

Questions?

- Midterm
 - About question #3
 - *Do all the math*
 - *Check your results: order of magnitude, units...*
 - *Read questions carefully*
- HW#6 is out
 - Only 2 HW left

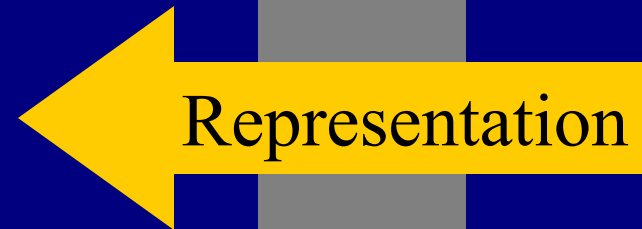
Information visualization

- Data presentation
 - Emphasis the important aspects
 - Tone down irreverent aspects
 - Avoid distortions
- Discovery
 - Understand trends
 - Figure out underlying principles
 - Avoid distortions
 - Iterative process

Visualization: a double gulf?

Visualization user

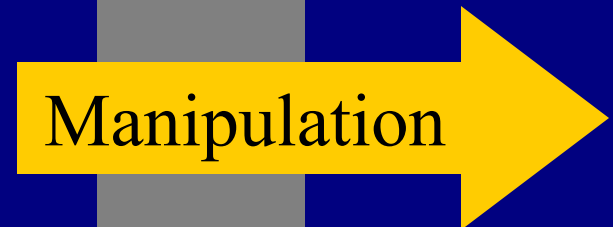
Visualization designer



Conceptual
model

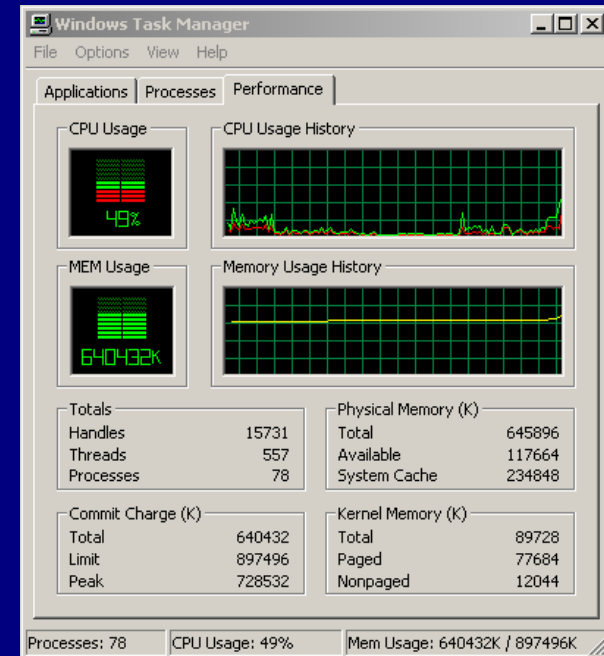
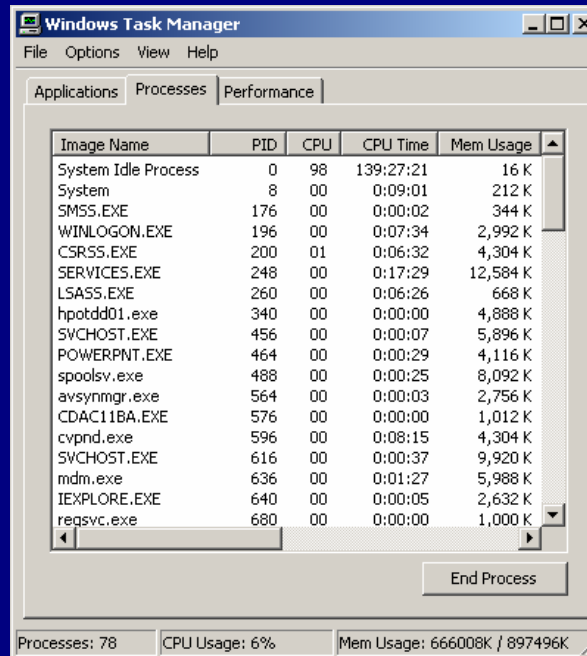
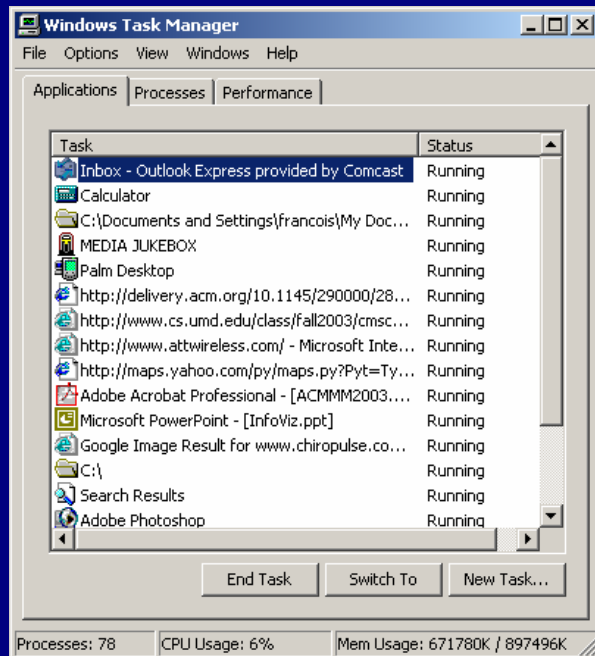
Visualization

Data



Goal directed

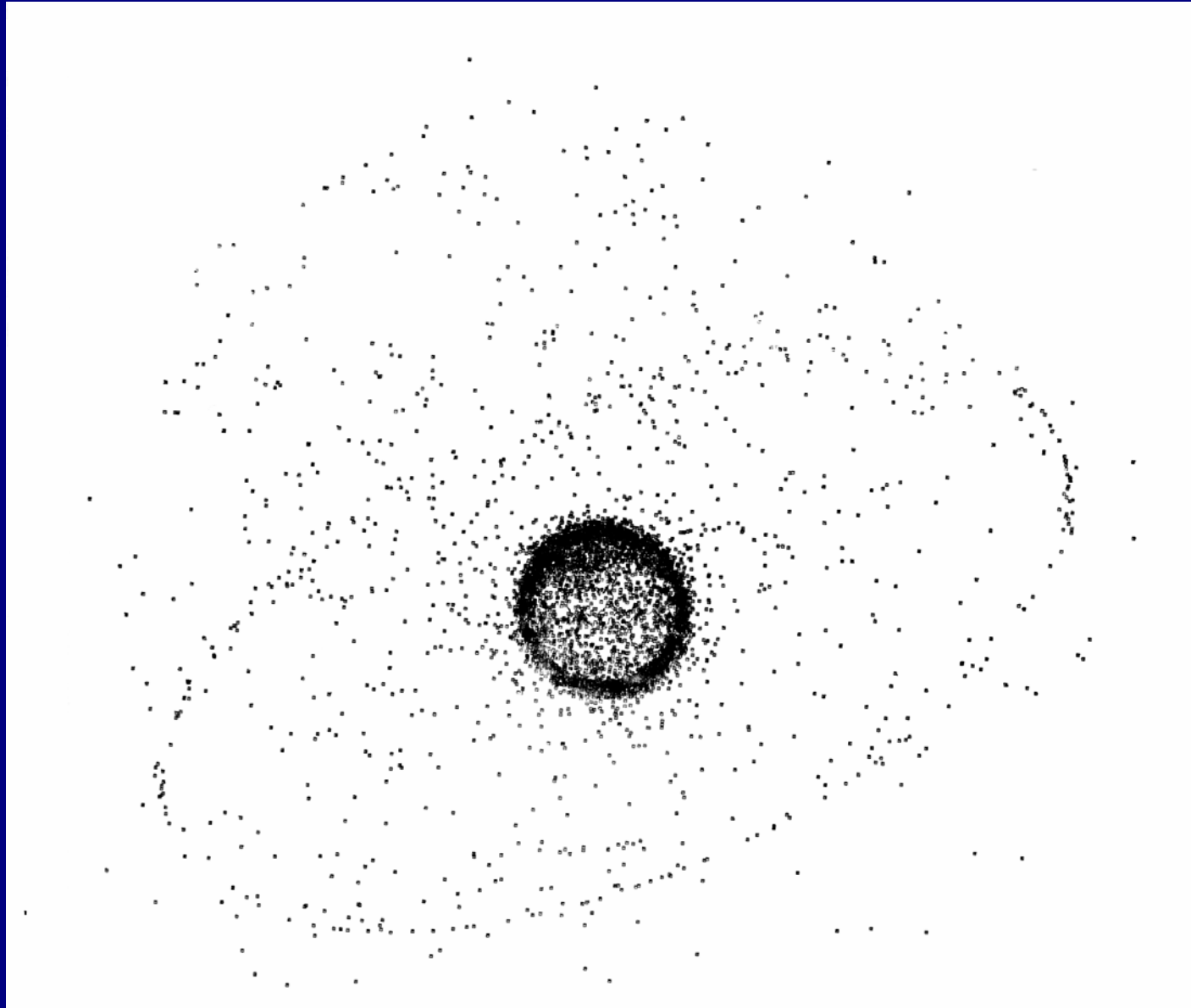
- The best visualization depend on the task
 - System performance meter



Tufte's classification

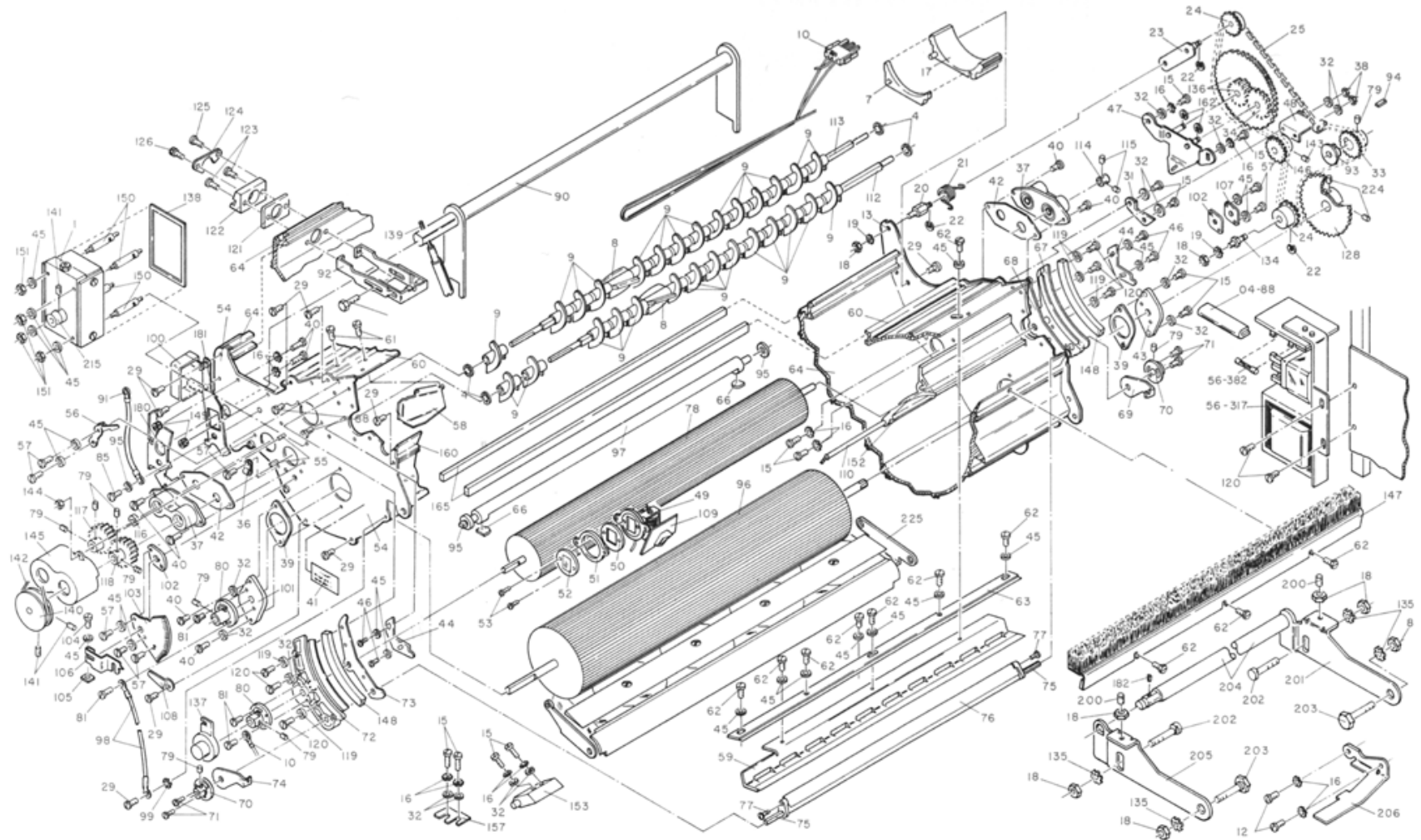
- “Envisioning Information” book
 - Micro/Macro reading
 - *Showing individual data points and identifying patterns*
 - Layering and separation
 - *Relating information structure*
 - Small multiple
 - *Comparing several alternatives*
 - Color
 - *Using color to identify sub-structures*
 - Narration of space and time
 - *Telling a story*

Macro-Micro reading: 7000 satelites



This is a detailed exploded view diagram of a mechanical assembly, likely a printer or copier. The diagram shows numerous numbered parts (1-157) and their assembly relationships. Key components include a large central roller assembly, a complex gear train on the right, and various structural components on the left and bottom. The parts are labeled with numbers in red, and the assembly is shown in a disassembled state to illustrate the relationship between the components.

Layering and separation: assembly



Layering and separation: table

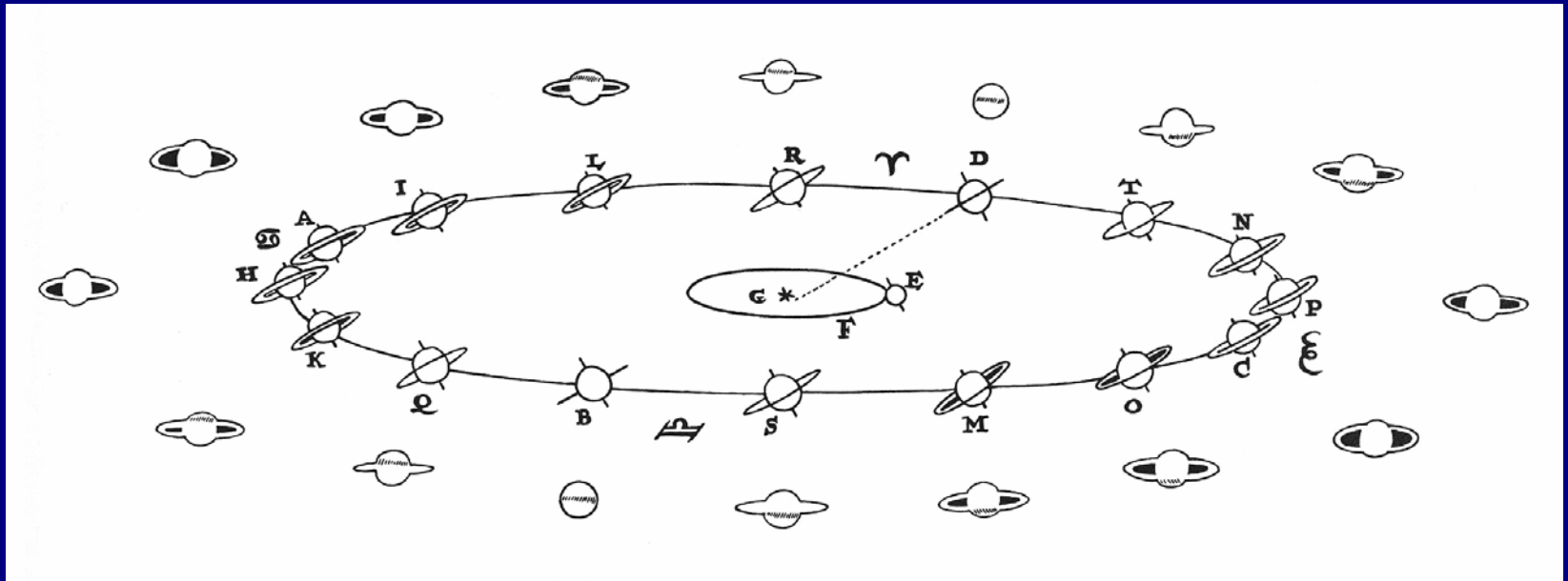
- Train schedule
 - Setting the emphasis on the data not the table

Train No.	3701	XM 3301	3801	A 67	3 3803
New York, N.Y.	A.M. 12.10	A.M. 12.40	A.M. 1.30	A.M. 3.52	A.M. 4.50
Newark, N.J. P	12.24	12.55	1.44	4.07	5.04
North Elizabeth					
Elizabeth	12.31	1.03	1.51		5.11
Linden	12.36		1.56		5.16
North Rahway					
Rahway	12.40	1.11	2.00		5.20
Metro Park (Iselin)	12.44		2.04	4.26	5.24
Metuchen	12.48		2.08		5.28
Edison	12.51		2.11		
New Brunswick	12.55		2.15		5.35
Jersey Avenue	1.02		2.18		
Princeton Jct. S			2.31		5.50
Trenton, N.J.			2.42	4.58	6.03

	am ●				
New York, NY	12.10	12.40	1.30	3.52	4.50
Newark, NJ ^P	12.24	12.55	1.44	4.07	5.04
North Elizabeth					
Elizabeth	12.31	1.03	1.51	..	5.11
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Edison	12.51		2.11	..	..
New Brunswick	12.55		2.15	..	5.35
Jersey Avenue	1.02		2.18	..	..
Princeton Junction ^S			2.31	..	5.50
Trenton, NJ			2.42	4.58	6.03
TRAIN NUMBER	3701	3301	3801	67	3803
NOTES		XM		➡	3

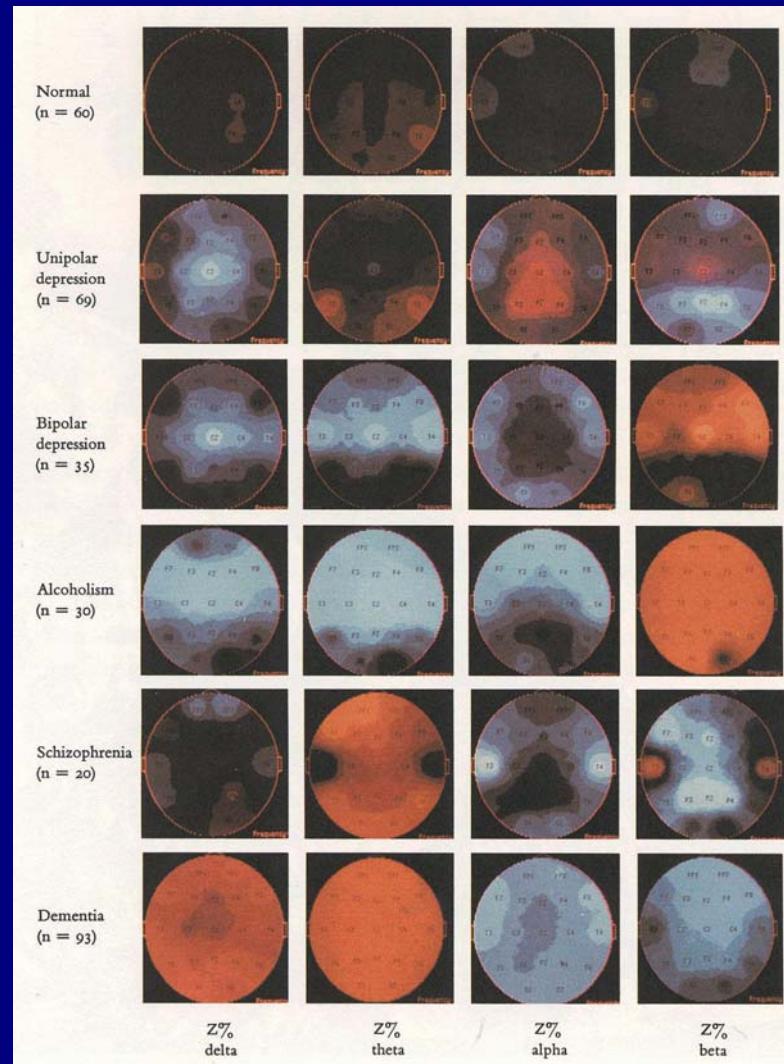
Small multiples

- Saturn and its satellites



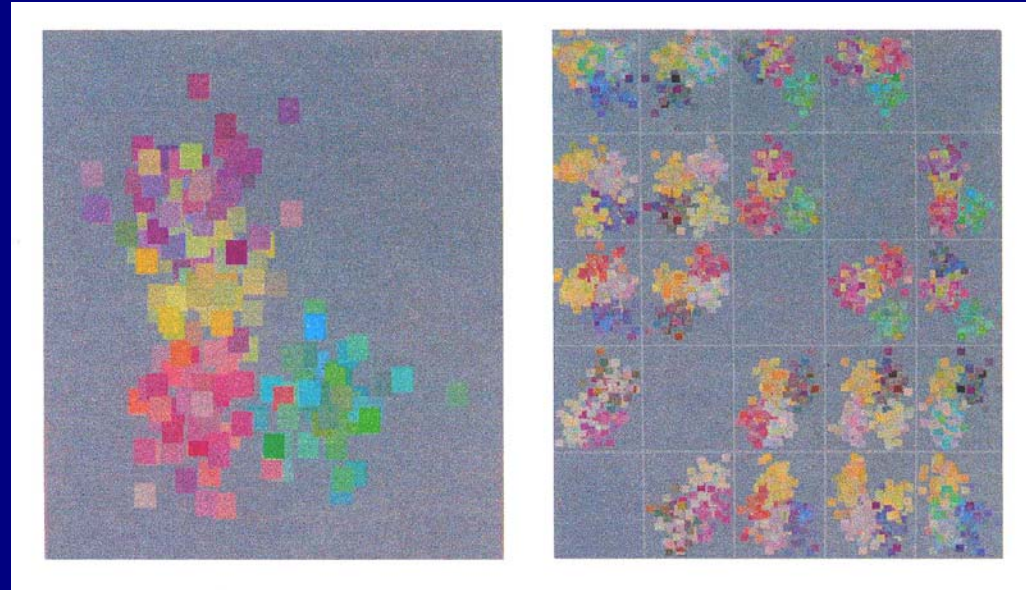
Small multiples

- Brain electrical activity



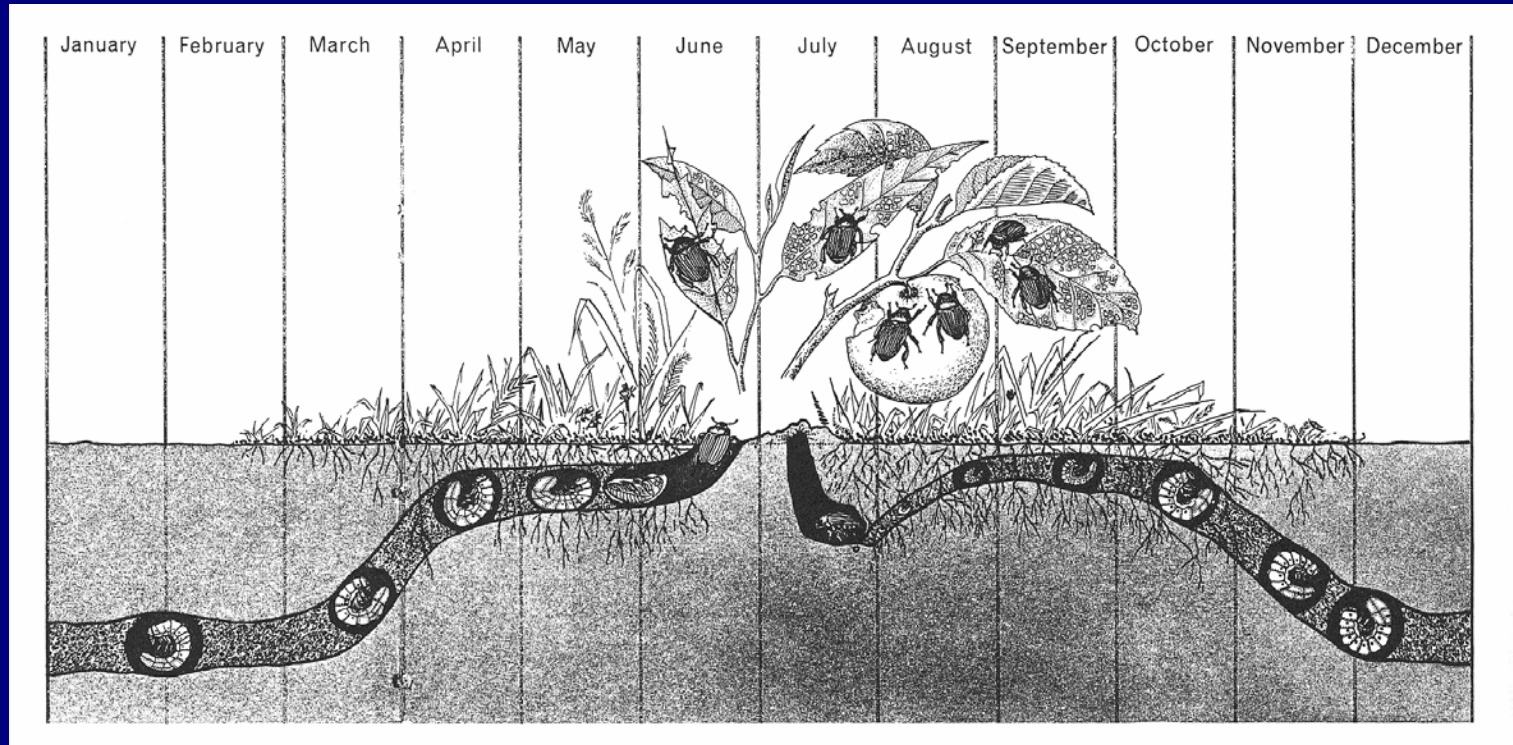
Color

- Used to identify and/or distinguish sub-group

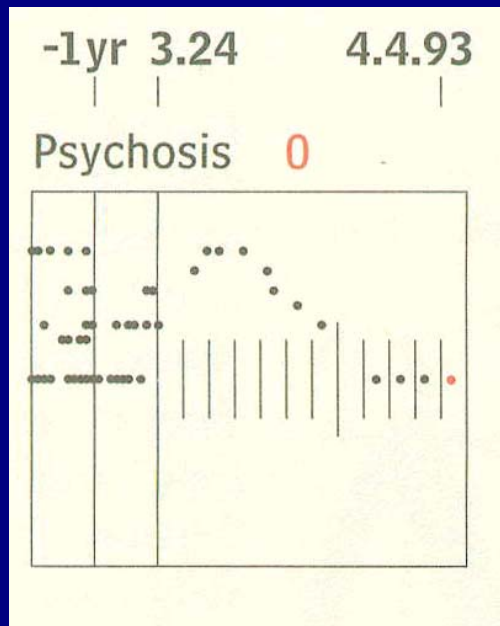


Narrative of space and time

- Japanese beetle life cycle



Example: Medical data

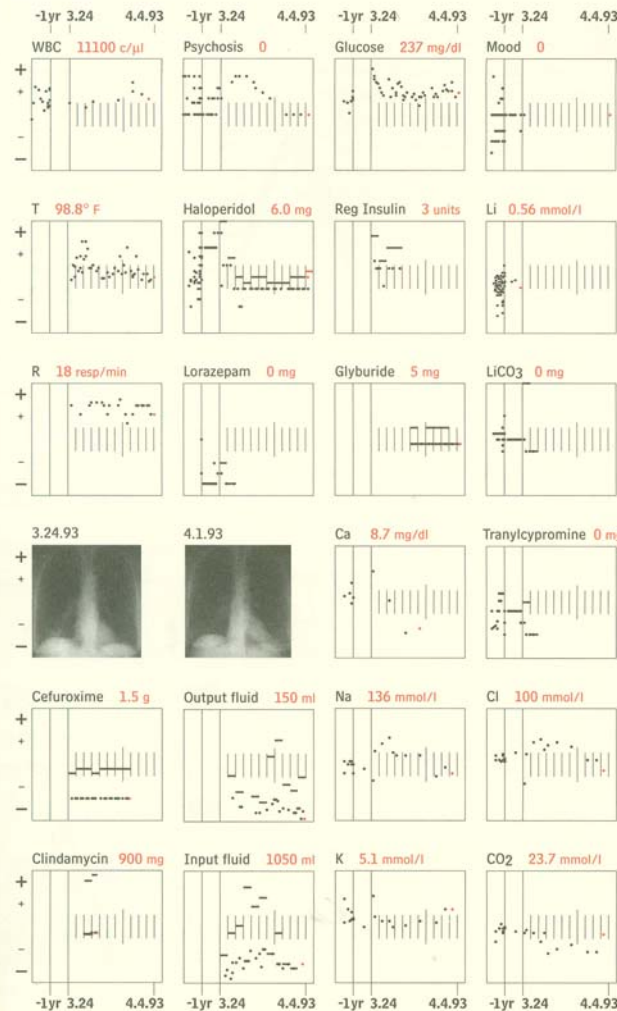


Surname, Forename M. admitted 3.24.93

Right lower lobe pneumonia, hallucinations, new onset diabetes,
history of manic depressive illness

4.4.93

7-South, Bed 5



Discharge. PB MD 1200 4.4.93

No delirium. JT MD 900 4.4.93

Enema given. PAC RN 1100 4.3.93

Will treat for probable constipation.
MBM 2245 4.2.93

Vomited three times. RW RN 2230 4.2.93

Left lower lobe infiltrate or atelectasis.
AL MD 1500 4.2.93

Alert and oriented. No complaints.
PAC RN 1100 4.1.93

Attending to activities of daily living.
PAC RN 1100 3.31.93

Ambulates with assistance. Weak.
PAC RN 1400 3.30.93

Still coughing. Breath sounds
diminished at right base.
PB MD 1000 3.30.93

Discontinued sitters. MM RN 1500 3.29.93

Follows directions. DB RN 1500 3.28.93

More relaxed. CM RN 700 3.28.93

Drowsy and sleeping. MT RN 2130 3.27.93

Out of restraints. JMT MD 1330 3.27.93

Left conjunctivitis; treat with garamycin
drops. DJS MD 1230 3.27.93

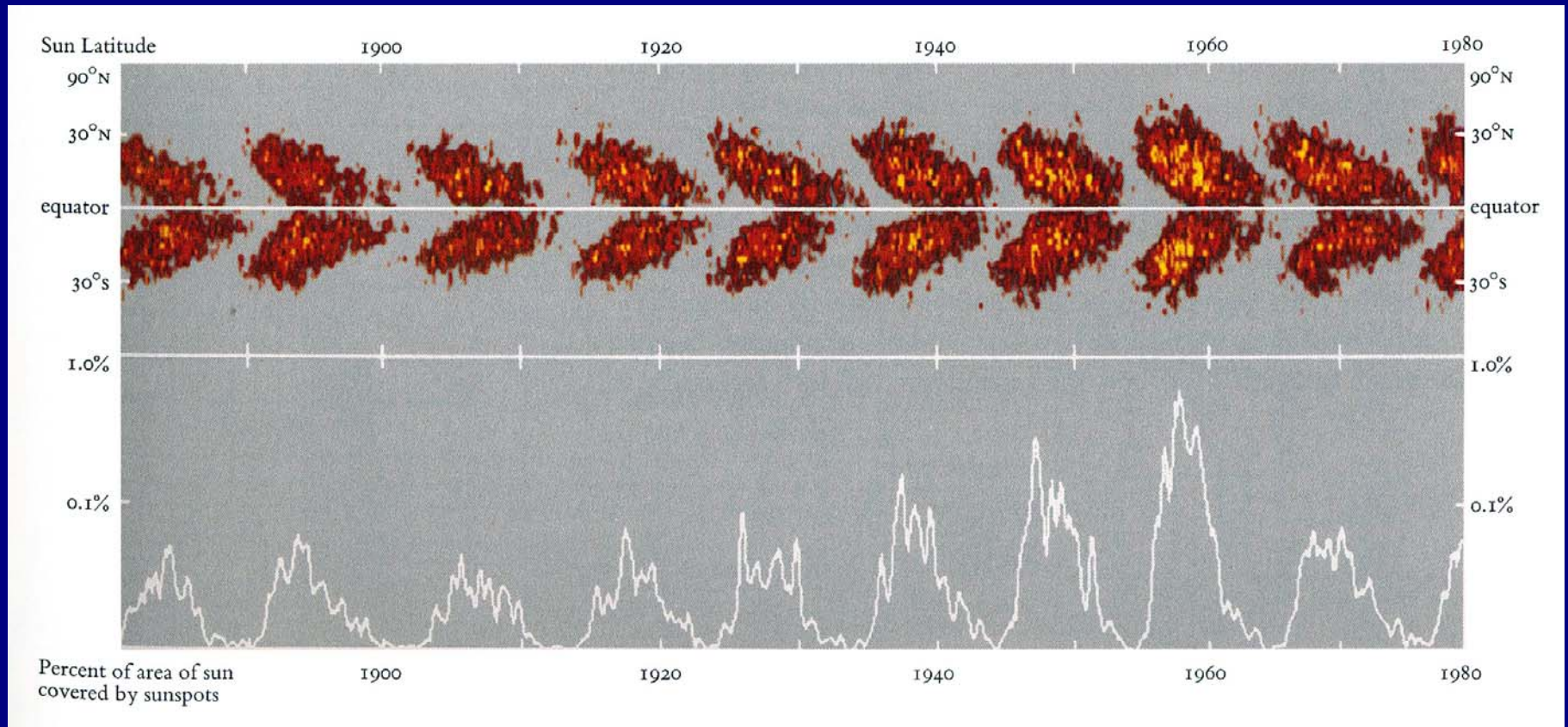
4-point restraints and sitter needed.
PM RN 1500 3.26.93

4-point restraints required. Delirious.
Switching to half normal saline for
hydration. Parathyroid hormone test
results pending. LMG MD 930 3.26.93

Pulled out IV twice. Hallucinating.
Attempted to drink call light.
CM RN 700 3.26.93

Next screen

Example: sunspots



Interaction

- Very important for the discovery process
 - Visage [Lucas 96]
 - FilmFinder [Ahlberg 94]
 - TableLens [Rao 95]