (interval/ratio)

**Qualitative (relationships)**
- O : order (ordinal)
- ≠ : association (similarity)
- ≡ : distinction (difference)

Proportionality: Q
Order: O
Associativity: ≠
Selectivity: ≡
the visual variables

- example of modifications
  - Spiess (1990)
  - MacEachren (1994)
  - Buttenfield (1999)
map symbolization

Figure 3.24 Matching map types to data models. Reproduced from MacEachren (1992) with permission.
points
areas
multivariate
and for non-geographic data...