

The Art and Science of Depiction

Non-linear Drawing systems

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Non-linear drawing systems

Calvin: CALVIN HAS TURNED INTO ONE OF HIS OWN CHILDLIKE DRAWINGS!

Ned: HIS ANATOMICAL REFERENCES WOULD PROBABLY BE USEFUL. CALVIN THINKS IT'S DIFFICULT TO MOVE. ARE THESE LINEAR ANATOMICAL REFERENCES?

Ned: YES, BUT FROM THINGS WE'VE SOME KIND OF ILLUSTRATION. IF ONLY CALVIN HAD LEARNED TO DRAW BETTER!

Ned: THAT'S WHAT ALL INDIVIDUALS SAY. WH NED!

Drawing systems 2

Munch exhibition

- Boston College
- Until May 21.
- Birth of expressionism

Drawing systems 3

Munch

Drawing systems 4

Munch

Drawing systems 5

Munch

Drawing systems 6

Munch



Drawing systems

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Munch



Drawing systems

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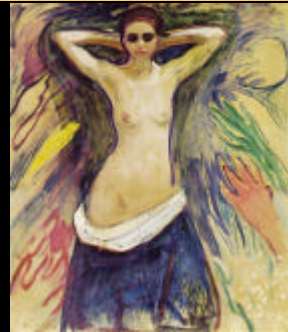
Munch



Drawing systems

9

Munch



Drawing systems

10

Green flash



Drawing systems

11

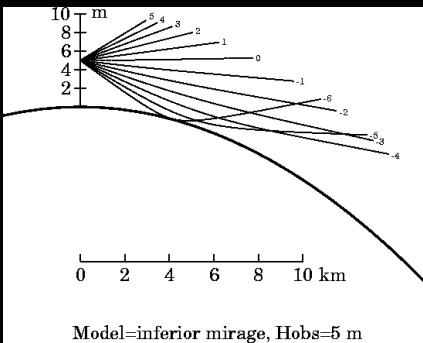
Green flash



Drawing systems

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Green flash



Drawing systems

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Green flash

INFERIOR-MIRAGE
SUNSET

10f

L = 10 m

Hobs = 5 m

Drawing systems

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Green flash

INFERIOR-MIRAGE
GREEN FLASH

10f

L = 10 m

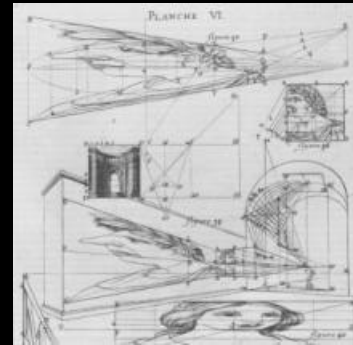
Hobs = 5 m

Drawing systems

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Anamorphosis

- Gregoire Huret 1670



Drawing systems

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Plan

- Drawing and projection
 - Linear perspective & the Renaissance
 - Drawing systems
 - Catalogue of “all” drawing systems
 - Advantage/disadvantages
 - Distortion and constraints
- Denotation
- Tone & color

Drawing systems

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Classification of drawing systems

- Linear
 - Parallel
 - Orthogonal
 - Fold-out oblique
 - Horizontal oblique
 - Vertical oblique
 - Orthographic
 - Isometric
 - Others
 - Non orthogonal
 - Oblique
 - Axonometric
 - Linear perspective
 - One point
 - Two points
 - Three points
 - Divergent perspective
- Non Linear
 - Quasi linear
 - Naive perspective
 - Expressionist perspective
 - Importance-driven
 - Cell panorama
 - Curved projections
 - Panorama
 - Fish-eye
 - Topological
 - Split views, fold-out
 - Multiple viewpoints

Drawing systems

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Linear projections

- Straight lines and alignments are preserved
- Can be expressed in primary geometry
 - Ray-image intersections
 - A matrix

- Parallel
- Linear perspective
- Divergent perspective



Drawing systems

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Classification of drawing systems

- Linear
 - Parallel
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Drawing systems

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Non Linear

- Does not preserve straight lines
- Can get rid of some distortions
- More freedom
- Dramatic effects

Drawing systems

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Non Linear

- Quasi linear
- Curved projections
- Topological
- Split views, fold-out
- Multiple viewpoints

Drawing systems

22

Quasi linear

- Locally linear
- Preserves the drawn straight lines
- No “accurate” space
- Unified space

Drawing systems

23

Quasi linear

- Naïve perspective
- “Expressionist” perspective
- Importance-driven
- Locally linear
- Cell panorama

Drawing systems

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Naïve perspective

- Attempt to depict scene 3 dimensionally
- Often lack of skill
- More or less formal secondary geometry rules

Drawing systems

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Naïve perspective

- Pompeii

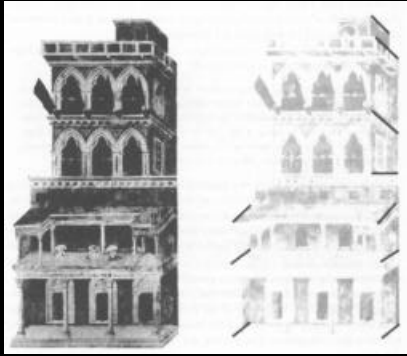


Drawing systems

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Naïve perspective

- Giotto

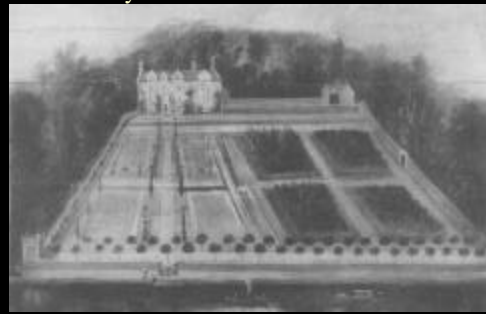


Drawing systems

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Naïve perspective

- 18th century



Drawing systems

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Locally linear

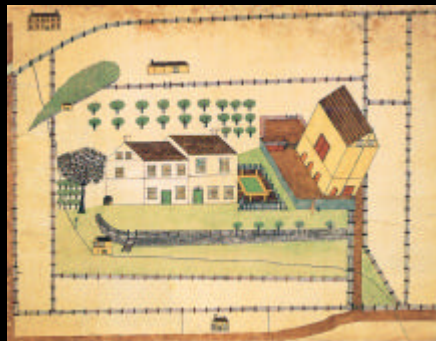
- Linear for objects or parts of the scene
- Choose the best system for each part
- Allows different scales, provide context
- In fact, this is the most common system!

Drawing systems

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Locally linear

- Folk



Drawing systems

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Locally linear



Drawing systems

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Locally linear

- Egyptian
- Best view for each object

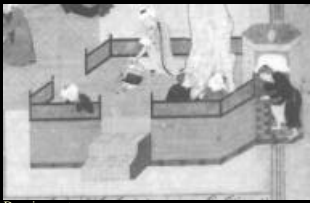


Drawing systems

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Locally linear

- Persian miniature, 1494
- Oblique+vertical oblique



Drawing systems

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Locally linear



Drawing systems

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Locally linear

- Plan of Manhattan

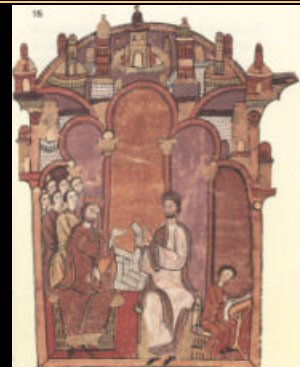


Drawing systems

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Locally linear

- Llibre Dels Feus
1162-1199



Drawing systems

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Locally linear

- *St John the Baptist Retiring to the Desert*
Giovanni di Paolo 1454



Drawing systems

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Locally linear

- Raphael, *The School of Athens*



Drawing systems

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Importance-driven

- Size depends on importance, symbol

Importance-driven



Drawing systems

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Drawing systems

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Importance-driven

- Piero de la Francesca *Mercy*



Drawing systems

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Comparison

- Piero de la Francesca, *Flagellation*, 1460



Drawing systems

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Importance-driven



Drawing systems

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Data-driven

- Scientific American



Drawing systems

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Cell multiperspective panorama

- Pinocchio, Walt Disney

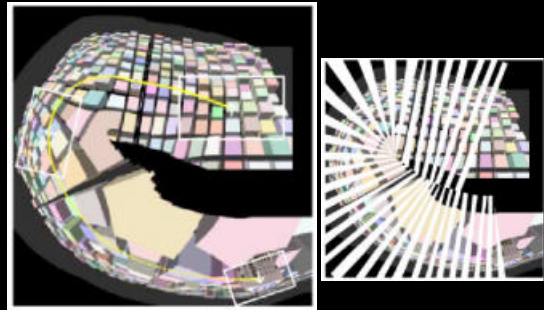


Drawing systems

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Multiperspective panorama

- [Wood et al. 98]



Drawing systems

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Multiperspective panorama

- [Wood et al. 98]

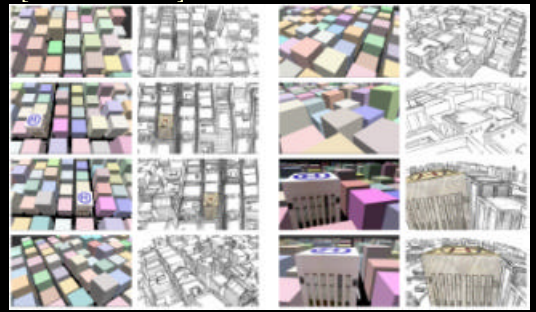


Drawing systems

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Multiperspective panorama

- [Wood et al. 98]



Drawing systems

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“Impressionist” perspective

- Pissarro

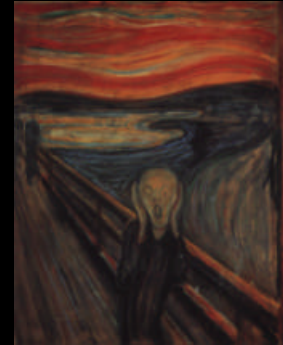


Drawing systems

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“Expressionist” perspective

- Munch,
the Scream



Drawing systems

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“Expressionist” perspective

- Van Gogh



Drawing systems

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Cézanne

- *Still life with basket, composition rule*

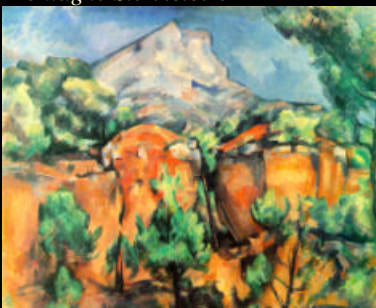


Drawing systems

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Cézanne

- *Montagne Ste Victoire*



Drawing systems

53

Cézanne

- *Montagne Ste Victoire*



Drawing systems

54

“Expressionist” perspective

- Max Beckman *Family Picture* 1920



Drawing systems

55

“Expressionist” perspective

- Umberto Boccioni *The Street Enters The House* 1911

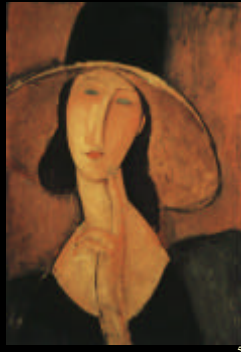


Drawing systems

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Quasi linear

- Modigliani *Femme au Chapeau*



Drawing systems

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Classification of drawing systems

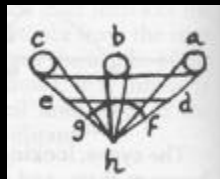
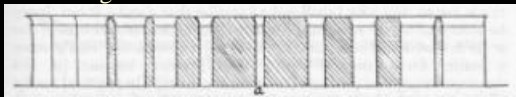
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Drawing systems

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Leonardo & contradictions

- Wide angle vision

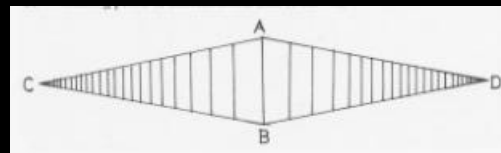


Drawing systems

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Leonardo & contradictions

- Wide angle vision
- Lateral recession



Drawing systems

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Curved perspective

- Panorama
 - Preserve verticals
- Fish eye

Drawing systems

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Curved perspective



Drawing systems

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Curved perspective

- Jean Fouquet, 15th century



Drawing systems

63

Curved perspective

- A View of Delft Carel Fabritius (follower of Rembrandt) 1652



Drawing systems

64

Curved perspective

- Turner *Petworth Park Tillington, Church in the Distance* 1828



Drawing systems

65

Curved perspective

- Panoramic camera



Drawing systems

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“Expressionist” perspective

- Van Gogh, *Bedroom in Arles*



Drawing systems

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“Expressionist” perspective

- Van Gogh, *Bedroom in Arles*



Drawing systems

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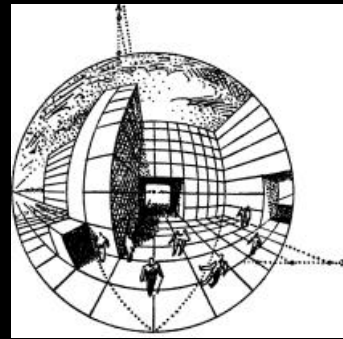
Curved perspective

- Panorama
 - Preserve verticals
- Fish eye

Drawing systems

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Fish-eye



Drawing systems

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Fish-eye vs. wide angle



Drawing systems

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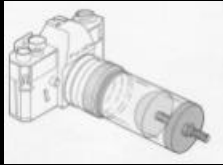
Fish-eye vs. wide angle



Drawing systems

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Bird's eye attachment



Drawing systems

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Fish-eye



Drawing systems

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Fish-eye

- MC Escher, *Hand with Reflecting Globe*



Drawing systems

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Fish-eye

- MC Escher, *Balcony*



Drawing systems

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Fish-eye

- *London from St Paul's cathedral 1845*



Drawing systems

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Fish-eye

- Anthony Green *The 30th Wedding Anniversary*



Drawing systems

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Projection surface

- Panorama, Imax
- “Good viewpoint”
 - Primary geometry and viewing conditions match



Drawing systems

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Projection

- Pavilion in the Colosseum Regent's Park 1829



Drawing systems

Classification of drawing systems

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Drawing systems

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Topological

- Paul Klee, Another Camel



Drawing systems

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Topological

- London Underground, Beck, 1931

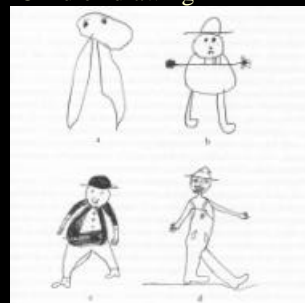


Drawing systems

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Topological

- Children drawing



Drawing systems

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Topological

- Comics



Drawing systems

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Classification of drawing systems

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Drawing systems

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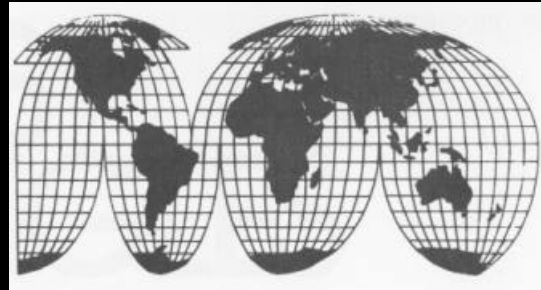
Split views, fold-out

- Can be seen as a smooth viewpoint change
- Can represent an object from all sides
- Continuity, preserves topology

Drawing systems

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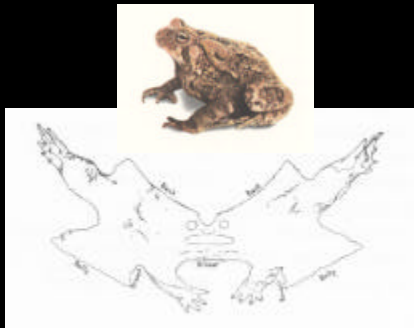
Split views, fold-out



Drawing systems

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Split views, fold-out



Drawing systems

89

Split views, fold-out

- Picasso,
Portrait of a woman



Drawing systems

90

Split views, fold-out

- Northwest Indian
Double Profile Bear



Drawing systems

91

Split views, fold-out



Drawing systems

92

Split views, fold-out

- Multiple-center of projection images, Paul
Rademacher



Drawing systems

93

Split views, fold-out

- Multiple-center of projection images, Paul
Rademacher

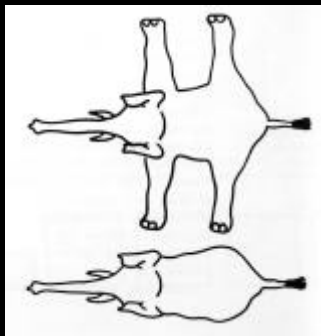


Drawing systems

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Split views, fold-out

- Multicultural
study



Drawing systems

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Split views, fold-out

- Interactive caricature (Fred Vernier)



Drawing systems

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Split views, fold-out

- Interactive caricature (Fred Vernier)



Drawing systems

97

Split views, fold-out

- Interactive caricature (Fred Vernier)



Drawing systems

98

Split views, fold-out

- Interactive caricature (Fred Vernier)



Drawing systems

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Cinema

- Robert Wiene The cabinet of Dr Caligari 1919-1920



Drawing systems

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Drawing systems

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Multiple viewpoints

- No more unity of pictorial space
- Represents objects from different viewpoints
- Less continuity, no topology

Drawing systems

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Cubism

- *Candlestick*
George Braque
1911

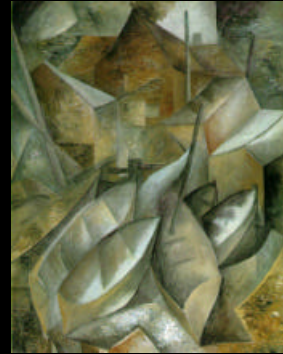


Drawing systems

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Cubism

- *Boats*
George Braque



Drawing systems

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Hockney



Drawing systems

105

Hockney



Drawing systems

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Escher

- *Other World* 1947



Drawing systems

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Mirrors, lenses

- Freddie Francis
The Skull



Drawing systems

108

Mirrors, lenses

- Hedgecoe



Drawing systems

109

Mirrors, lenses

- Casas Abarca
Le Salon
1875-1958



Drawing systems

110

Mirrors, lenses

- Manet, *Le Bar Des Folies Bergeres*



Drawing systems

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Discussion

- No universal solution
- Secondary geometry
- Invariants
- Property mapping or translation

Drawing systems

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Drawing and cinema

- Characters too close
- Trenching
- Etc.

Drawing systems

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