INTRODUCTIONS

- Your Name
- Your Department/Institute/Organization Affiliation
- What are your interests in Visualization?
- What's your favourite type of visualization/What is a Visualization that you've seen that you've liked?
- What would you like to see from the group?
- Your favourite font?

UNIVERSITY OF TORONTO
VISUALIZATION DISCUSSION GROUP

THE CONCEPT OF DATA-INK

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Dunlap Institute for Astronomy & Astrophysics

DATA-INK RATIO

$$\text{Data-ink ratio} = \frac{\text{data-ink}}{\text{total ink used to print the graphic}}$$

$$= \text{proportion of a graphic's ink devoted to the non-redundant display of data-information}$$

$$= 1.0 - \text{proportion of a graphic that can be erased without loss of data-information.}$$

Tufte: *The Visual Display of Quantitative Information*

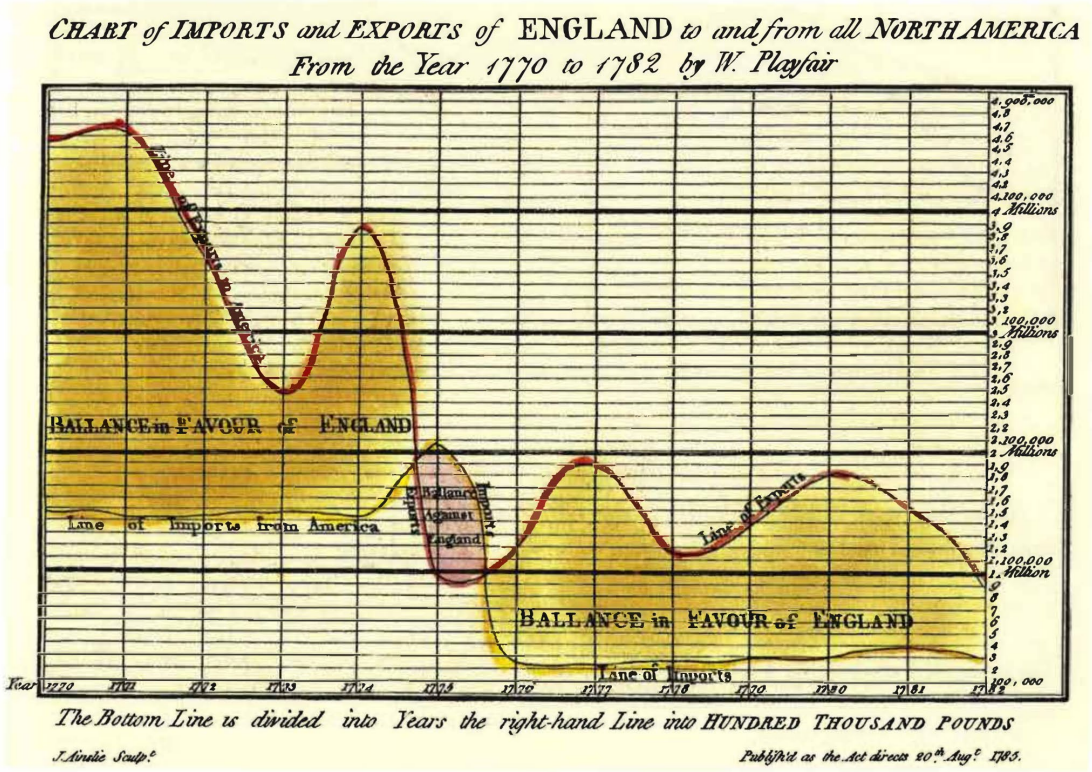
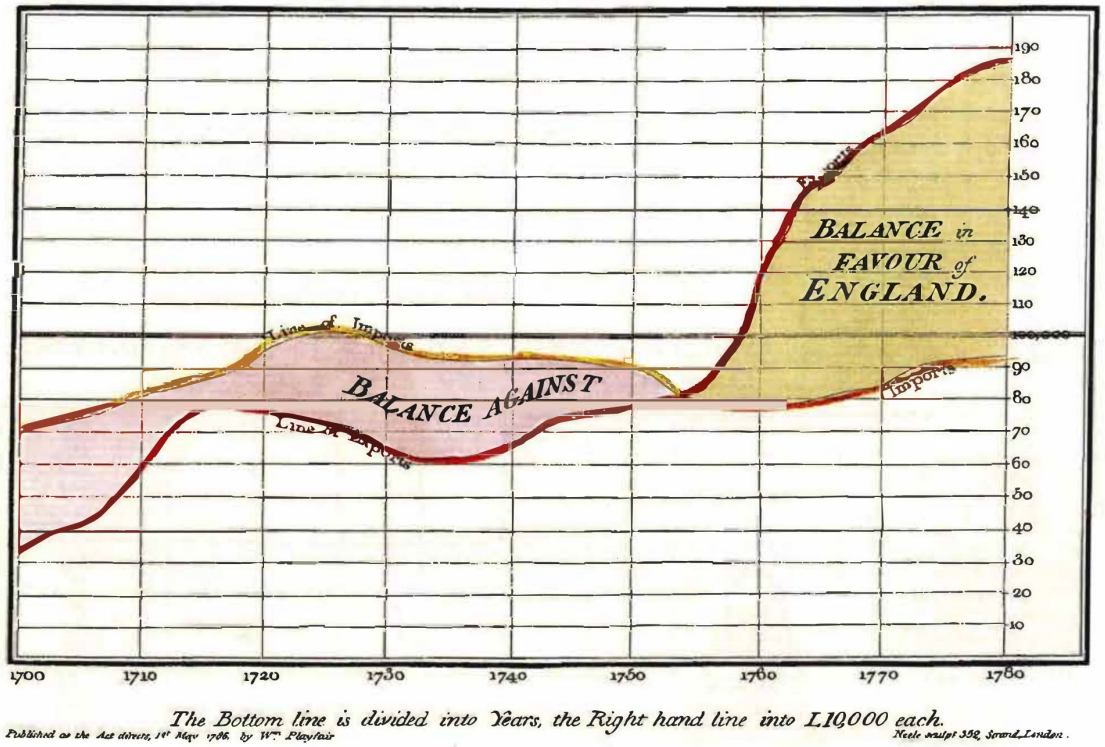
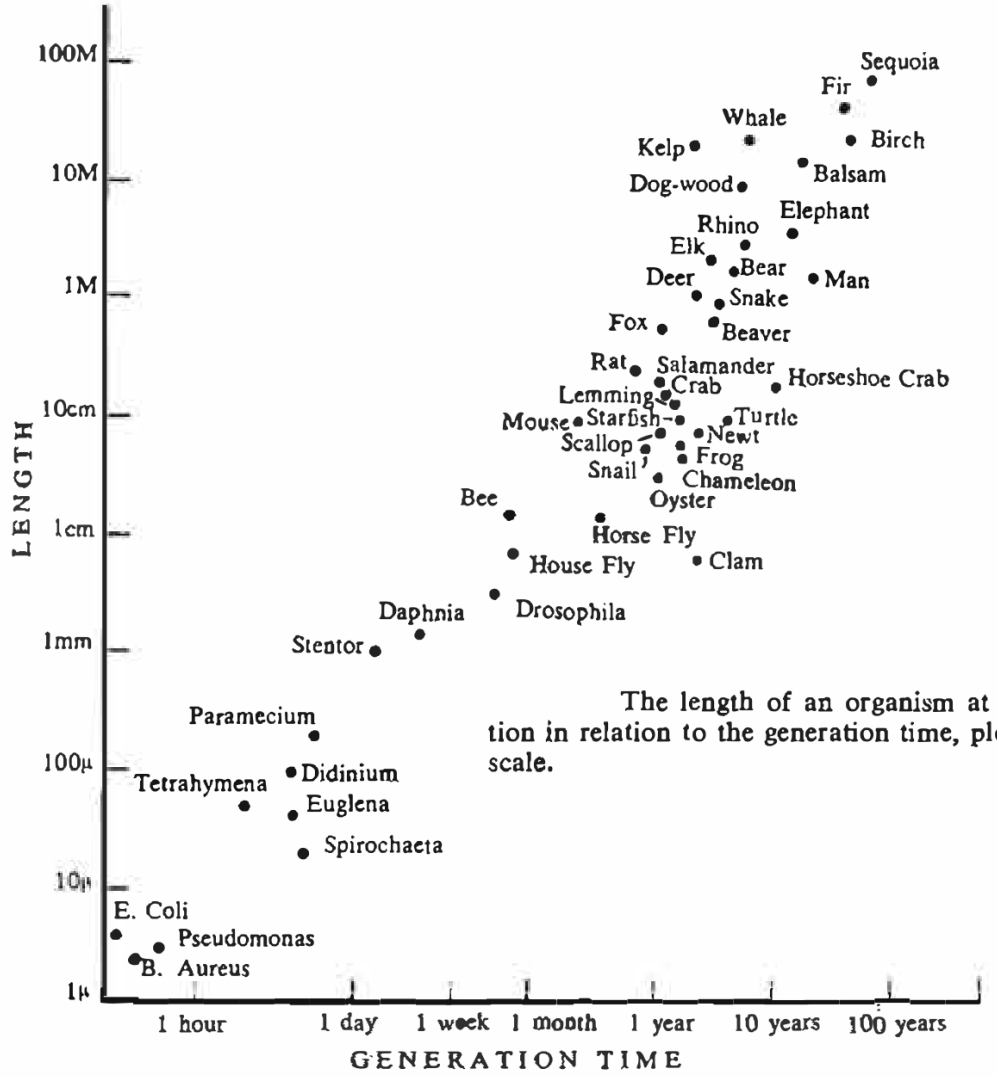


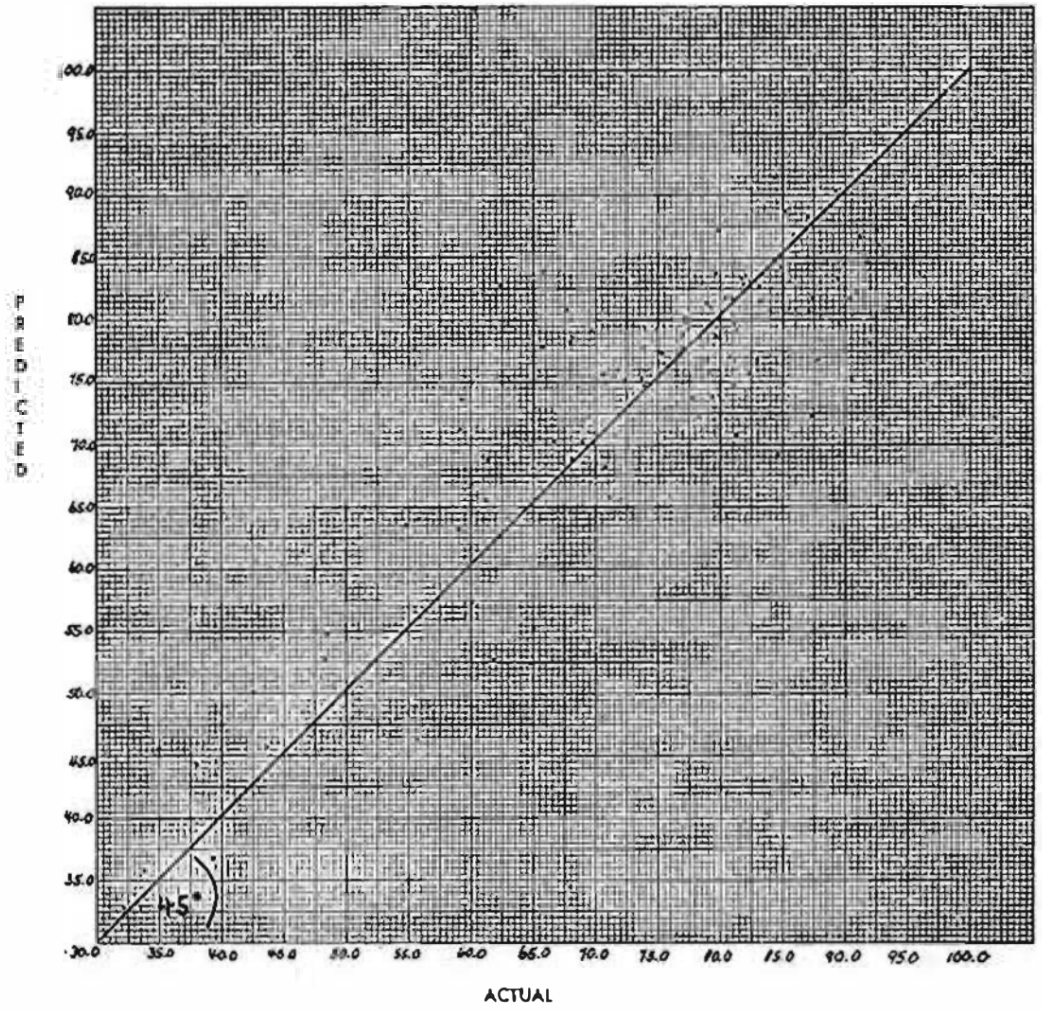
CHART of IMPORTS and EXPORTS of ENGLAND to and from all NORTH AMERICA
From the Year 1770 to 1782 by W. Playsfair
BALLANCE in FAVOUR of ENGLAND
Lane of Imports from America
Balance Against England
Exports
Imports
Line of Exports
BALLANCE in FAVOUR of ENGLAND
Lane of Imports
Year
1770
1771
1772
1773
1774
1775
1776
1777
1778
1779
1780
1781
1782
The Bottom Line is divided into Years the right-hand Line into HUNDRED THOUSAND POUNDS
J. Ainslie Sculp.
Publish'd as the Act directs 20th Augt 1785.


Exports and Imports to and from DENMARK & NORWAY from 1700 to 1780
Line of Imports
BALANCE AGAINST
Line of Exports
Exports
BALANCE in FAVOUR of ENGLAND.
Imports
1700
1710
1720
1730
1740
1750
1760
1770
1780
The Bottom line is divided into Years, the Right hand line into £10000 each.
Published as the Act directs, 1st May 1786, by Wm Playsfair
Neele sculpt 352, Strand, London.



The length of an organism at the time of reproduction in relation to the generation time, plotted on a logarithmic scale.

Relationship of Actual Rates of Registration to Predicted Rates
(104 cities 1960).



DATA-INK RATIO MAXIMIZATION

Should you always strive to maximize your data-ink ratio?

Pros

- Cleaner plots
- Cheaper ink/Less pixels
- Fewer distractions
- Focuses the data
- Clearer message

Cons

- Misleading message
- Commercial/Impact reasons
- Never truly lossless
- Making a choice for the audience
- Is it appropriate
- More difficult to read/understand
- Human Convention
- Over interpreting/reaching the wrong conclusion
- Oversimplification
- Leads to patterns that aren’t there

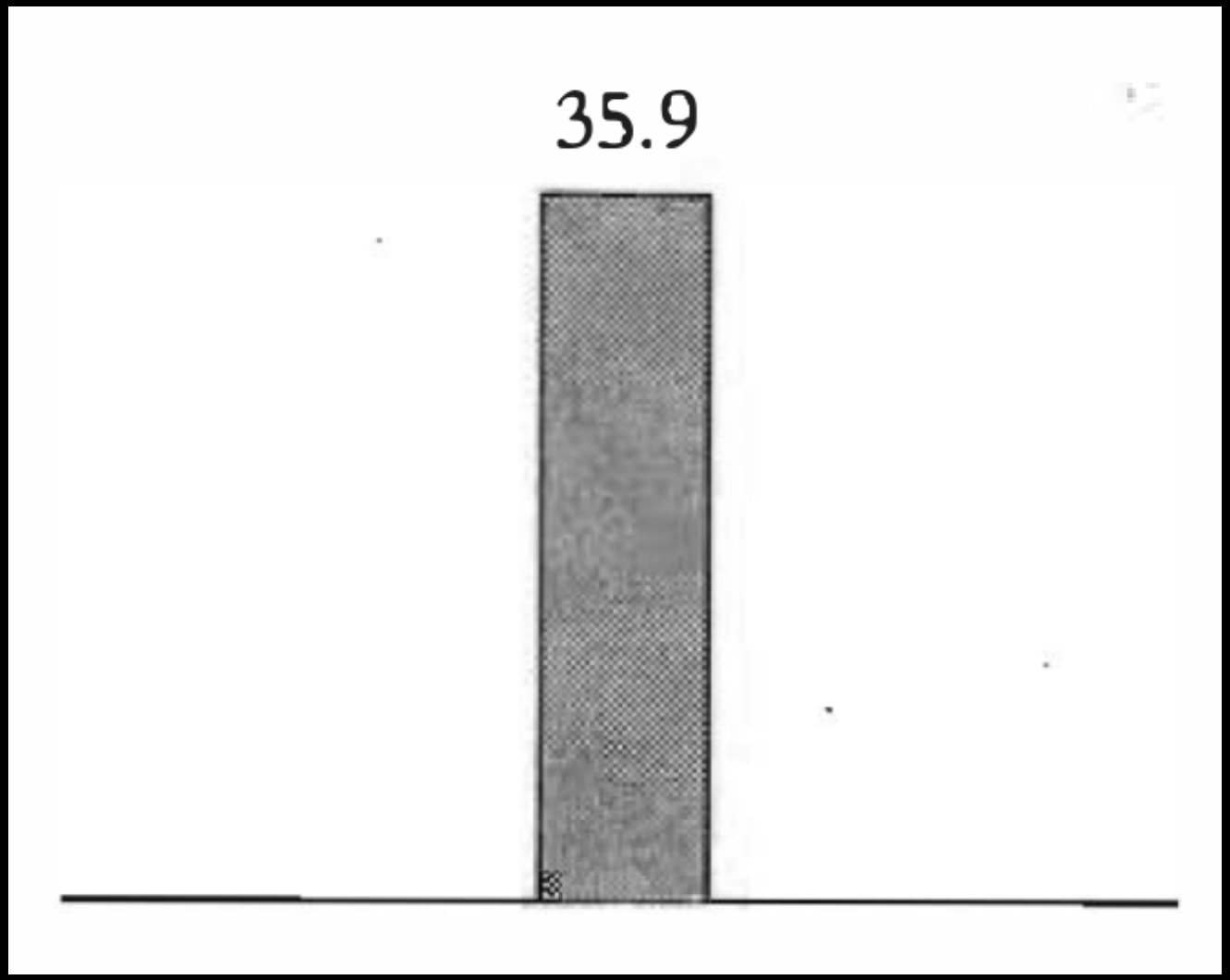
GUIDING PRINCIPLES OF DATA-INK

Maximize Data-Ink ratio, within reason.

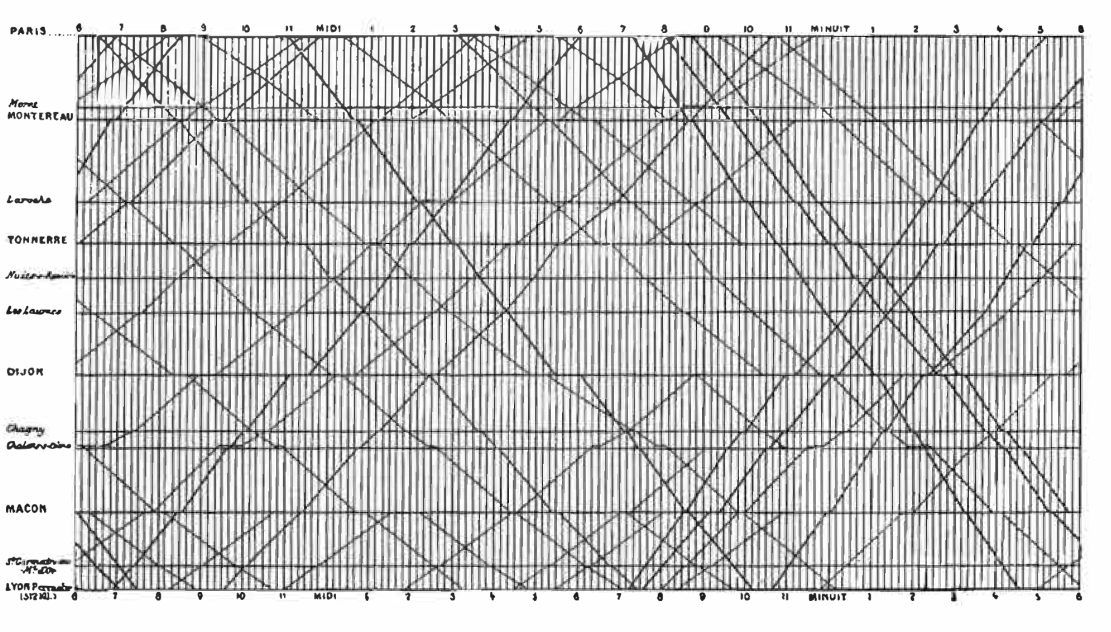
Erase Non-Data-Ink, within reason.

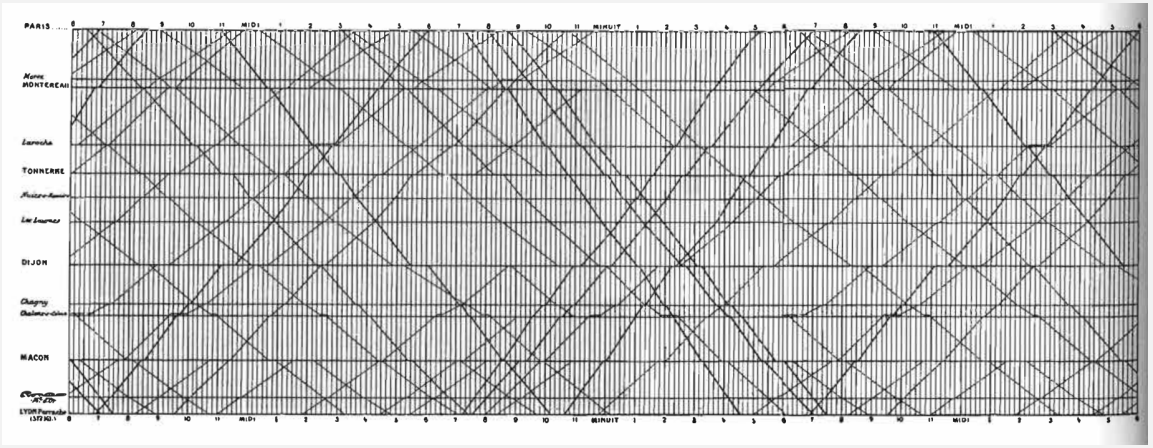
REDUNDANT DATA-INK

How many ways is the amplitude of the value indicated in this visual?



BENEFITS OF REDUNDANCY





TUFTE'S METHODS

Above all else show the data.

Maximize the data-ink ratio.

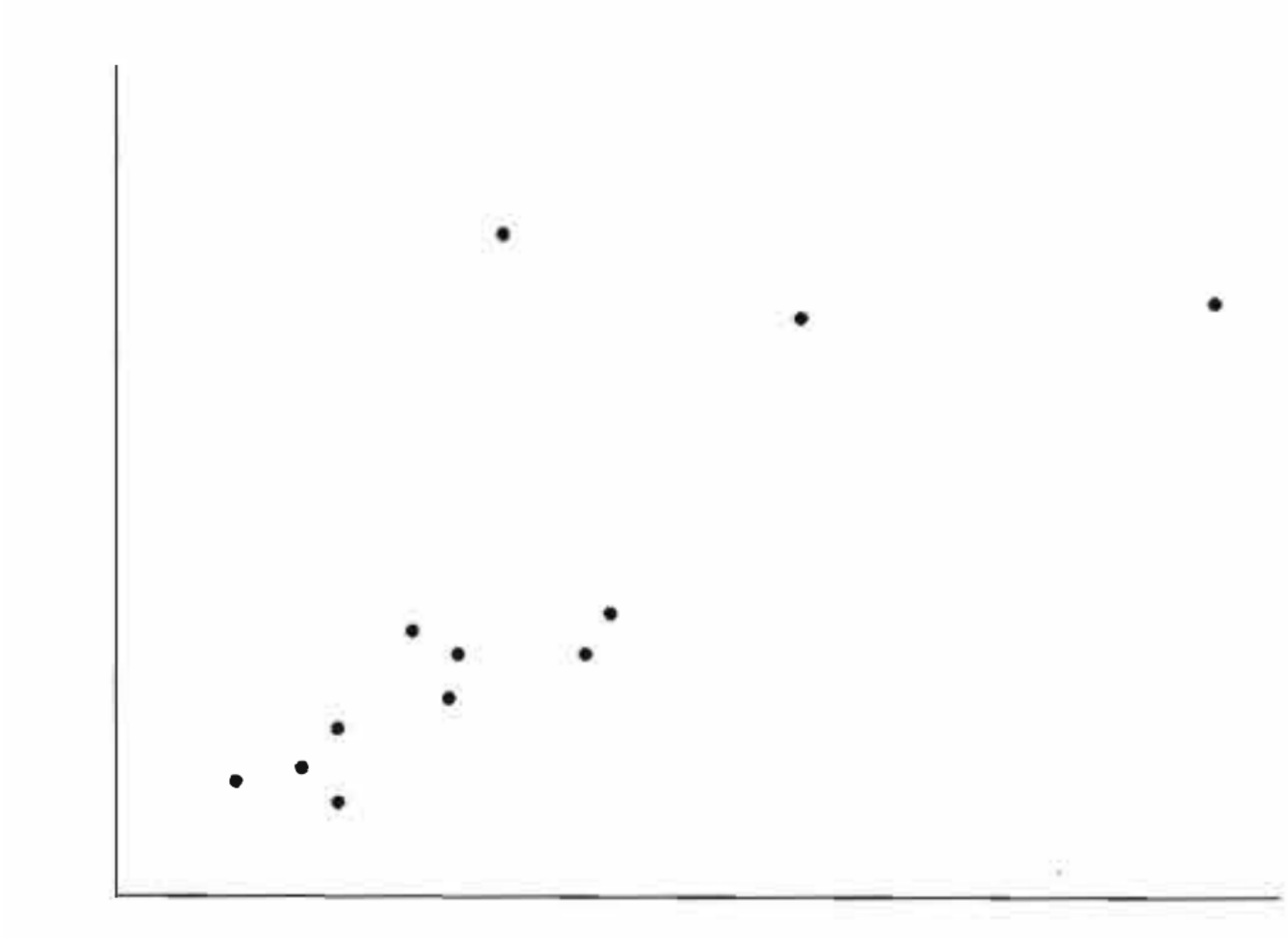
Erase non-data-ink.

Erase redundant data-ink.

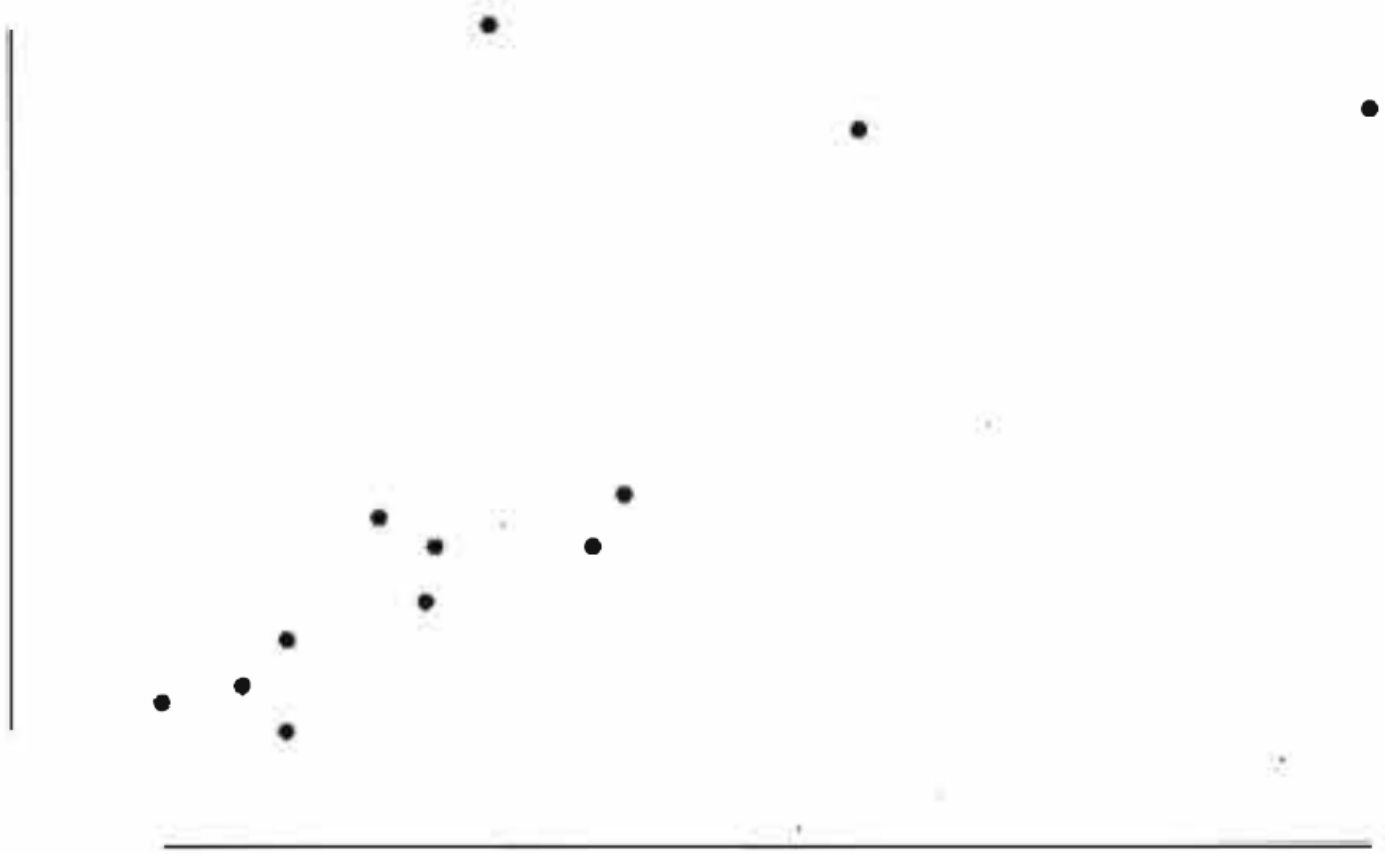
Revise and edit.

Tufte: *The Visual Display of Quantitative Information*

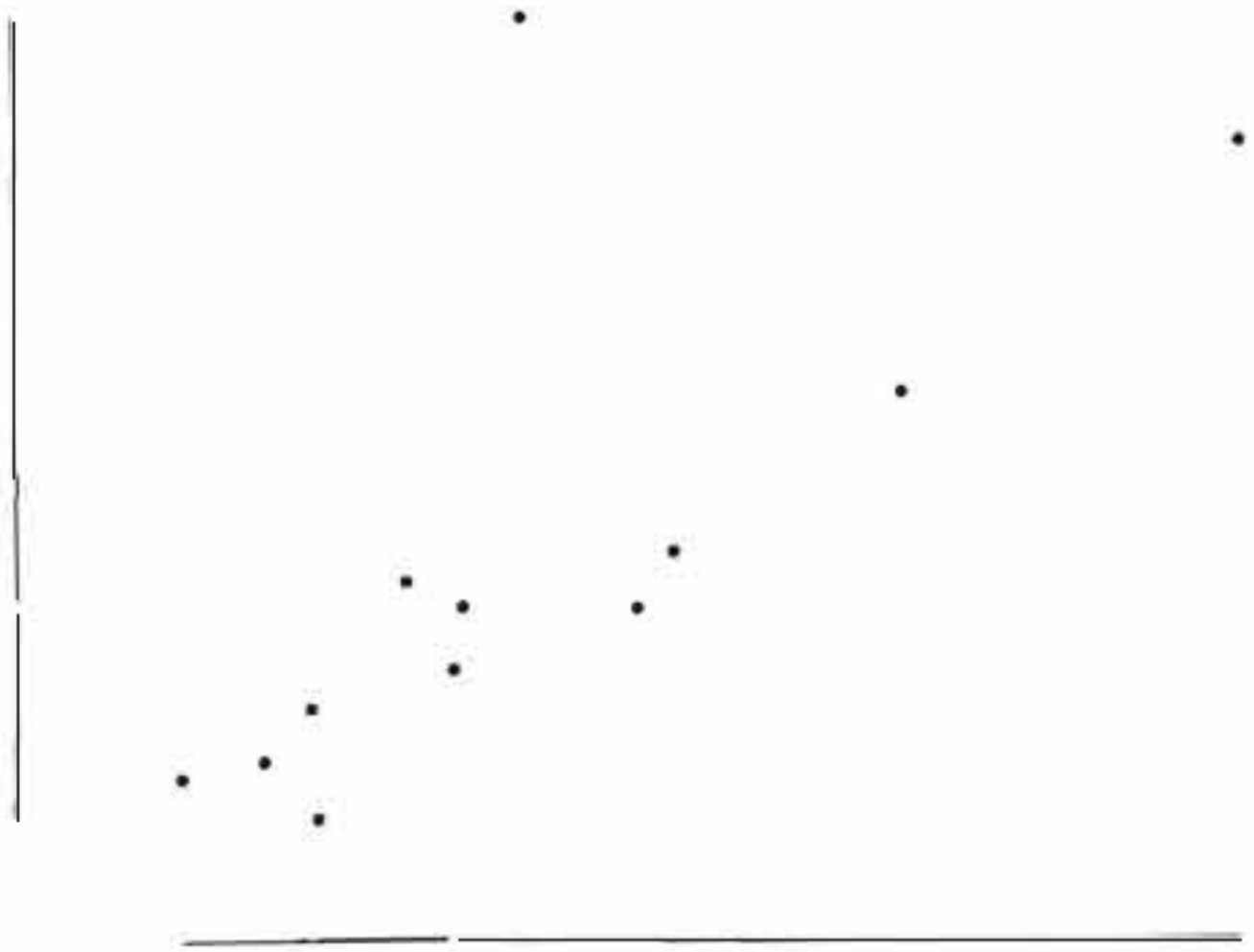
REDESIGNING THE SCATTERPLOT



REDESIGNING THE SCATTERPLOT



REDESIGNING THE SCATTERPLOT



REDESIGNING THE SCATTERPLOT