

Graphiques intelligents

Comment visualiser des statistiques de
façon convaincante et honnête

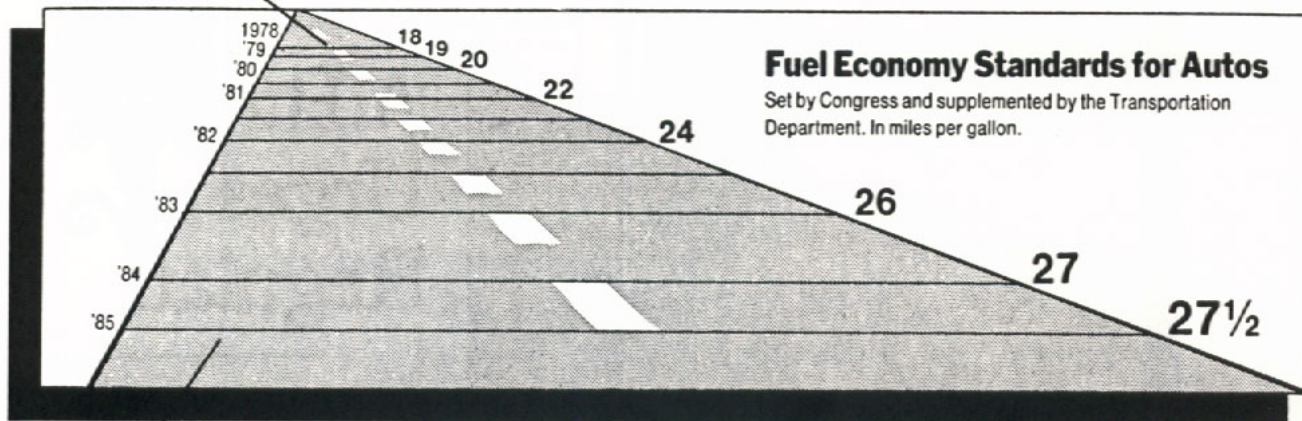
Edward R. Tufte

- The Visual Display of Quantitative Information
- 1983 et toujours d'actualité

Lie factor

- Lie factor = taille de l'effet montré sur le graphique / taille de l'effet dans les données
- Mauvais exemples:
 - Fuel Economy Standards for Autos $LF=14,8$
 - In the barrel... $LF=9,4$ en aire
 - In the barrel... $LF=59,4$ en volume!

This line, representing 18 miles per gallon in 1978, is 0.6 inches long.



This line, representing 27.5 miles per gallon in 1985, is 5.3 inches long.

$$LF = 14,8$$

$$(27,5 - 18) / 18 = 53\%$$

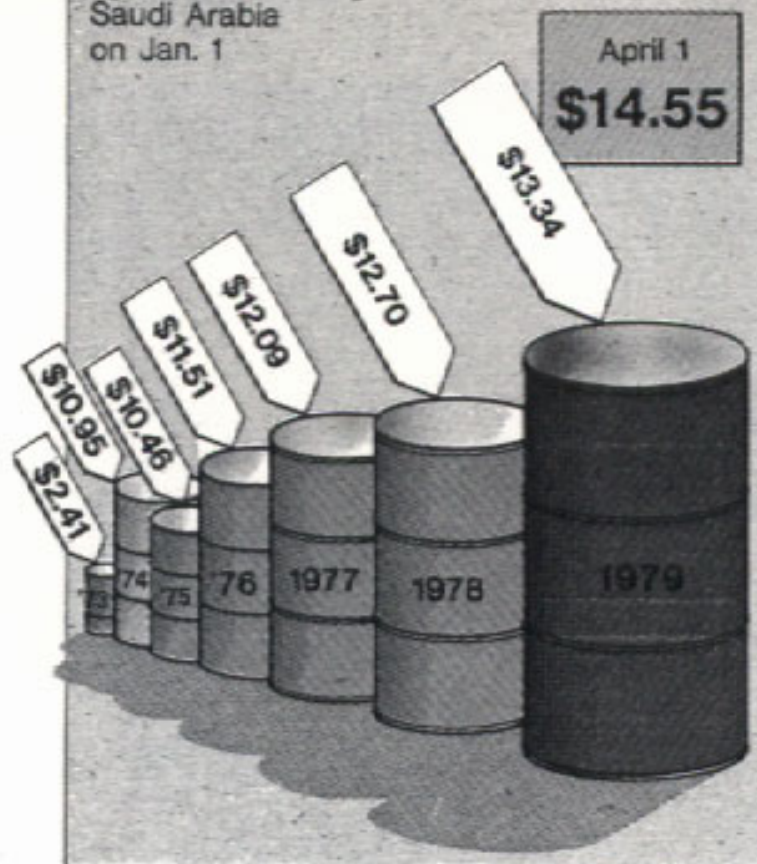
$$(5,3 \text{ po} - 0,6 \text{ po}) / 0,6 \text{ po} = 783\%$$

$$783 / 53 = 14.8$$

$$LF = 1$$

IN THE BARREL...

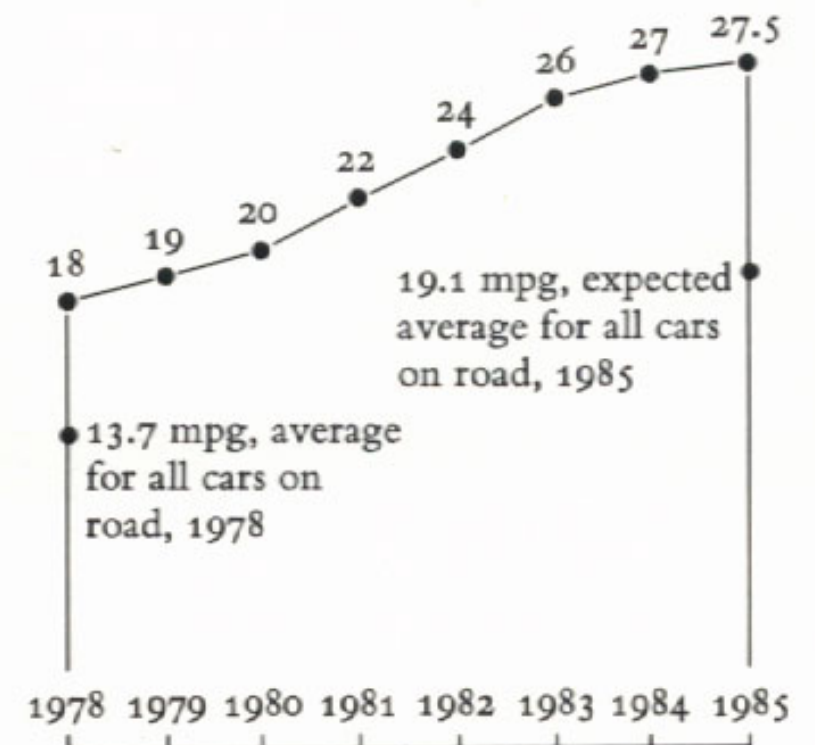
Price per bbl. of light crude, leaving Saudi Arabia on Jan. 1



$$LF_{\text{aire}} = 9,4$$

$$LF_{\text{vol}} = 59,4 !$$

REQUIRED FUEL ECONOMY STANDARDS: NEW CARS BUILT FROM 1978 TO 1985



1D versus 2D

- Éléments graphiques à 1D pour données à 1D
- Éléments graphiques à 2D pour données 2D...
- Mauvais exemple:
 - Purchasing Power of the Diminishing Dollar
- Bon exemple:
 - Service postal italien 1876 à 1881



1958 — EISENHOWER: \$1.00



1963 — KENNEDY: 94¢



1968 — JOHNSON: 83¢



1973 — NIXON: 64¢



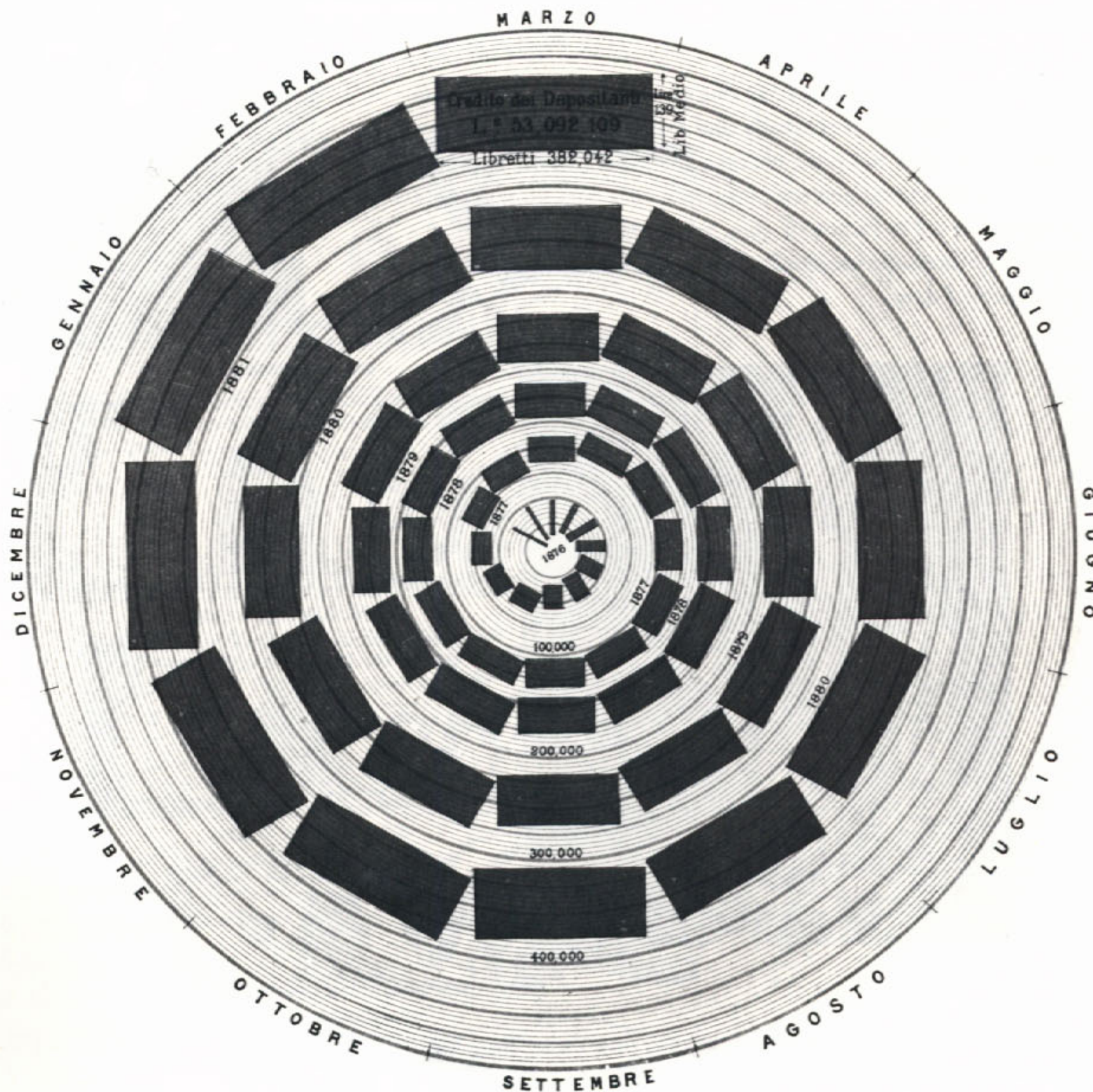
1978 — CARTER: 44¢
(August)

Purchasing
Power
of the
Diminishing
Dollar

Source: Labor Department

CASSE POSTALI DI RISPARMIO ITALIANE

Numero dei Libretti, Libretto medio e Deposito totale
al fine di ogni mese



Nombre de
comptes
ouverts

X

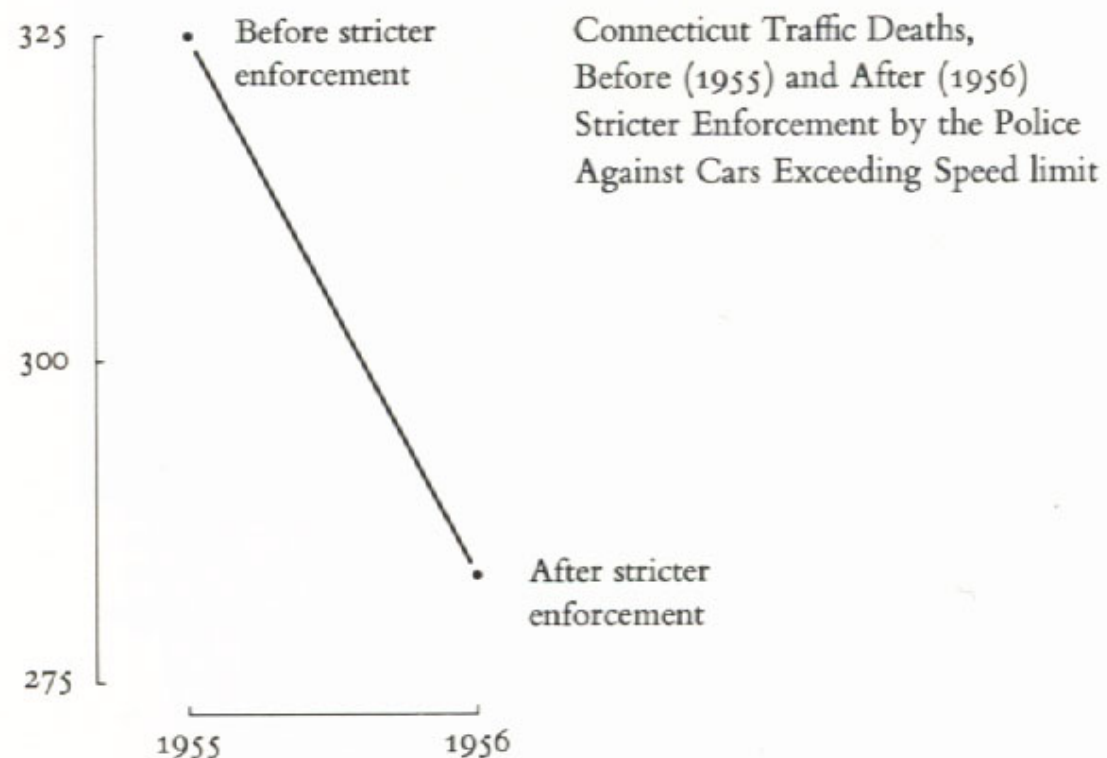
Dépôt moyen
(livres)

=

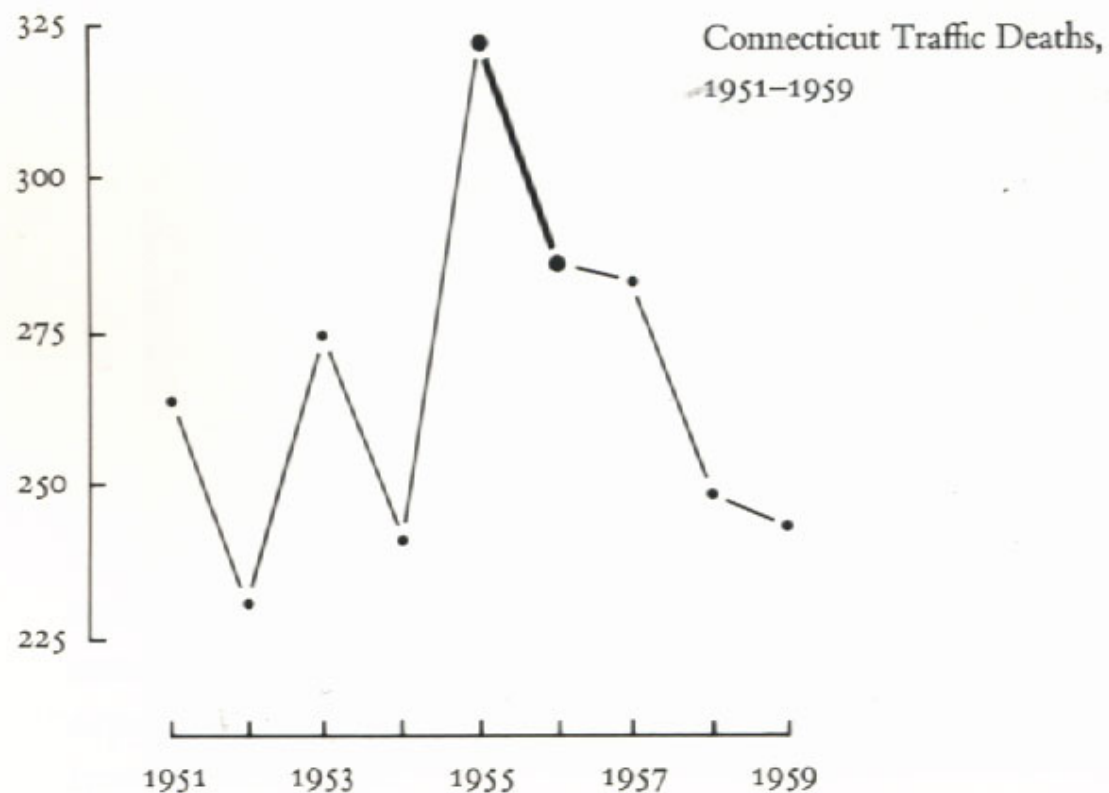
Dépôts
totaux pour
chaque mois

Contexte

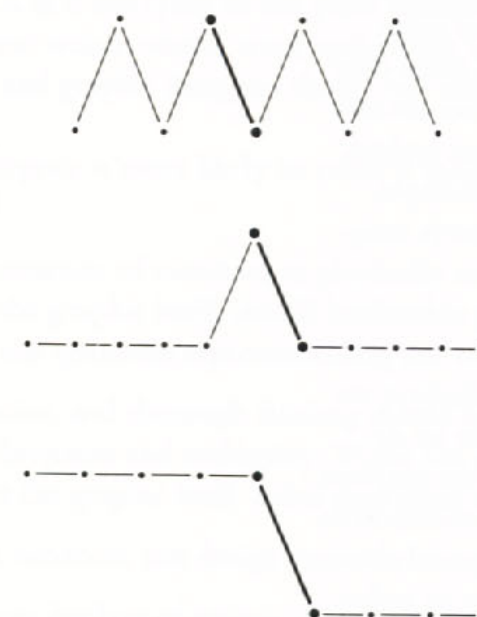
- Ne pas (trop) sortir les données de leur contexte
- Mauvais exemple:
 - Connecticut Traffic Deaths Before and After Stricter Enforcement by Police Against Cars Exceeding Speed Limit
- Bon exemple:
 - Traffic Deaths per 100,000 Persons in Connecticut, Massachusetts, Rhode Island and New York



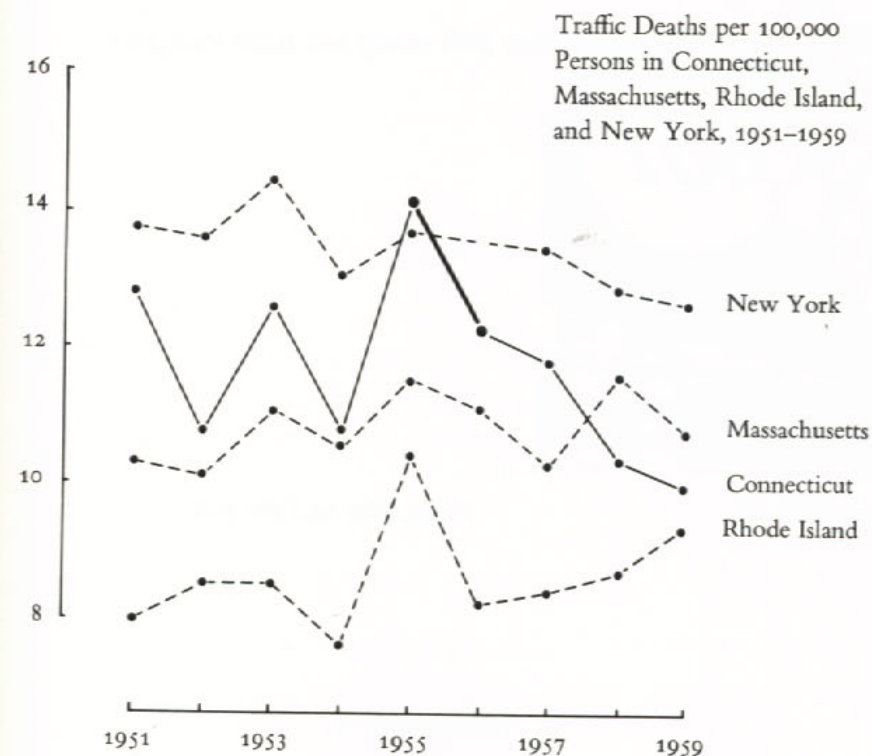
A few more data points add immensely to the account:



Imagine the very different interpretations other possible time-paths surrounding the 1955-1956 change would have:

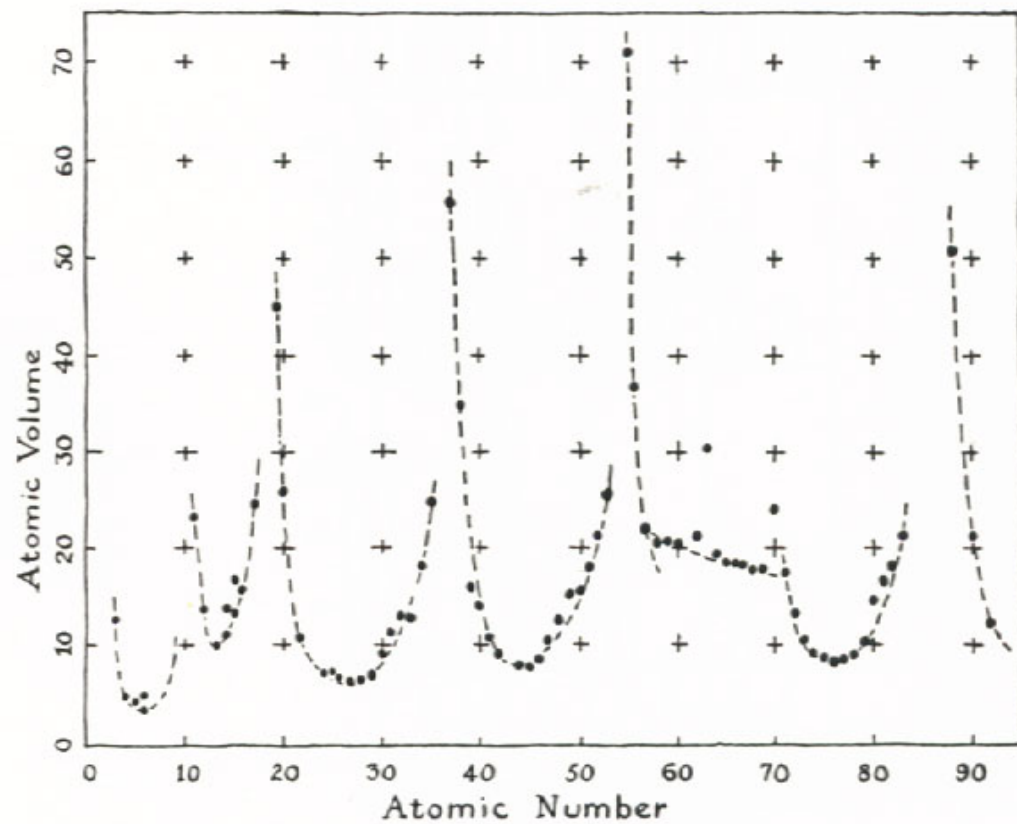


Comparisons with adjacent states give a still better context, revealing it was not only Connecticut that enjoyed a decline in traffic fatalities in the year of the crackdown on speeding:

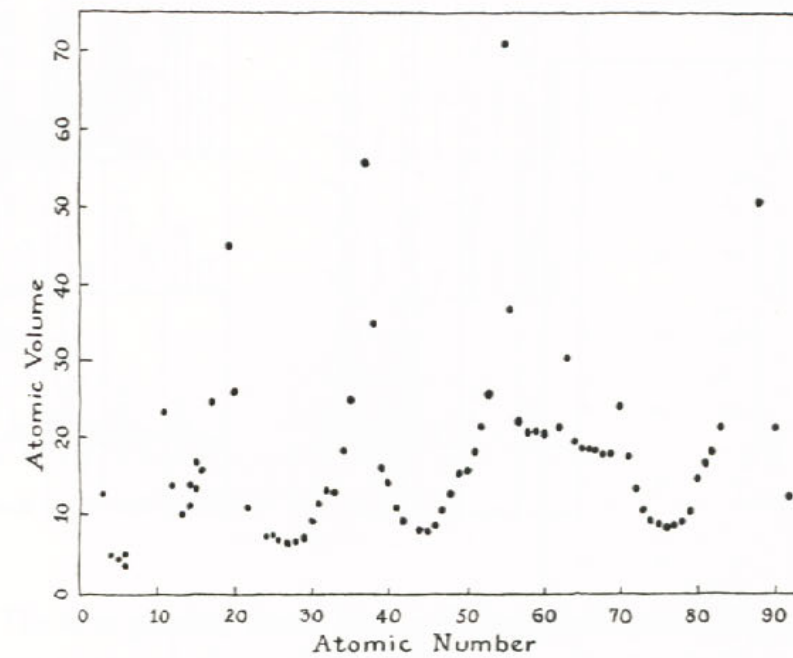


Design des graphiques

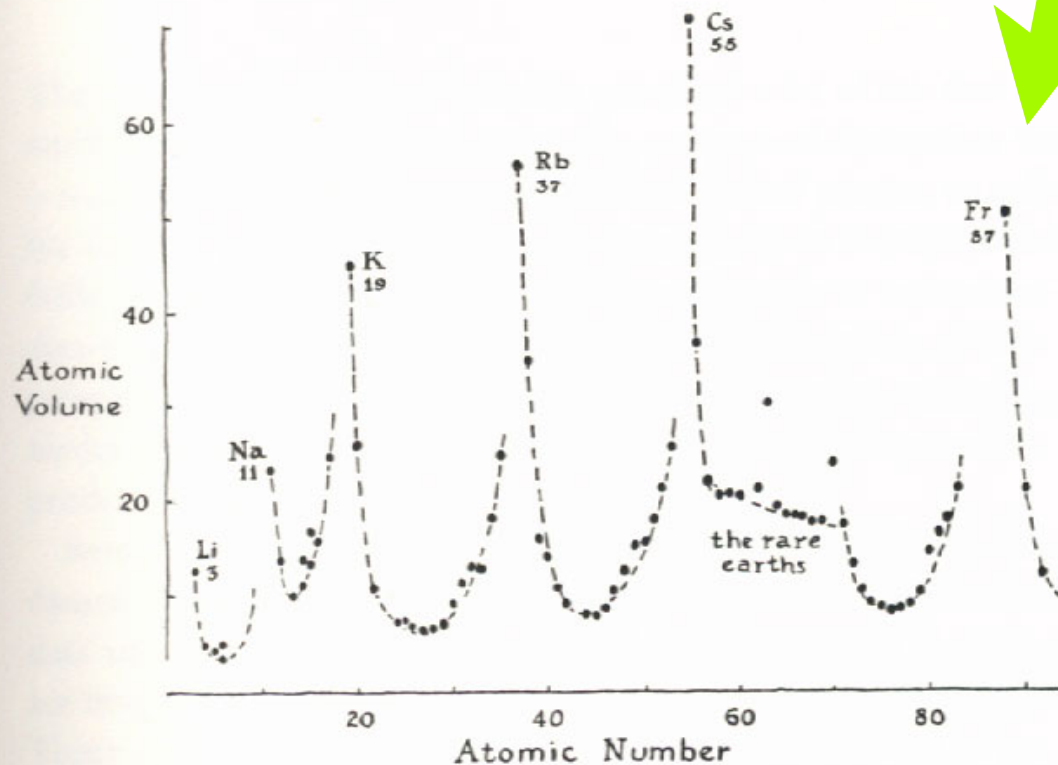
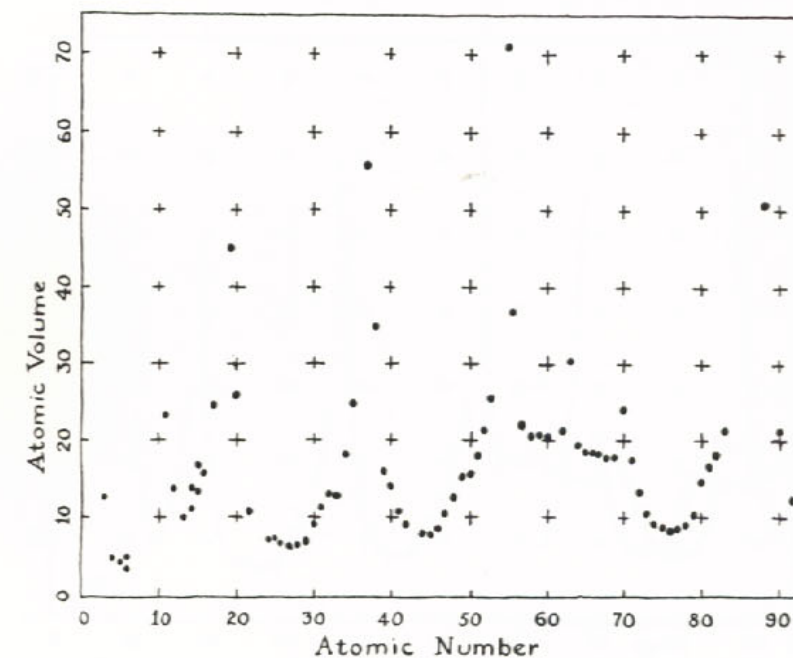
- Data-ink ratio
- $DIR = \text{encre utilisée pour montrer les données} / \text{utilisation totale d'encre pour le graphique}$
- Réduire l'utilisation des grilles
- Demi visage de Chernoff
- Demi box-plot / parallel schematic plot

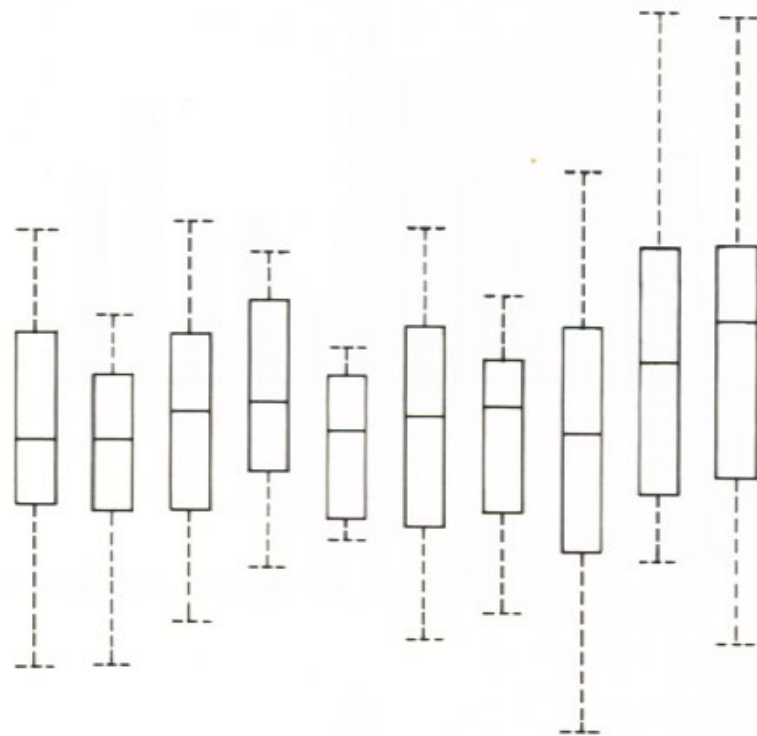


The reference curves prove essential for organizing the data to show the periodicity. The curves create a structure, giving an ordering, a hierarchy, to the flow of information from the page:

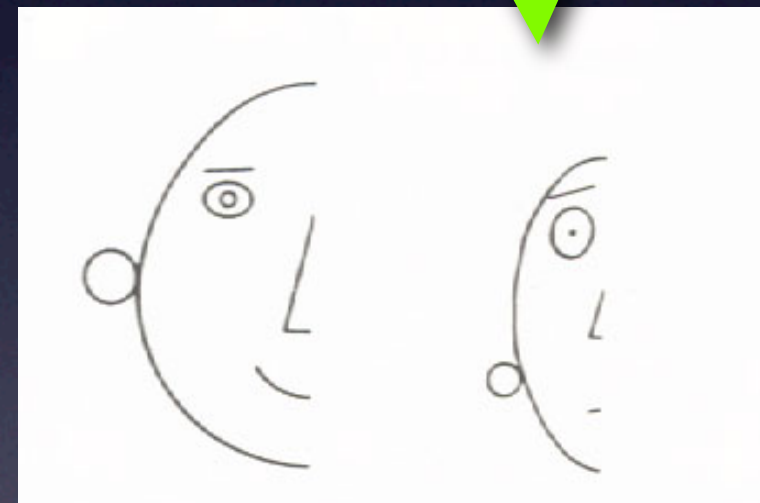
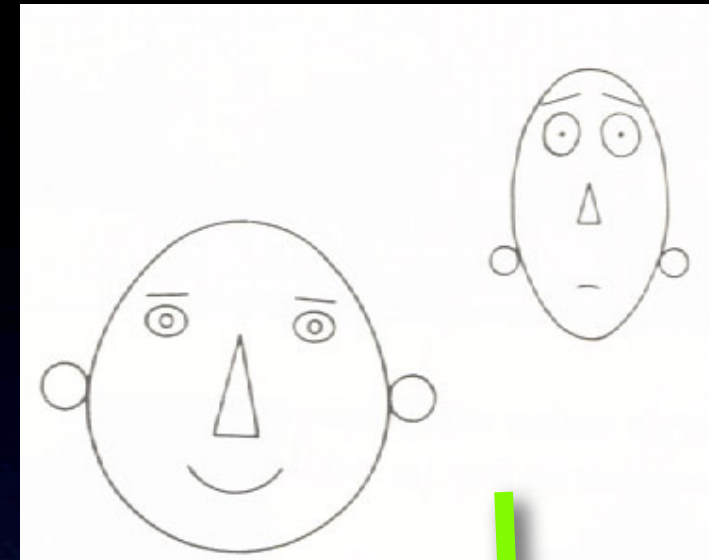
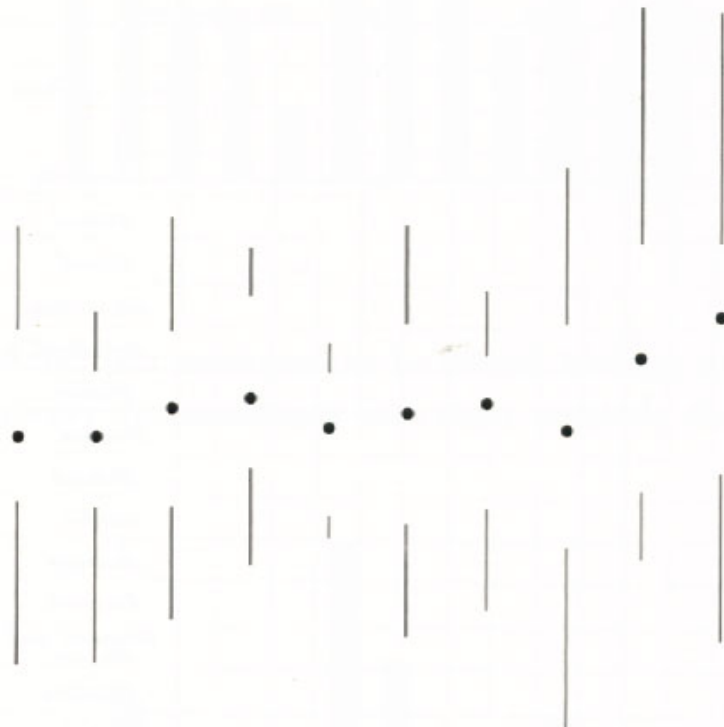


Restoring the grid fails to organize the data. The ticks are too powerful, and they also add a disconcerting visual vibration to the graphic. With the ticks, the reference curves become all the more necessary, since the eye needs some guidance through the maze of dots and crosses:



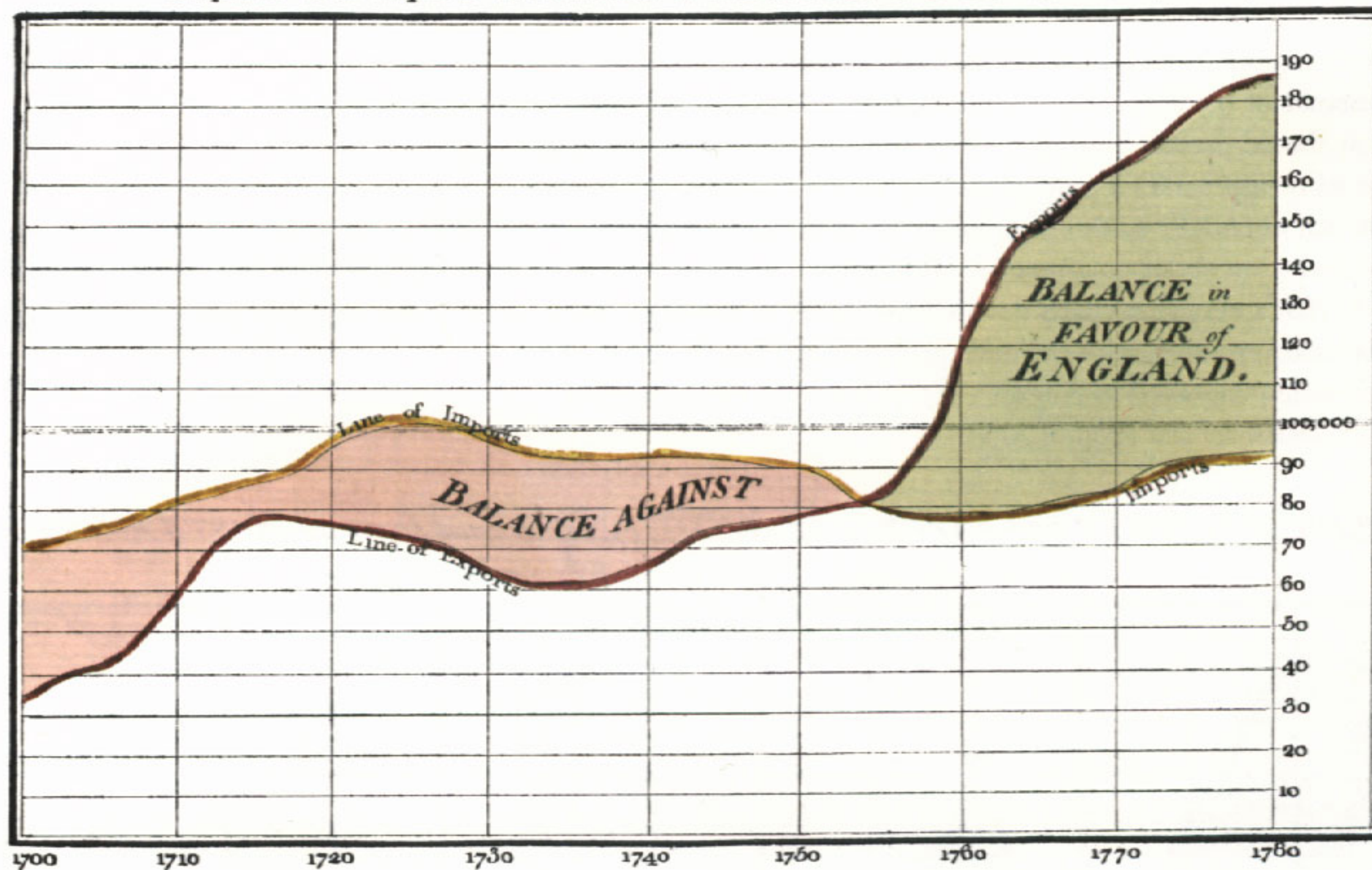


An erased version requires only 10 verticals to show the same information:



Exemples de designs intelligents

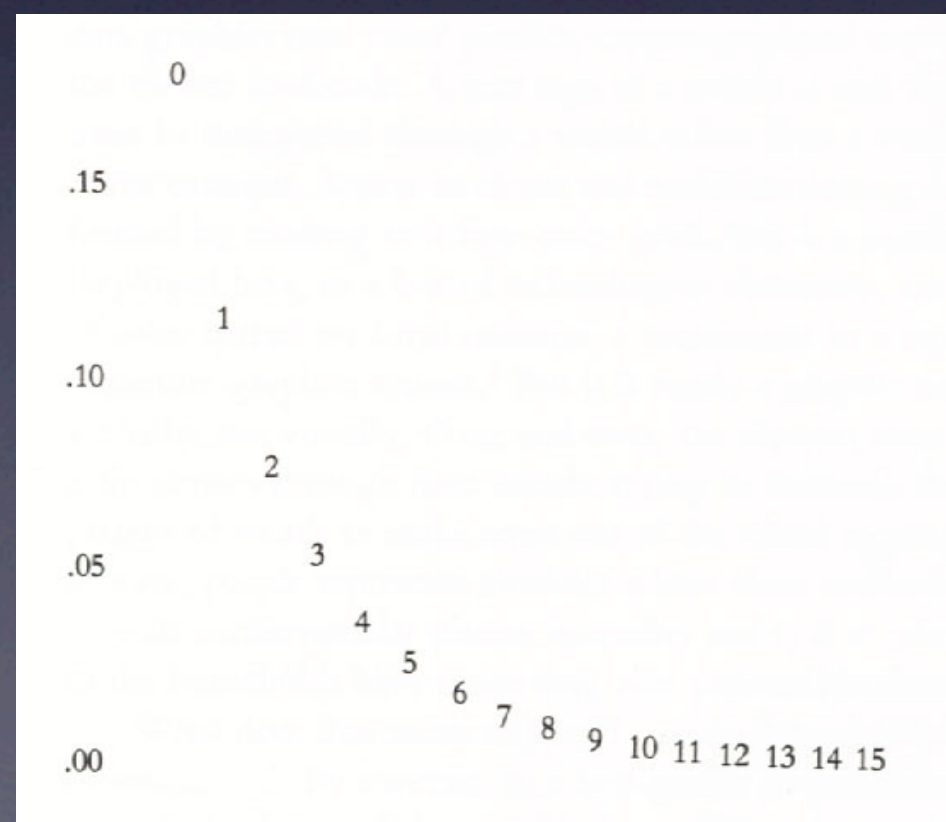
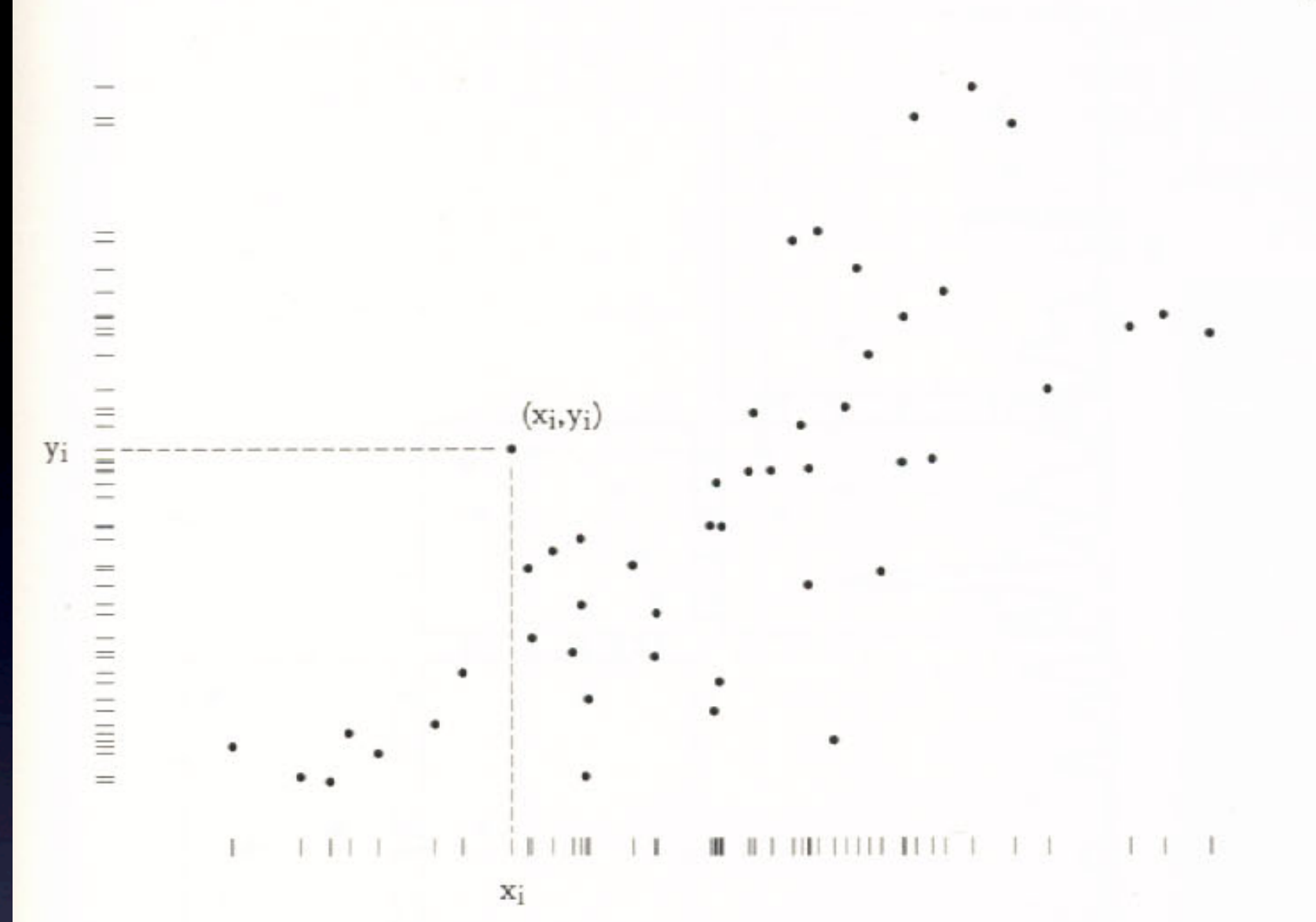
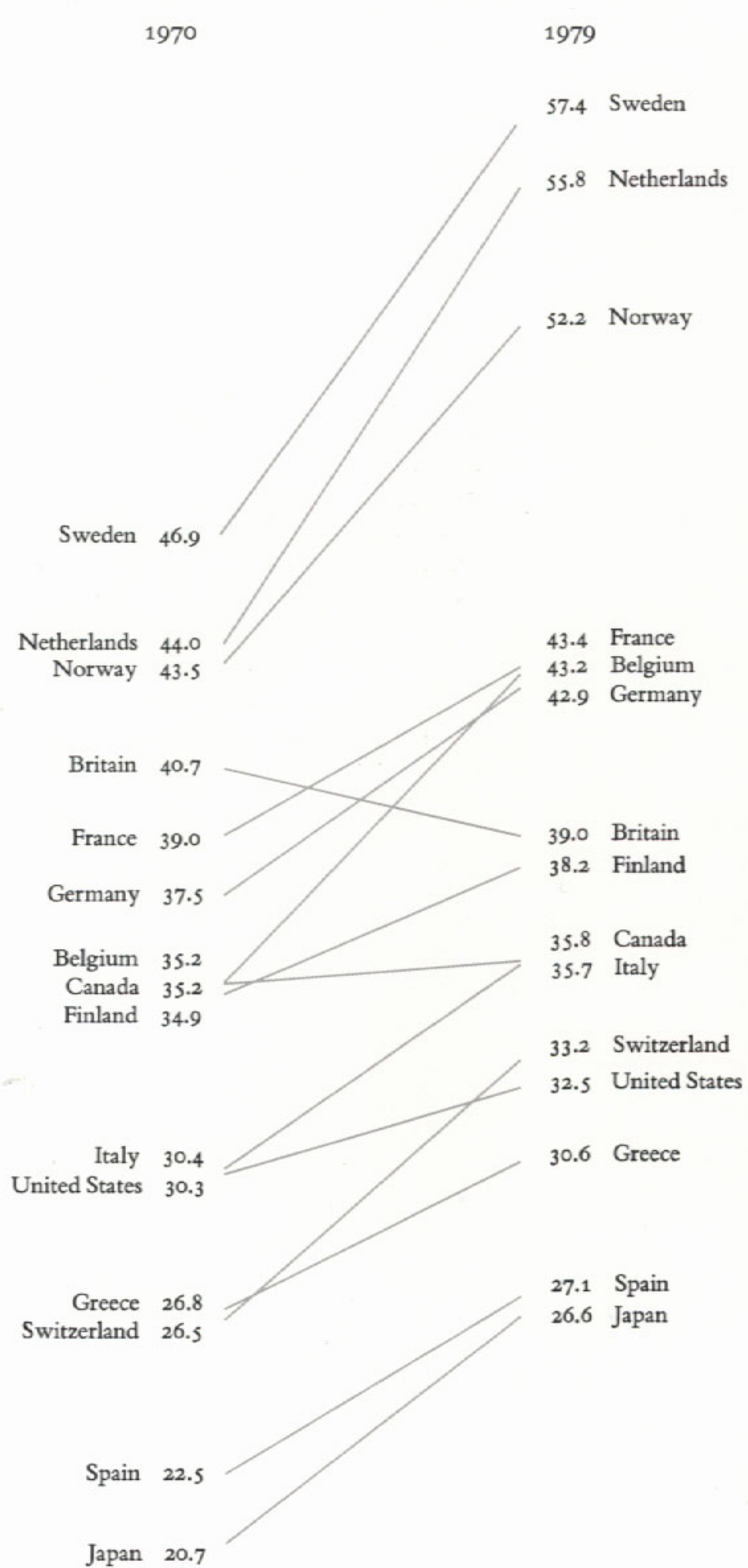
Exports and Imports to and from DENMARK & NORWAY from 1700 to 1780



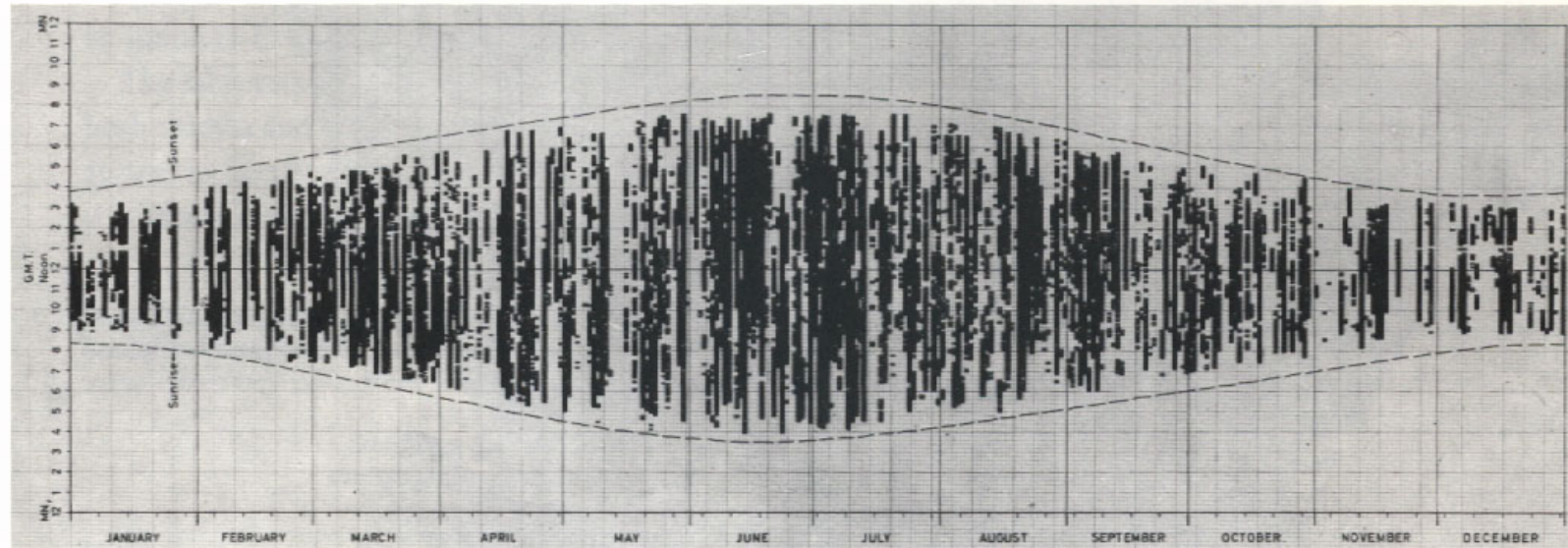
The Bottom line is divided into Years, the Right hand line into £10,000 each.

Published as the Act directs, 11th May 1786. by W^m Playfair

Neale sculpsit 352, Strand, London.



Ensoleillement



The visual metaphor corresponds appropriately to the data if the image is reversed, so that the light areas are the times when the sun shines:

