Uni Studies 3:
The Visual Display of Quantitative Information: Graphical Excellence

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Uni Stu 3 Fall 2012

The Visual Display of Quantitative Information

- Graphical Excellence
  - is the well-designed presentation of interesting data
    - substance
    - statistics
    - design

The Visual Display of Quantitative Information

- Graphical Excellence
  - consists of complex ideas communicated with
    - clarity
    - precision
    - efficiency

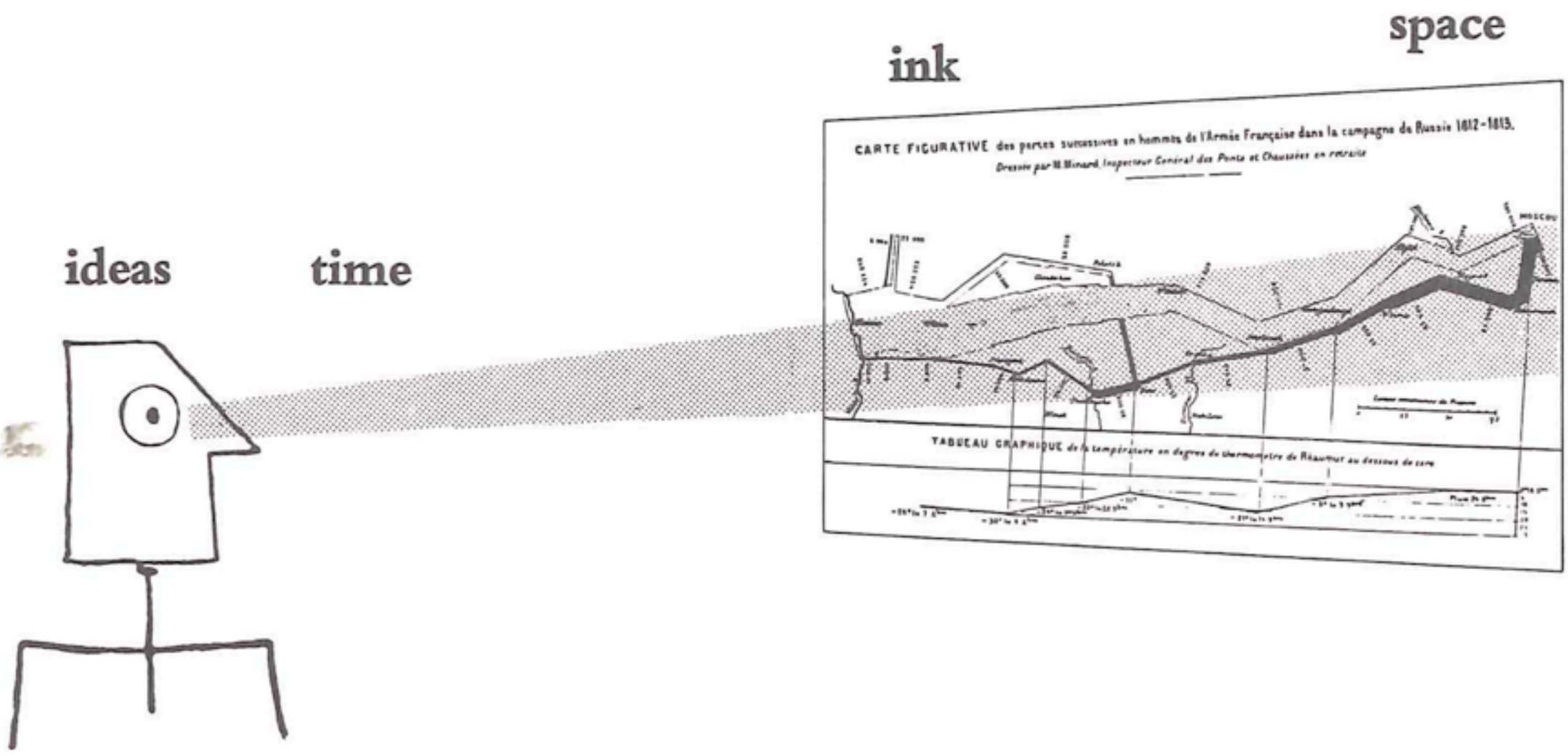
The Visual Display of Quantitative Information

- Graphical Excellence
  - is that which gives the viewer
    - the greatest number of ideas
    - in the shortest time
    - with the least ink

The Visual Display of Quantitative Information

- Graphical Excellence
  - is nearly always multivariate
  - requires telling the truth about the data

The Visual Display of Quantitative Information



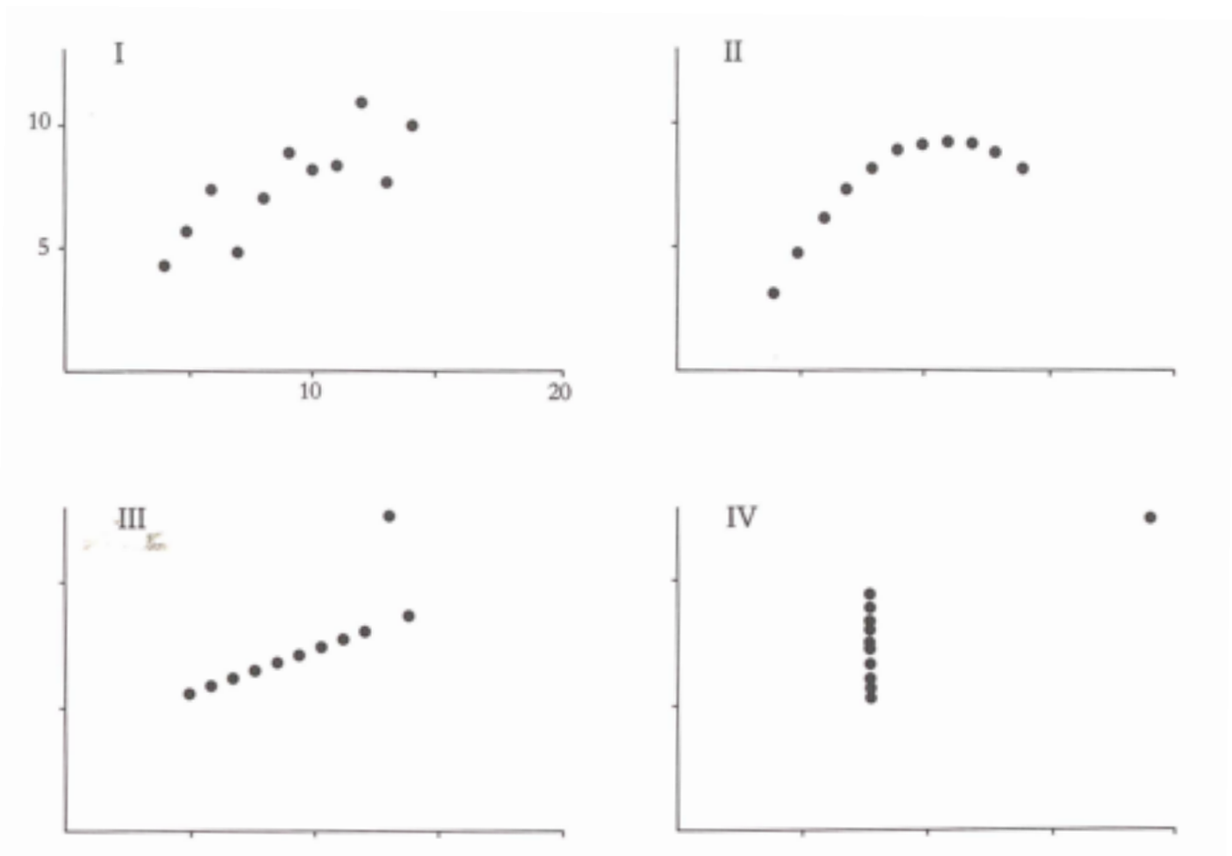
The Visual Display of Quantitative Information

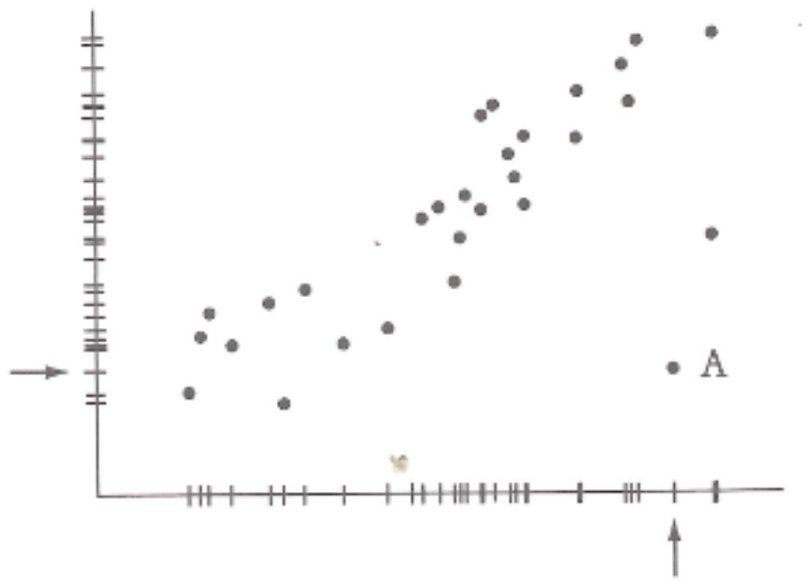
- Why graphical representations at all?
  - reveal data
  - precisely
  - in large quantity
  - leveraging the visual part of our brains

The Visual Display of Quantitative Information

I		II		III		IV	
X	Y	X	Y	X	Y	X	Y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

N = 11
mean of X's = 9.0
mean of Y's = 7.5
equation of regression line: Y = 3 + 0.5X
standard error of estimate of slope = 0.118
t = 4.24
sum of squares $X - \overline{X} = 110.0$
regression sum of squares = 27.50
residual sum of squares of Y = 13.75
correlation coefficient = .82
$r^2 = .67$





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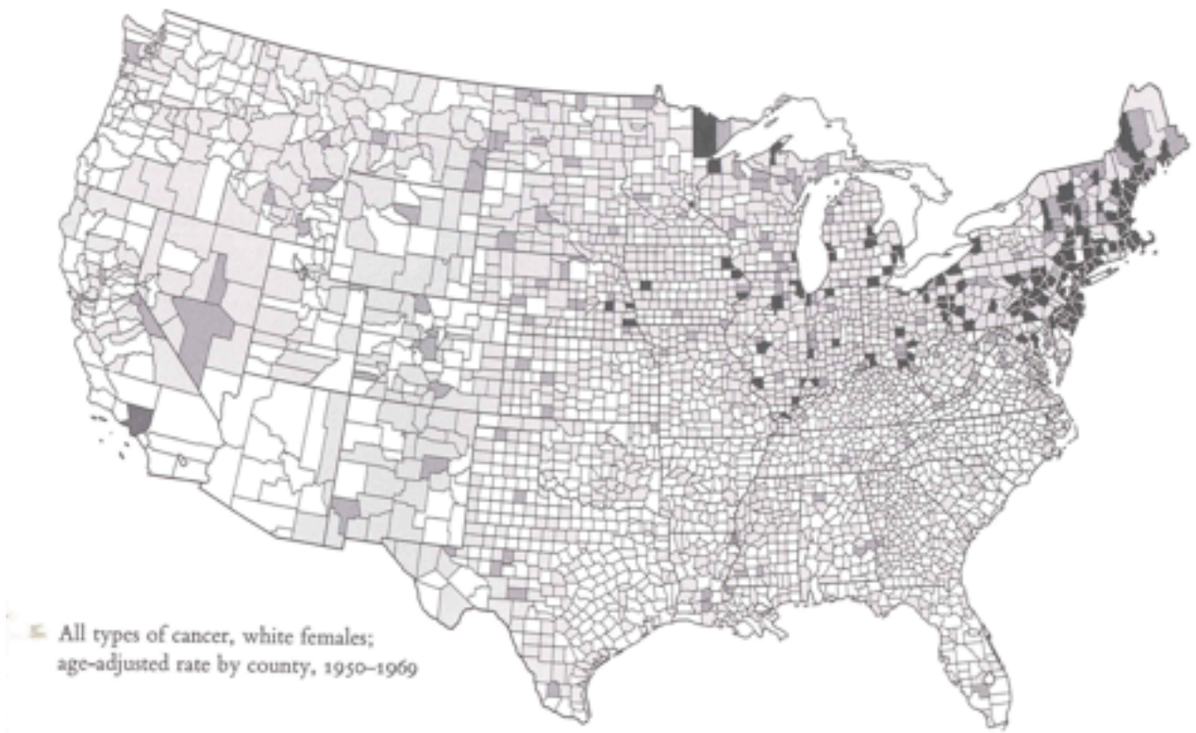
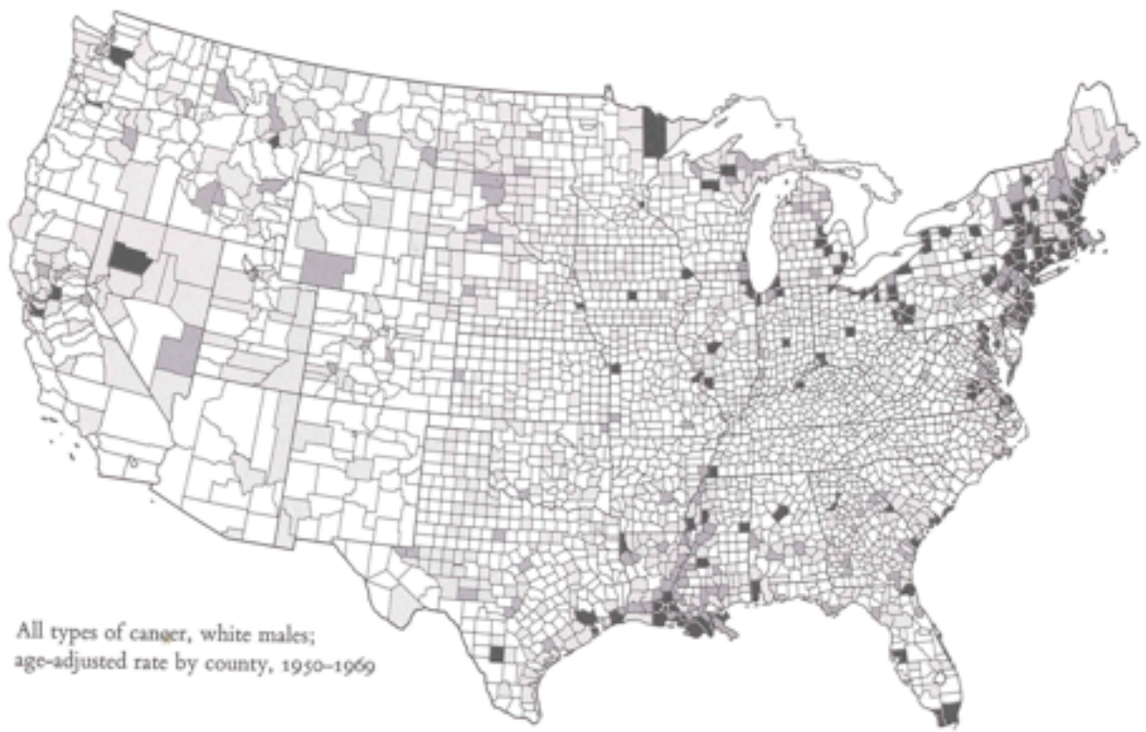


All types of cancer, white females;
age-adjusted rate by county, 1950–1969



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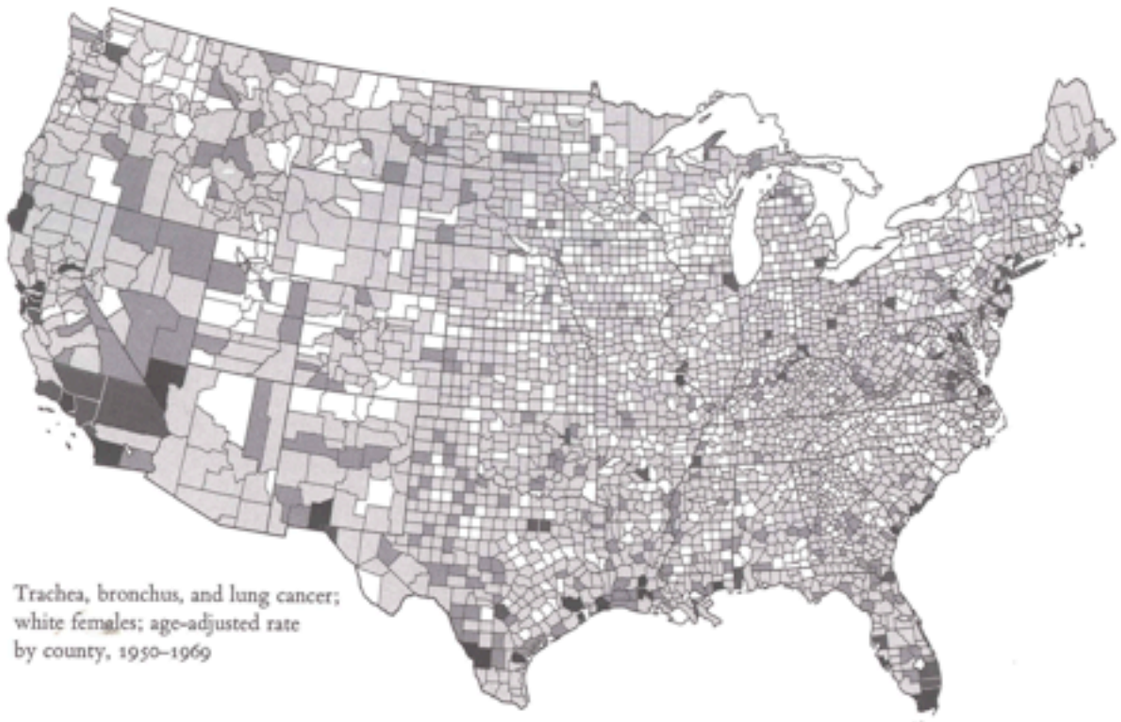
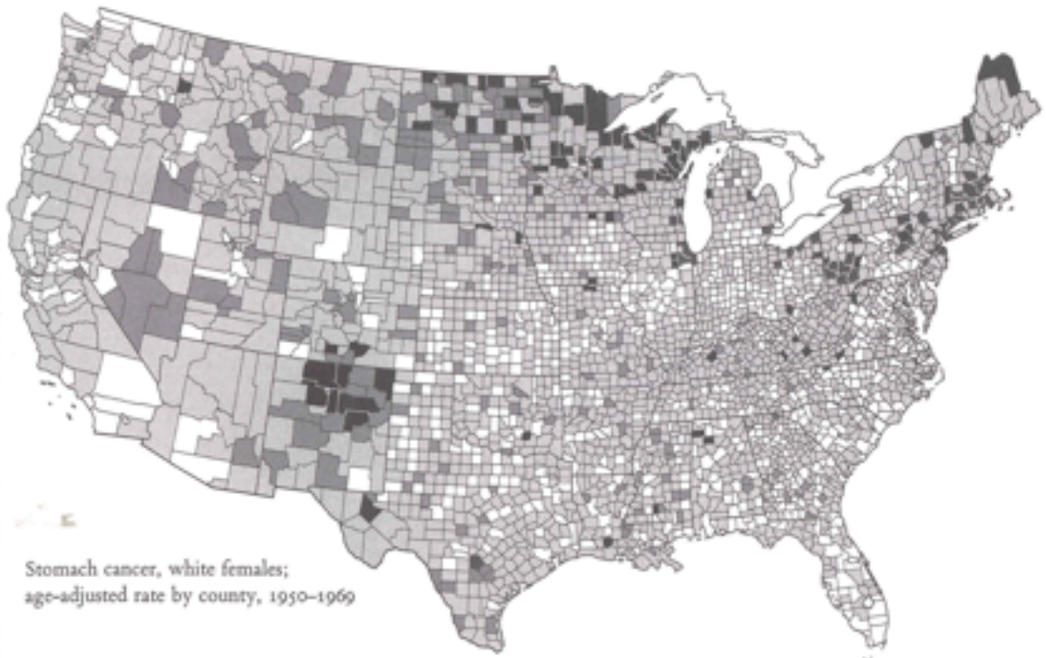
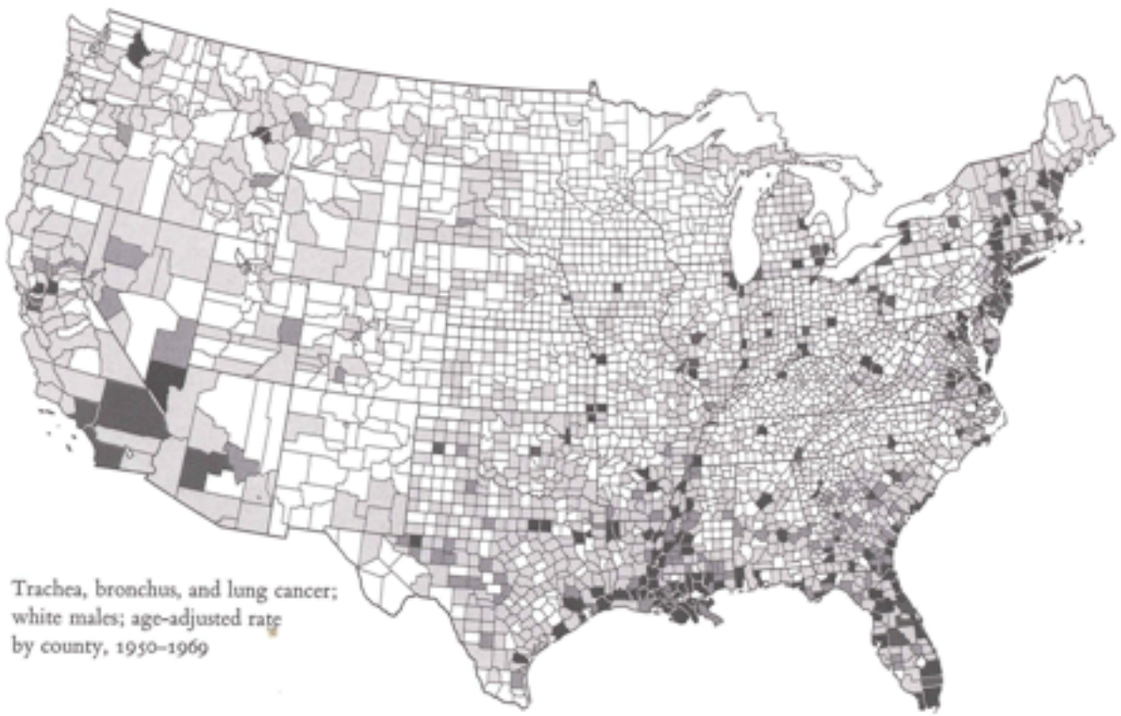


Trachea, bronchus, and lung cancer;
white females; age-adjusted rate
by county, 1950–1969



Stomach cancer, white females;
age-adjusted rate by county, 1950–1969



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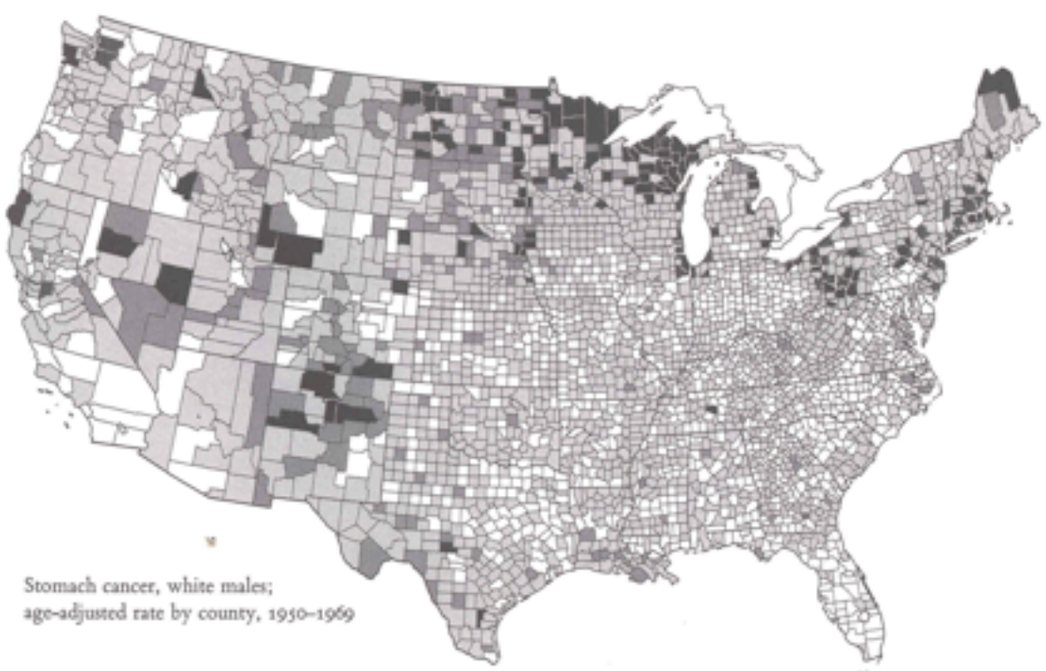

Stomach cancer, white males;
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The Visual Display of Quantitative Information

- The story...
  - Infographics comes from
    - geographical representation
    - time-series representation
    - combinations
    - abstractions

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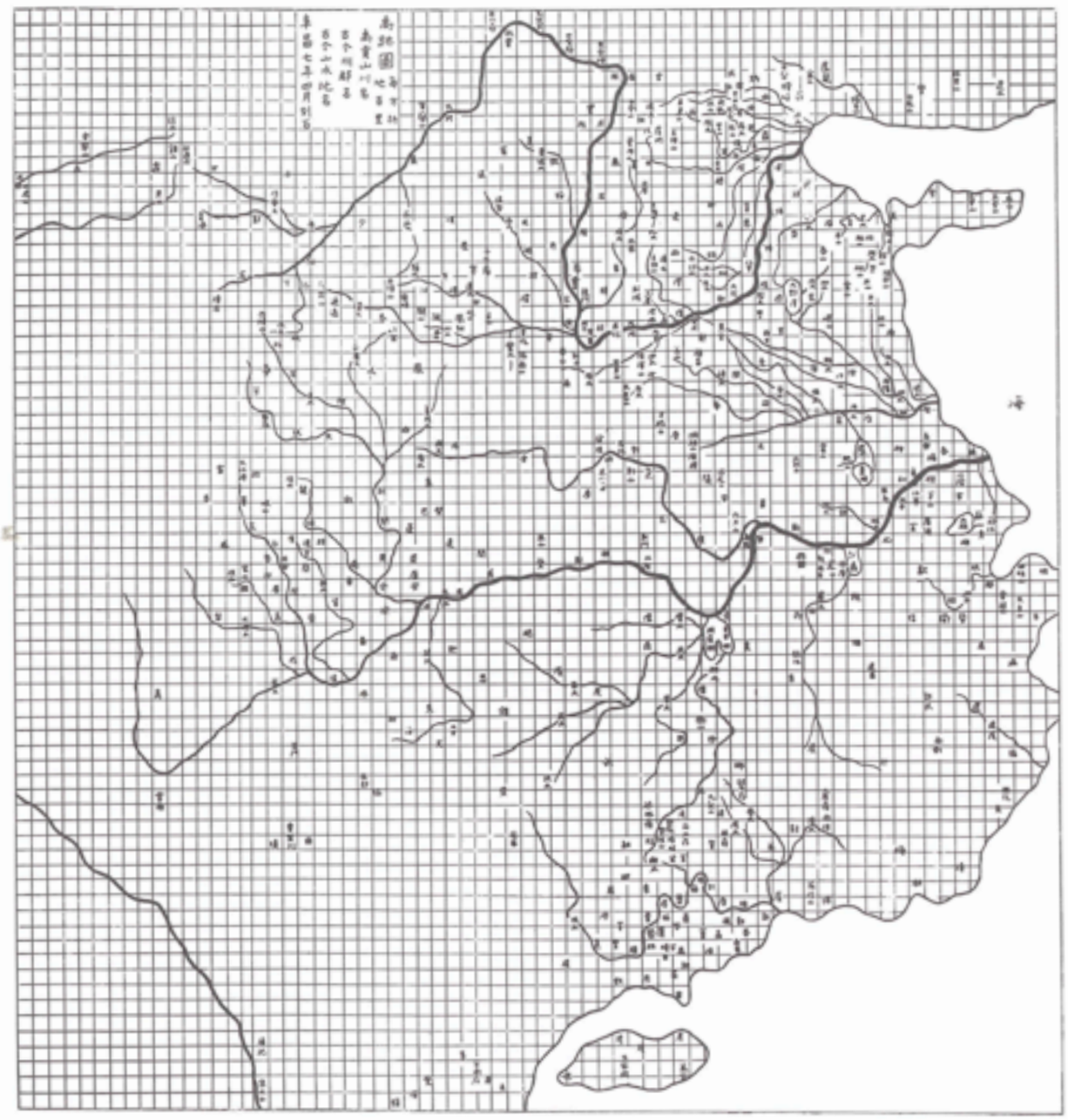

E. Chavannes, "Les Deux Plus Anciens Spécimens de la Cartographie Chinoise," *Bulletin de l'École Française de l'Extrême Orient*, 3 (1903), 1–35, Carte B.

- Data maps took a long time to be used
  - 17th century
- early Chinese map c. 1137AD
- European equivalents not until 1550

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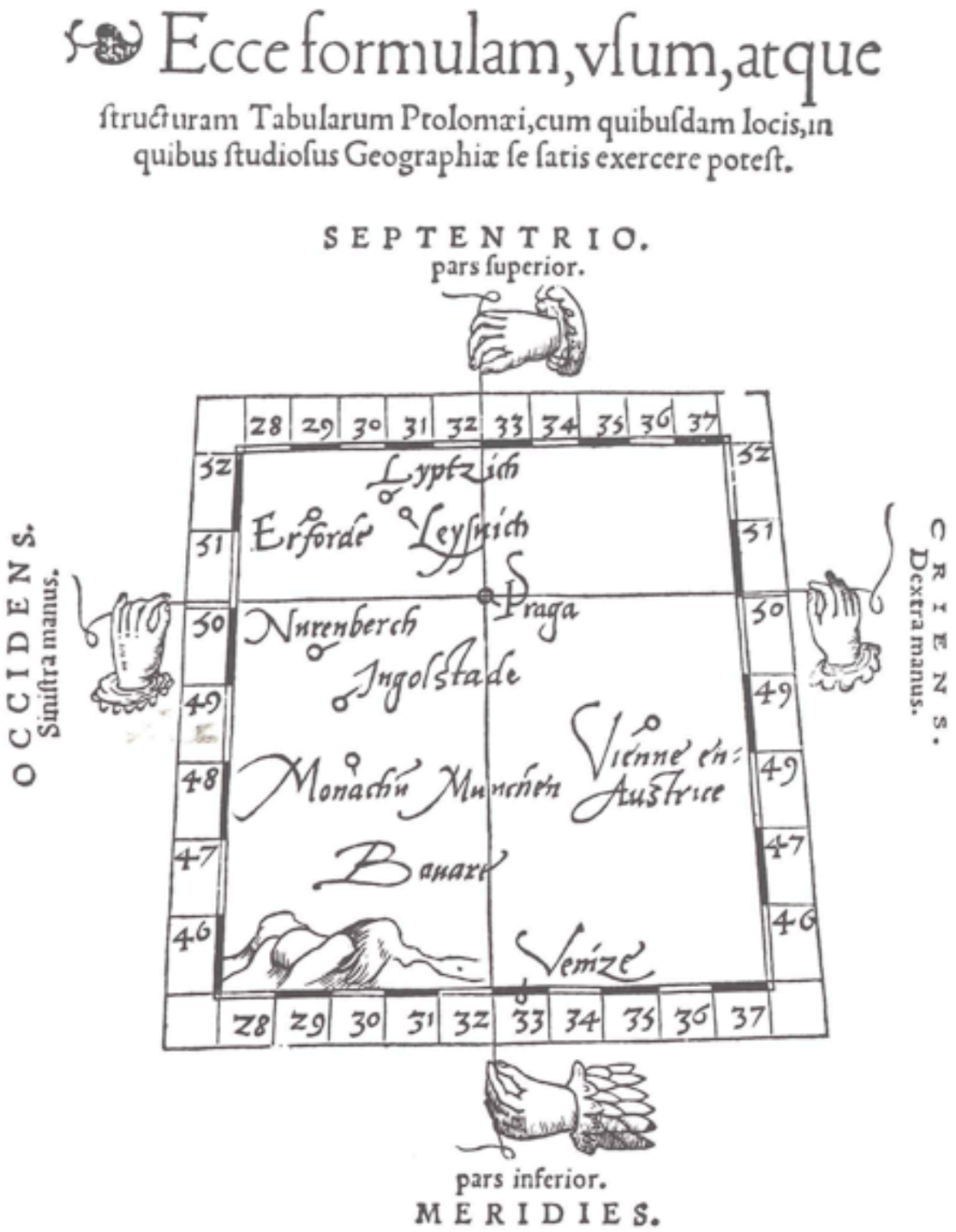

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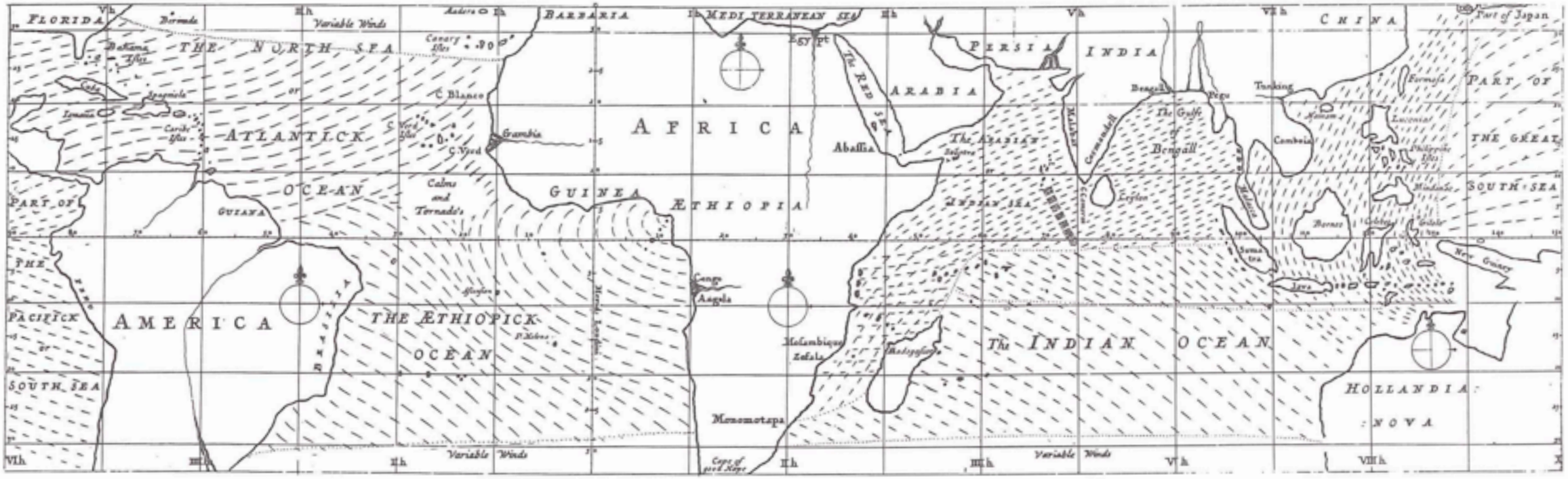

- Edmond Halley's 1686 chart showing trade winds on a world map
- data map

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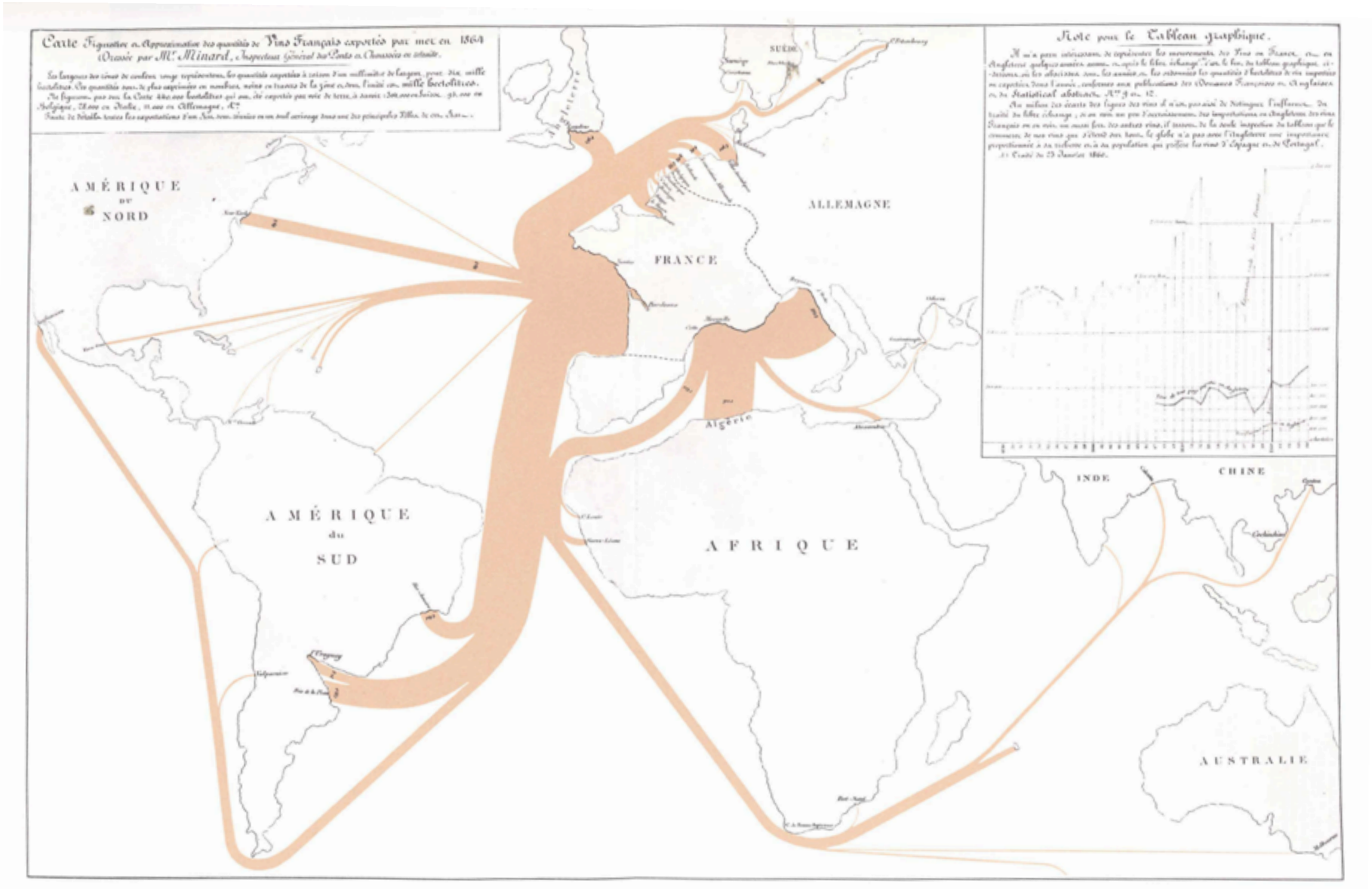
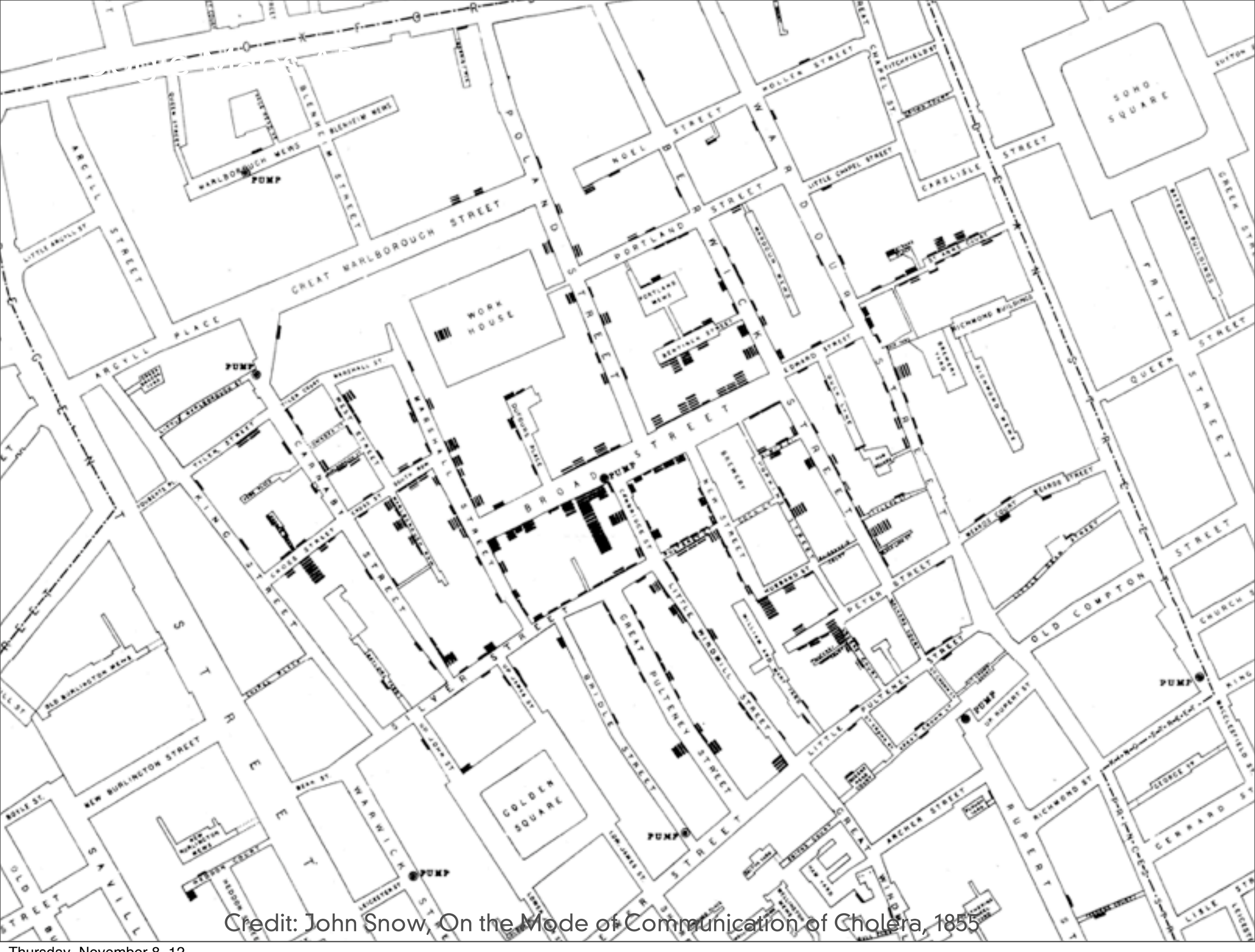


- Minard 1845
- data map



Credit: John Snow, On the Mode of Communication of Cholera, 1855

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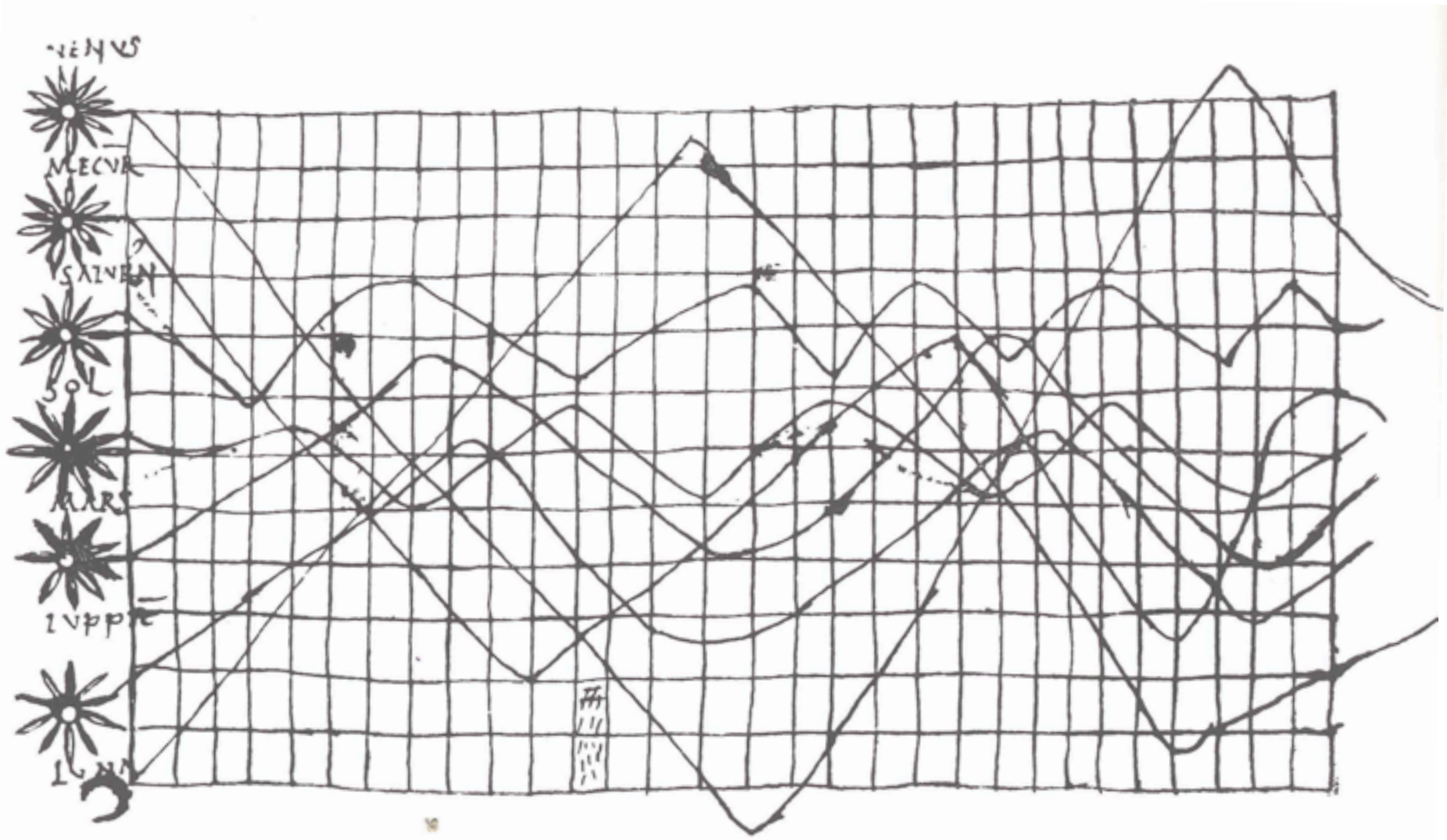

- 10th century monastic diagram of celestial bodies
- time series

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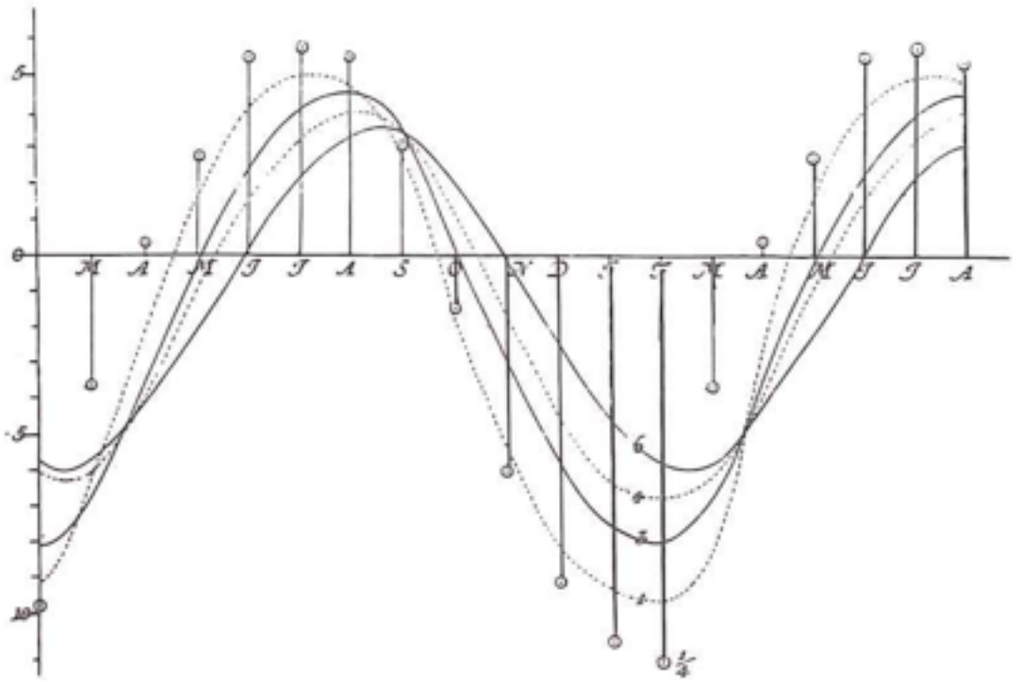
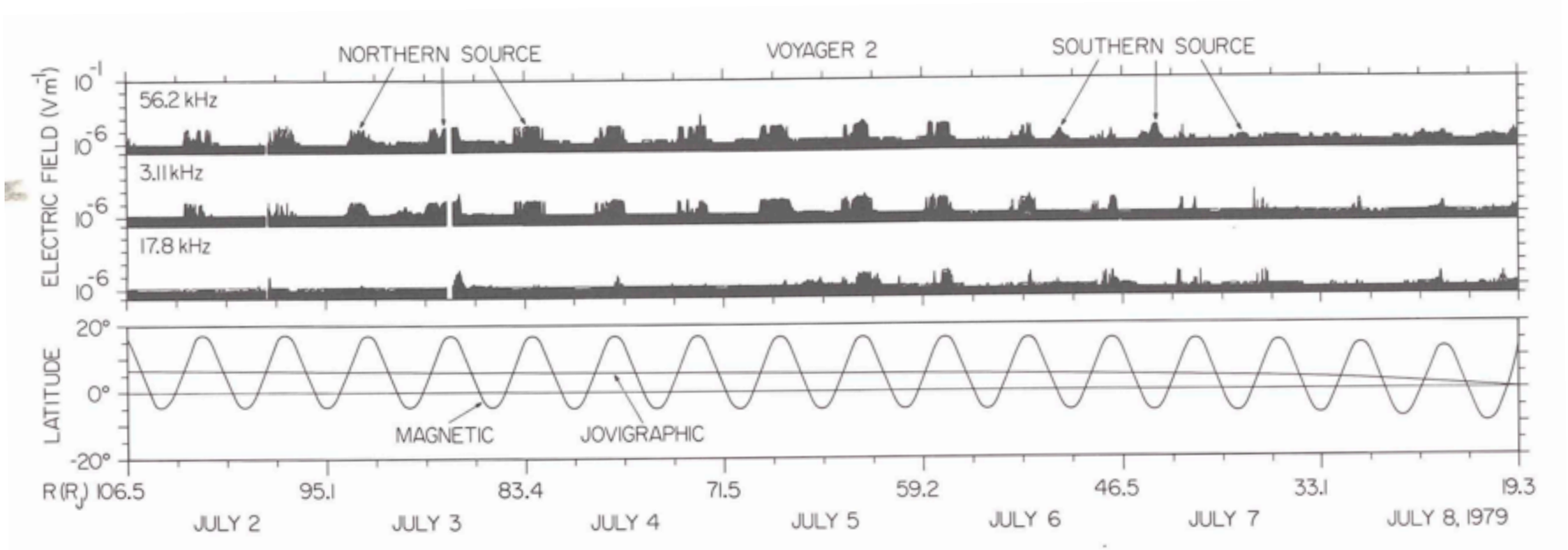


- It was not until 1700s that time-series charts began to appear in scientific writings

J. H. Lambert, *Pyrometrie* (Berlin, 1779).



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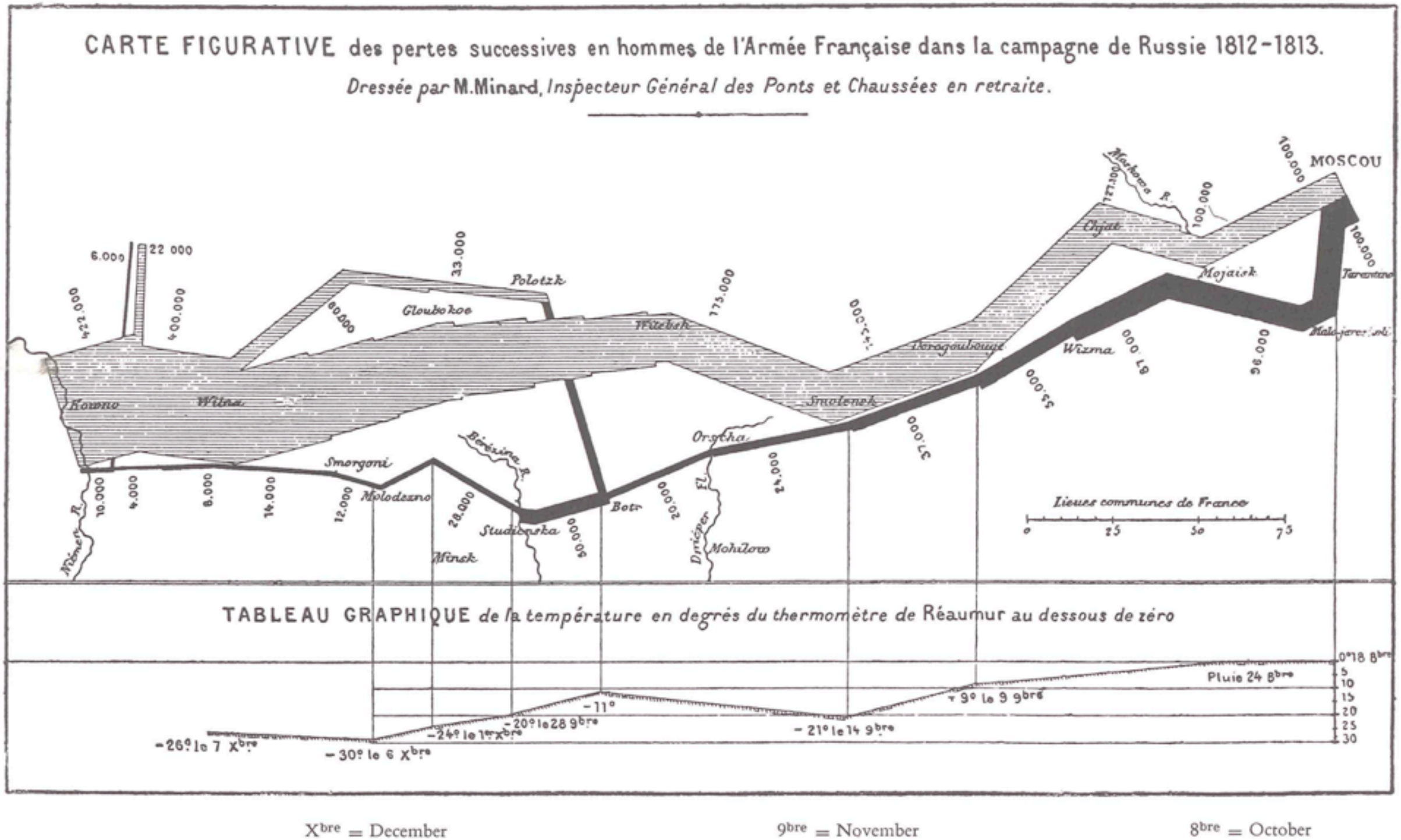

- 1861
- combination space and time

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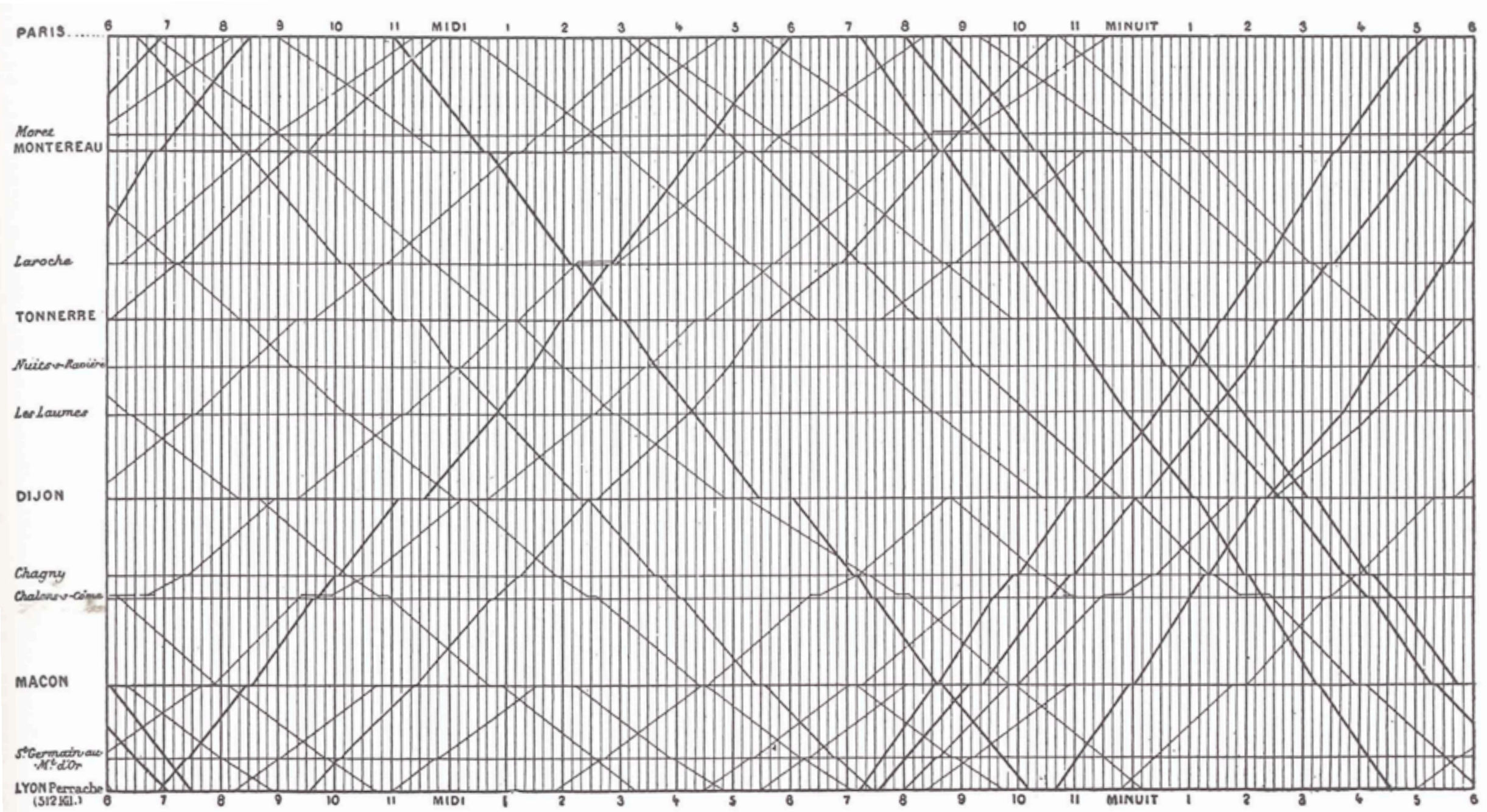

- 1885
- combination

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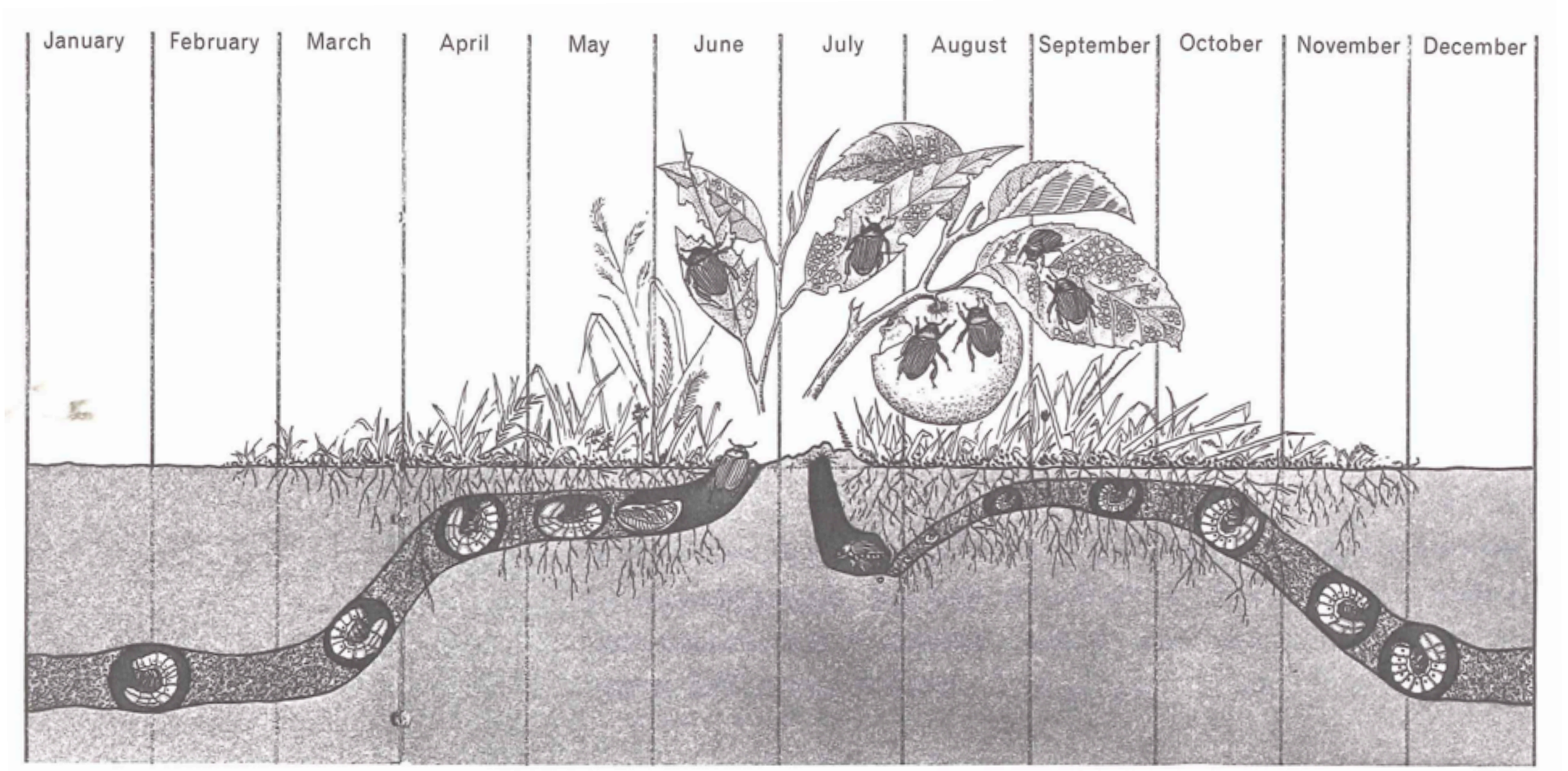

- combination

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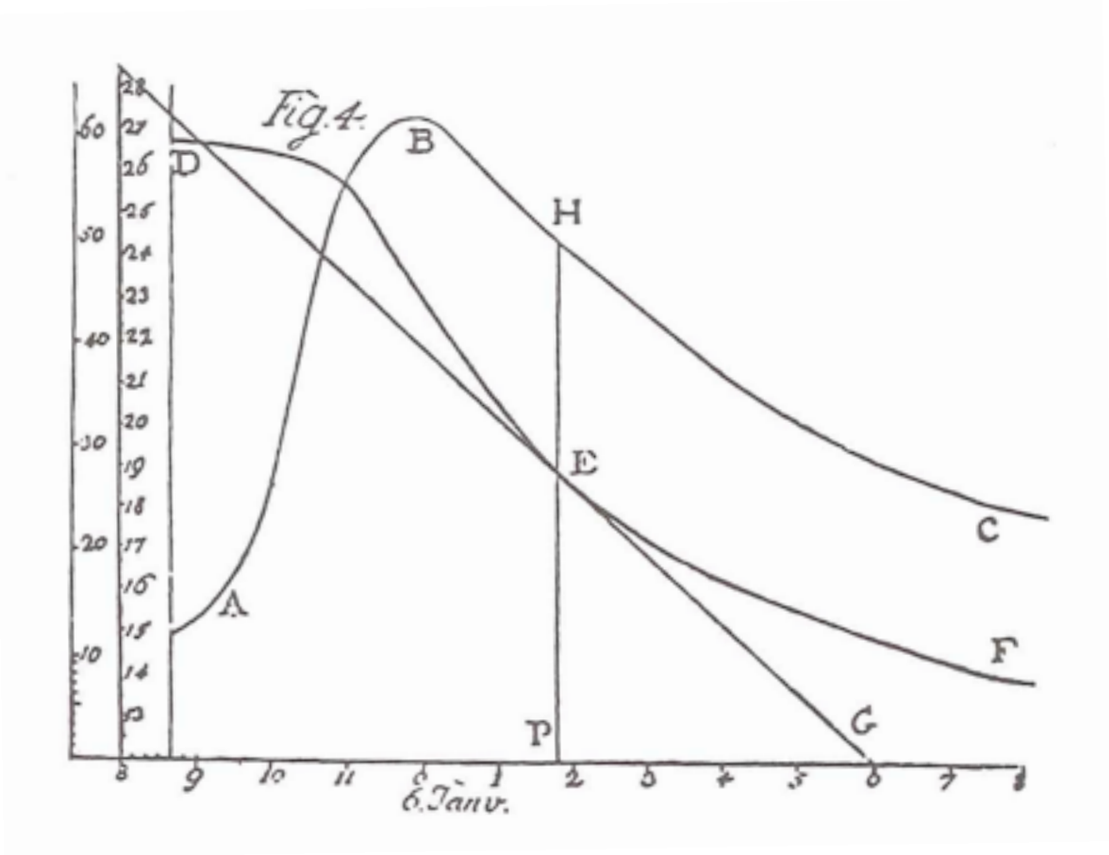

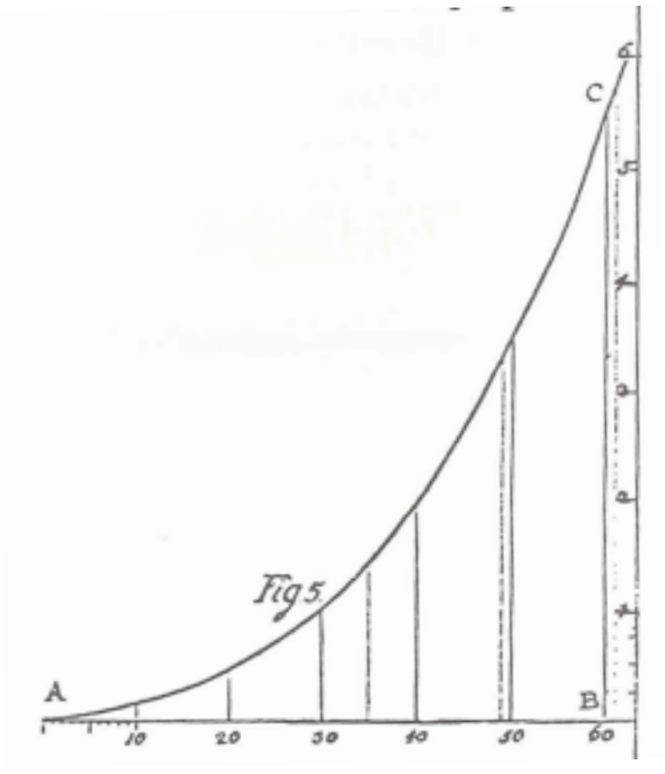

- 1765
- abstraction
- By 1800's graphical design was no longer dependent on direct analogy to the physical world. Any quantity could be placed in relationship to any other variable quantity. [Infographics] became relevant to all quantitative inquiry.

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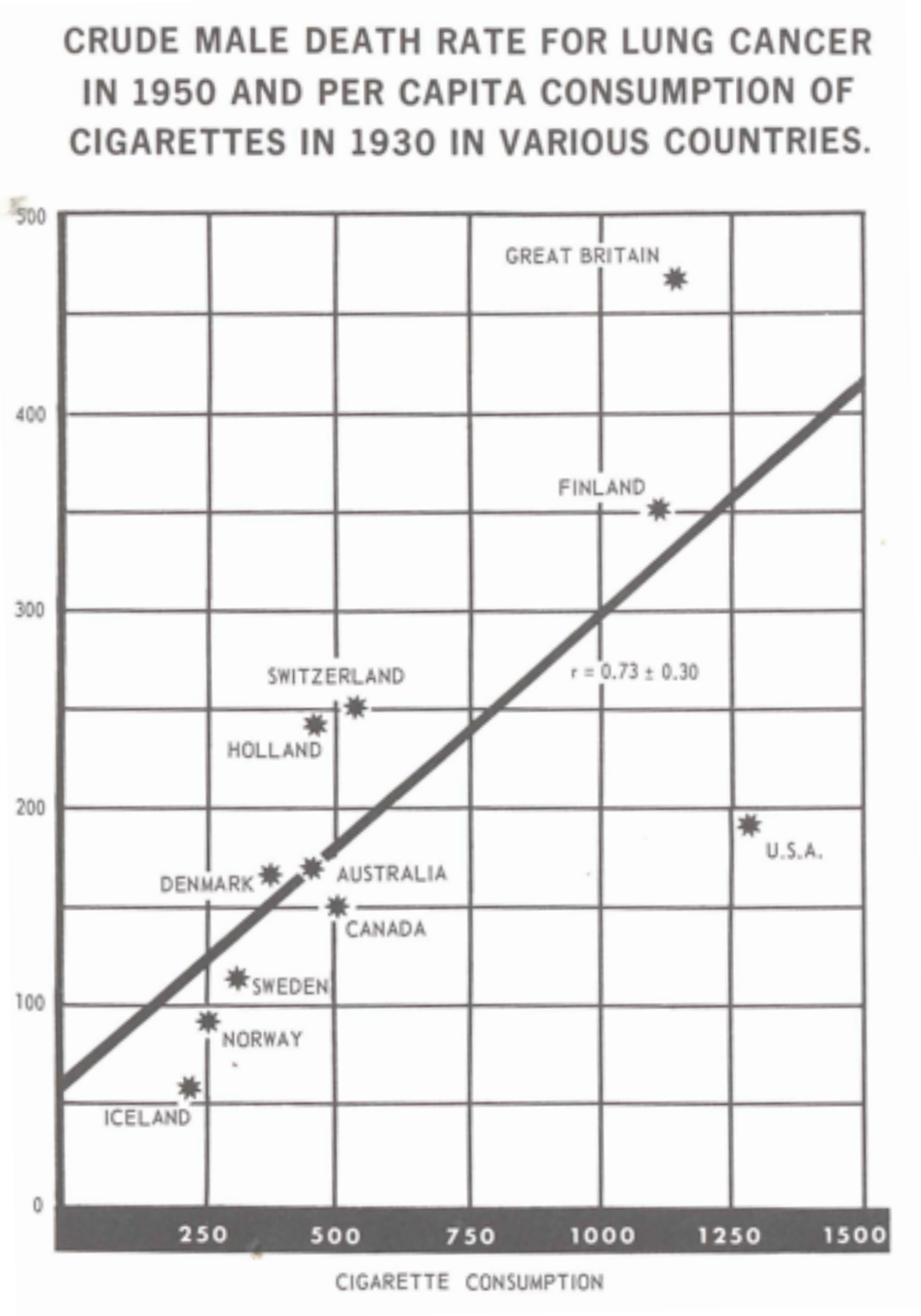
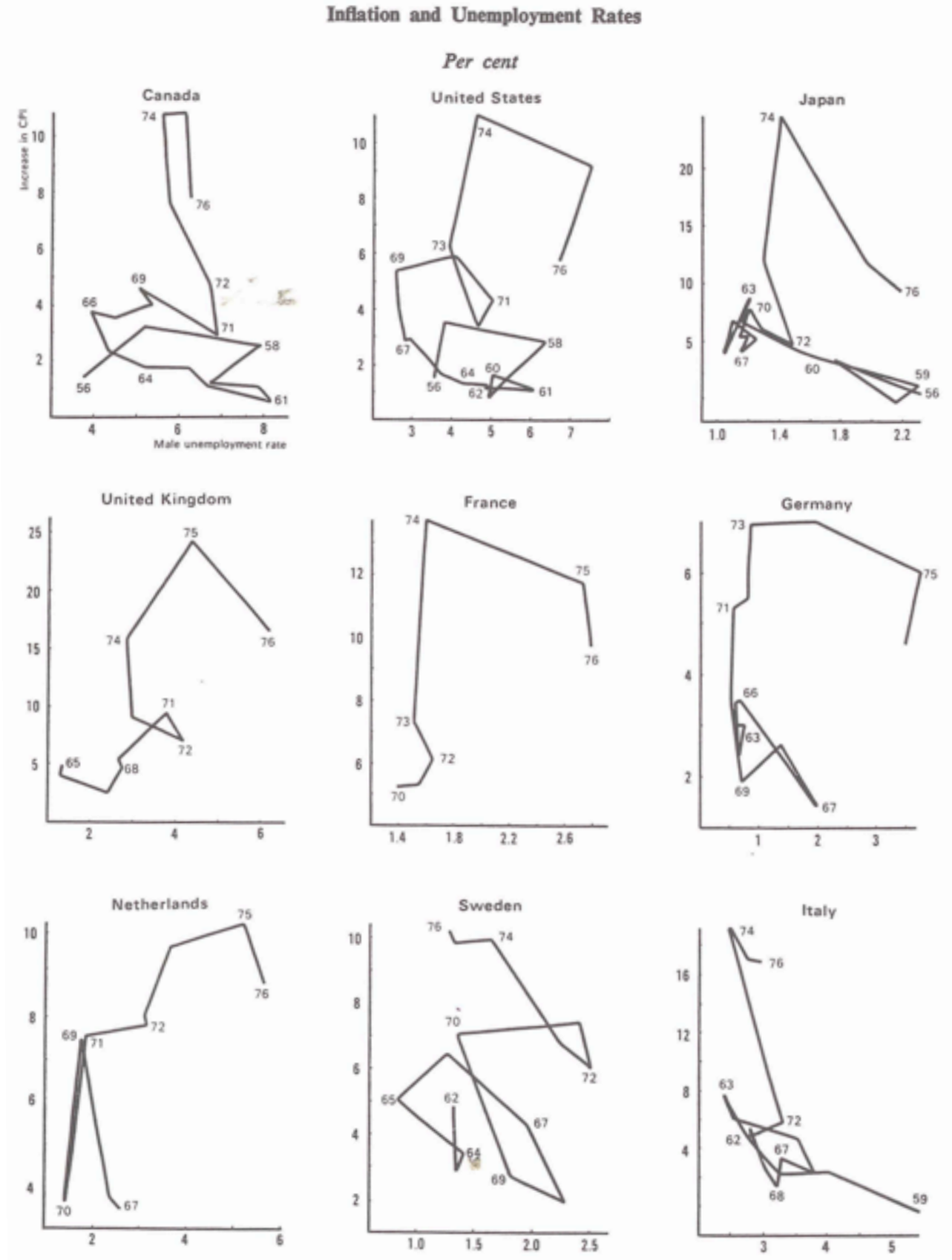
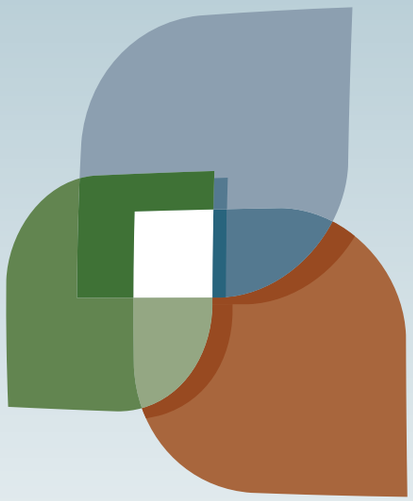


- Support and deny causal relationships





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