The Visual Display of Quantitative Information

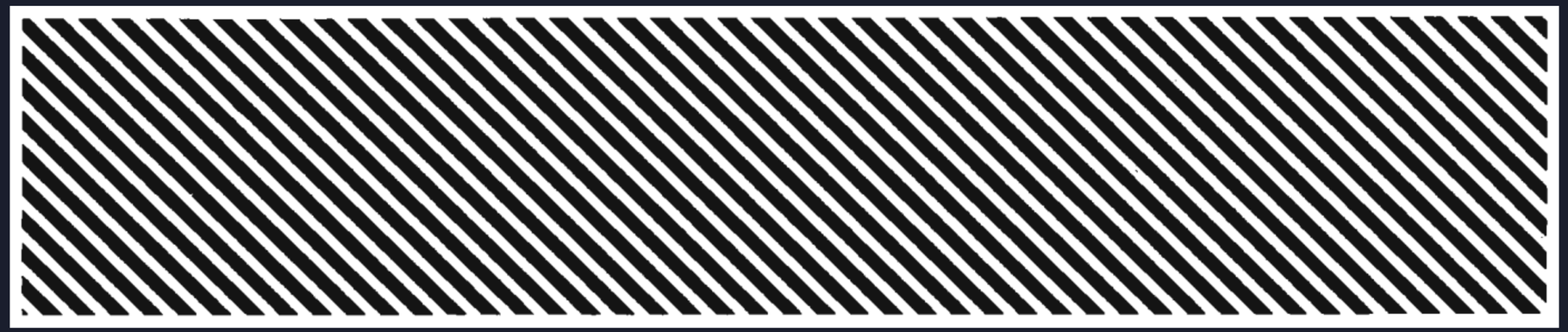
Chapters 5 & 6

Chartjunk:
Vibrations, Grids, and Ducks

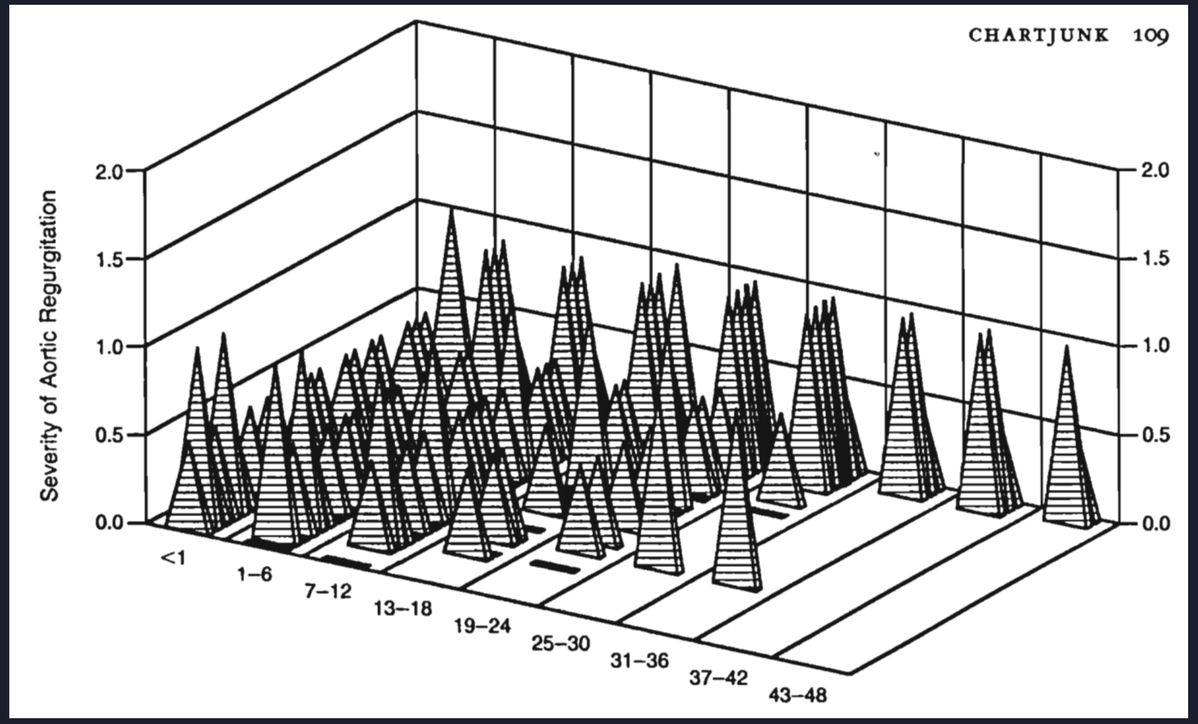
Decoration!!!

Decoration~~!!!~~

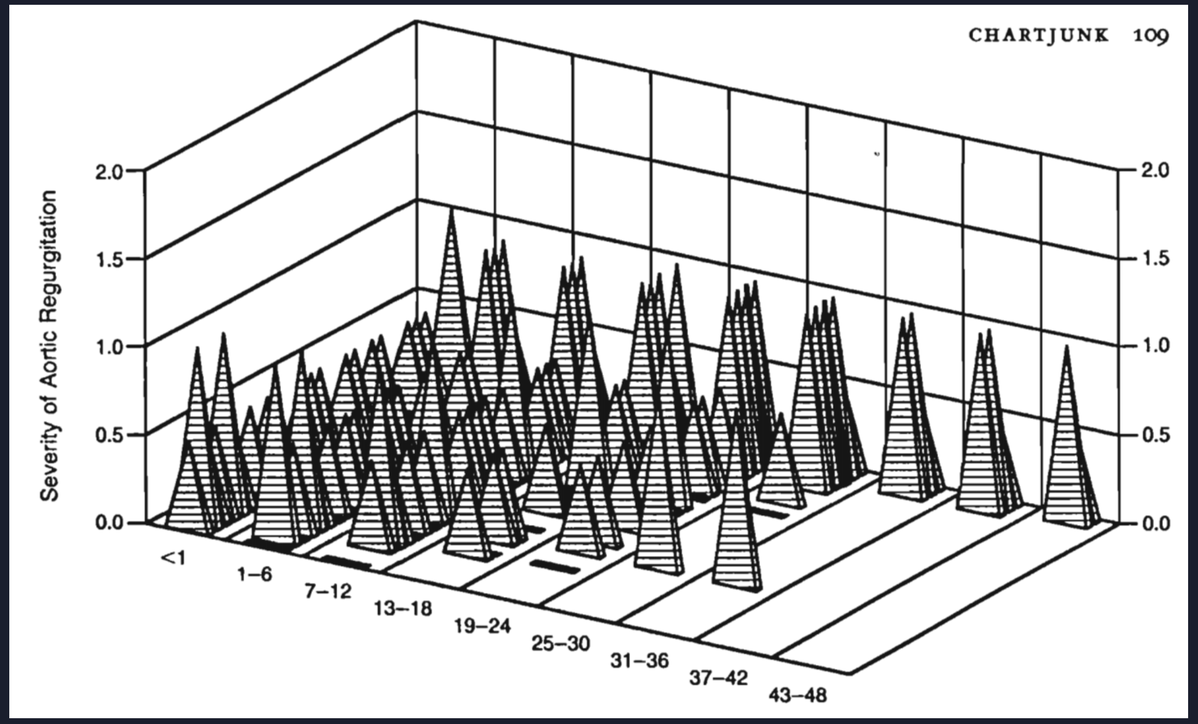
1. Unintentional Optical Art



Moiré Effect


CHARTJUNK 109
Severity of Aortic Regurgitation
2.0
1.5
1.0
0.5
0.0
<1
1–6
7–12
13–18
19–24
25–30
31–36
37–42
43–48

Necker Illusion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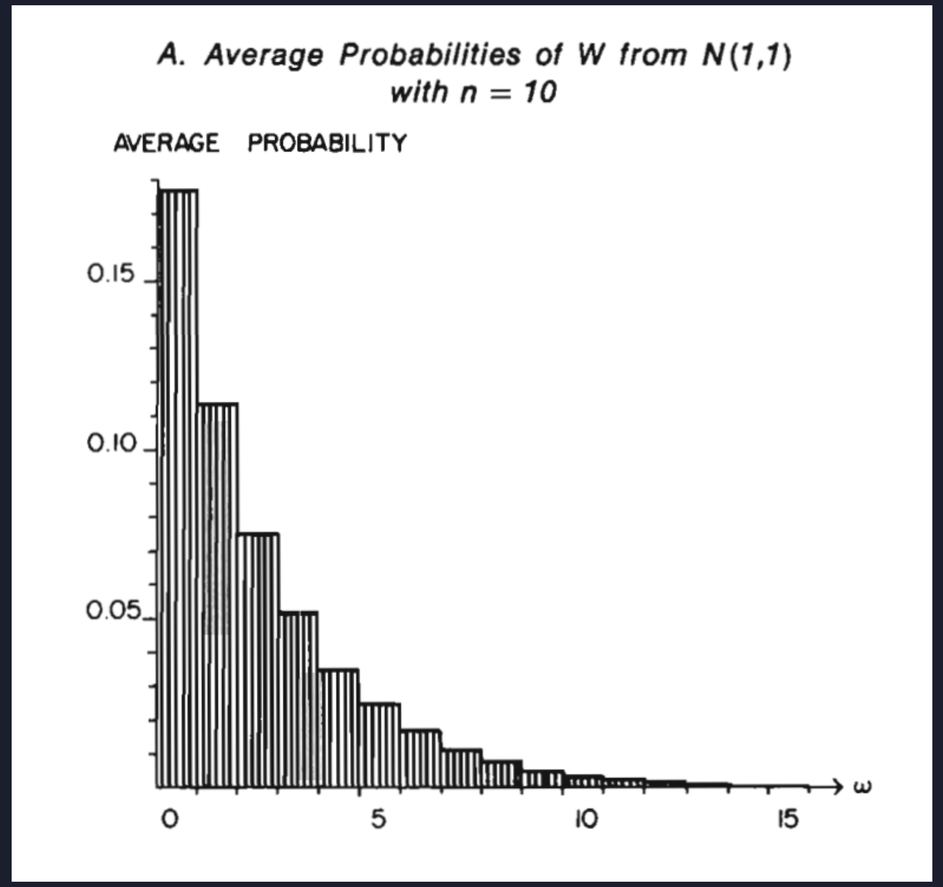
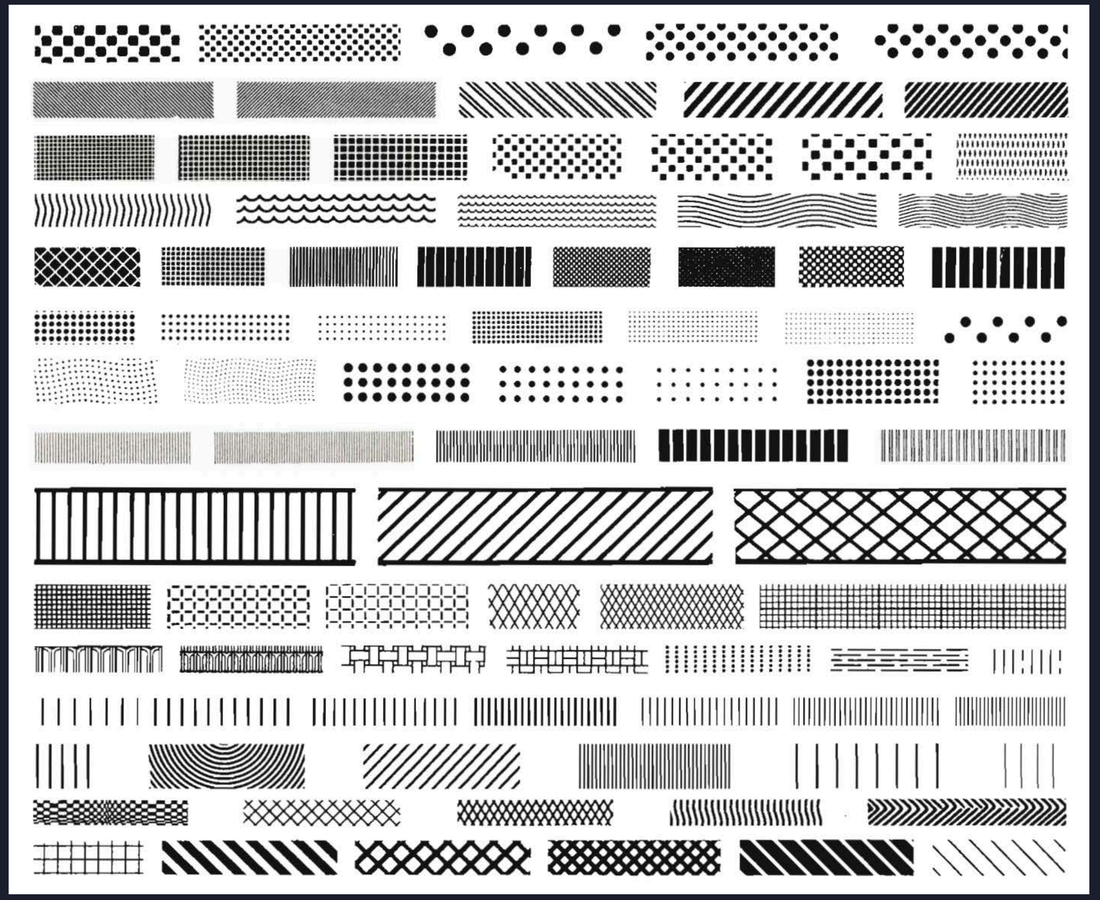
0.5
0.0
<1
1–6
7–12
13–18
19–24
25–30
31–36
37–42
43–48

“one variable (stacked depth of the stupid pyramids) has no label or scale”

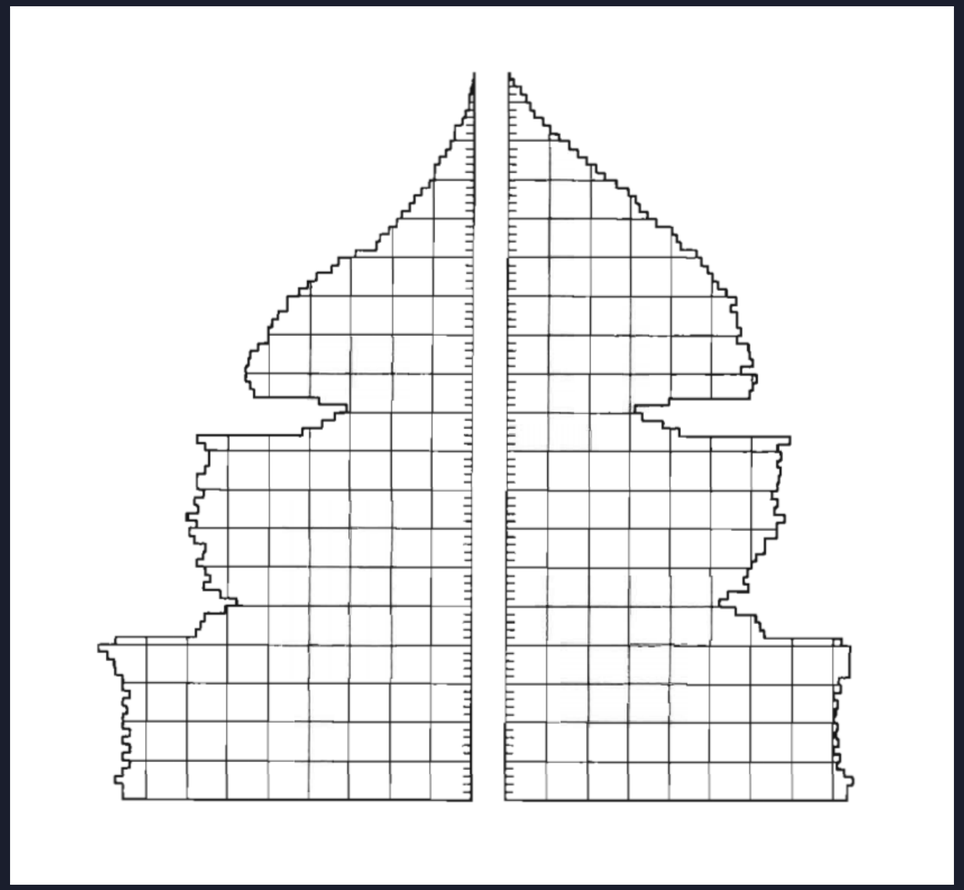

A. Average Probabilities of W from N(1,1)
with n = 10
AVERAGE PROBABILITY
0.15
0.10
0.05
0
5
10
15
ω

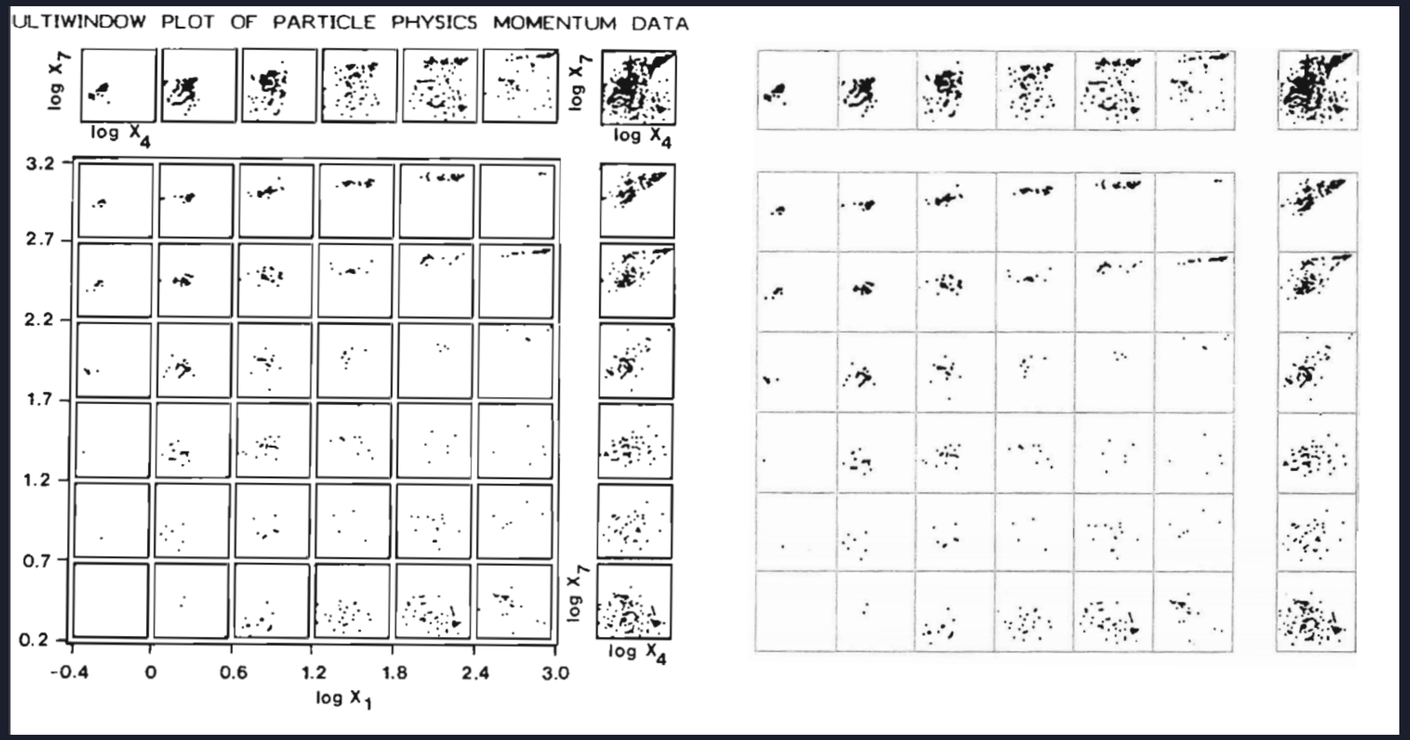
+

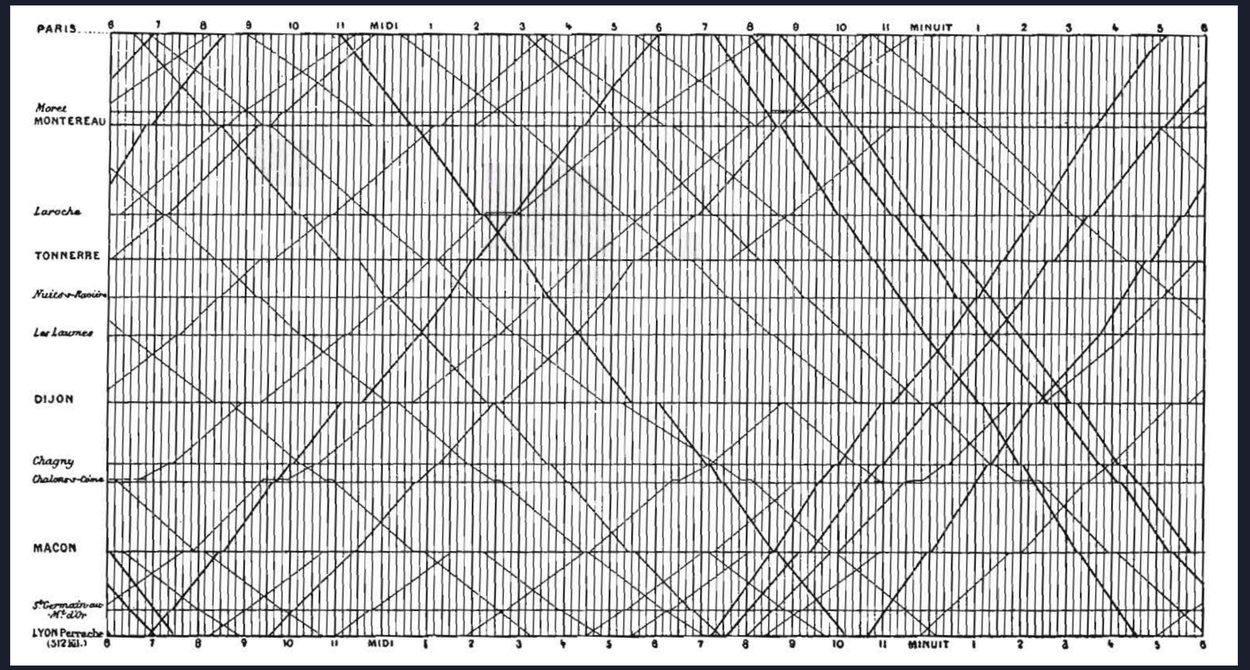


Textbooks and handbooks of statistical graphics; and manuals for computer graphics programs (ordered by date of publication)	Percentage of graphics with moiré vibration	Total number of graphics
Willard C. Brinton, *Graphic Methods for Presenting Facts* (New York, 1914)	12%	255
R. Satet, *Les Graphiques* (Paris, 1932)	29%	28
Herbert Arkin and Raymond R. Colton, *Graphs: How to Make and Use Them* (New York, 1936)	17%	95
Mary Eleanor Spear, *Charting Statistics* (New York, 1952)	46%	134
Anna C. Rogers, *Graphic Charts Handbook* (Washington, D.C., 1961)	32%	201
F. J. Monkhouse and H. R. Wilkinson, *Maps and Diagrams* (London, third edition, 1971)	14%	322
Calvin F. Schmid and Stanton E. Schmid, *Handbook of Graphic Presentation* (New York, second edition, 1979)	22%	399
A. J. MacGregor, *Graphics Simplified* (Toronto, 1979)	34%	65
The user's manual for a widely distributed computer graphics package: *SAS/GRAPH User's Guide* (Cary, North Carolina, 1980)	68%	28
The manual for a very extensive computer graphics program: *Tell-A-Graf User's Manual* (San Diego, 1981)	53%	459

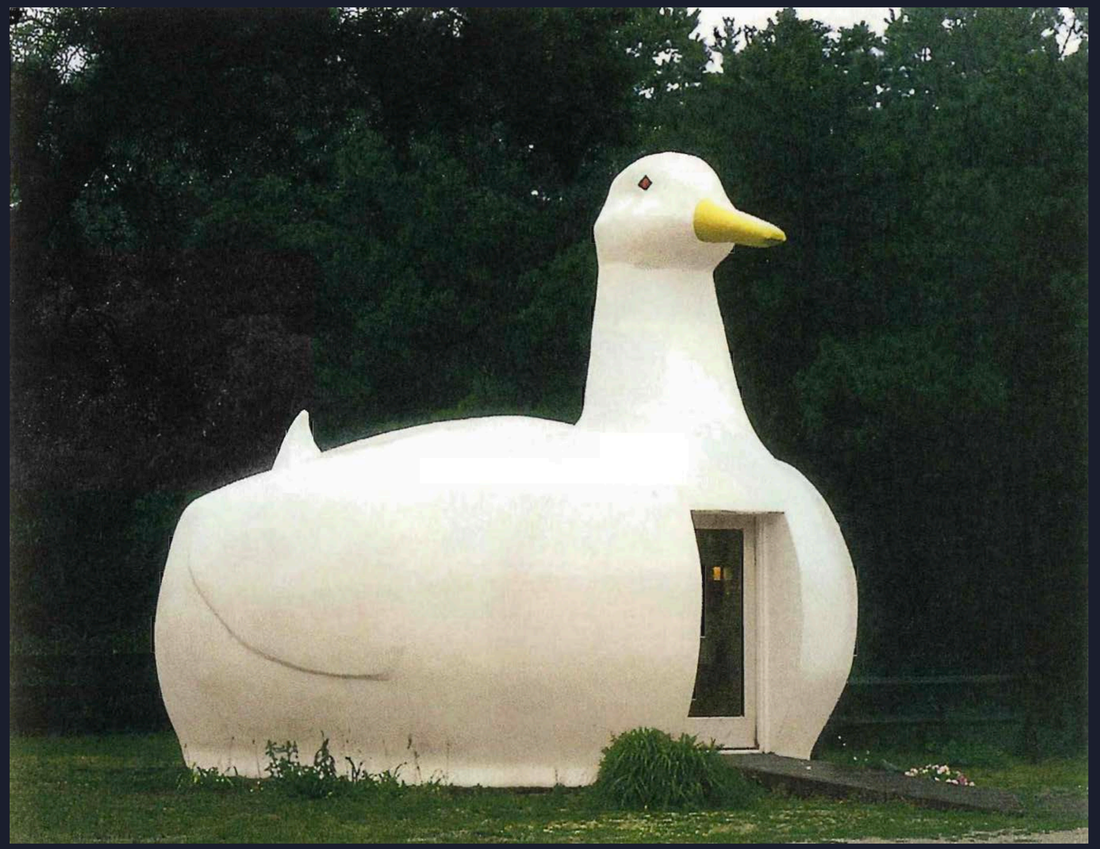
2. Dreaded Grid

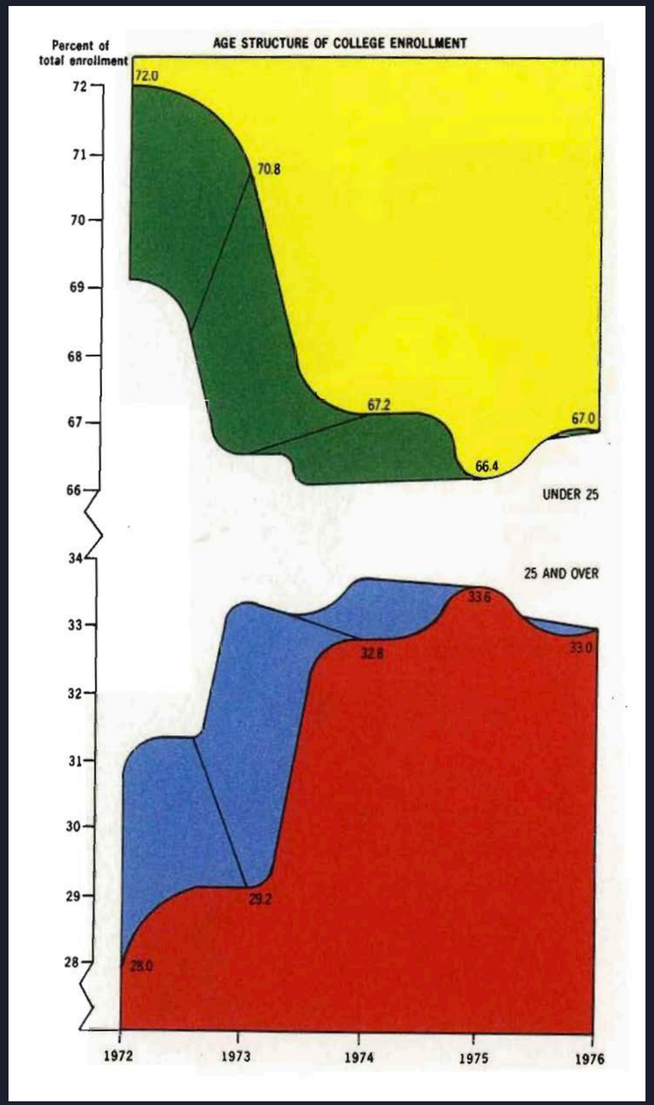



ULTIWINDOW PLOT OF PARTICLE PHYSICS MOMENTUM DATA
log X7
log X4
3.2
2.7
2.2
1.7
1.2
0.7
0.2
-0.4
0
0.6
1.2
1.8
2.4
3.0
log X1

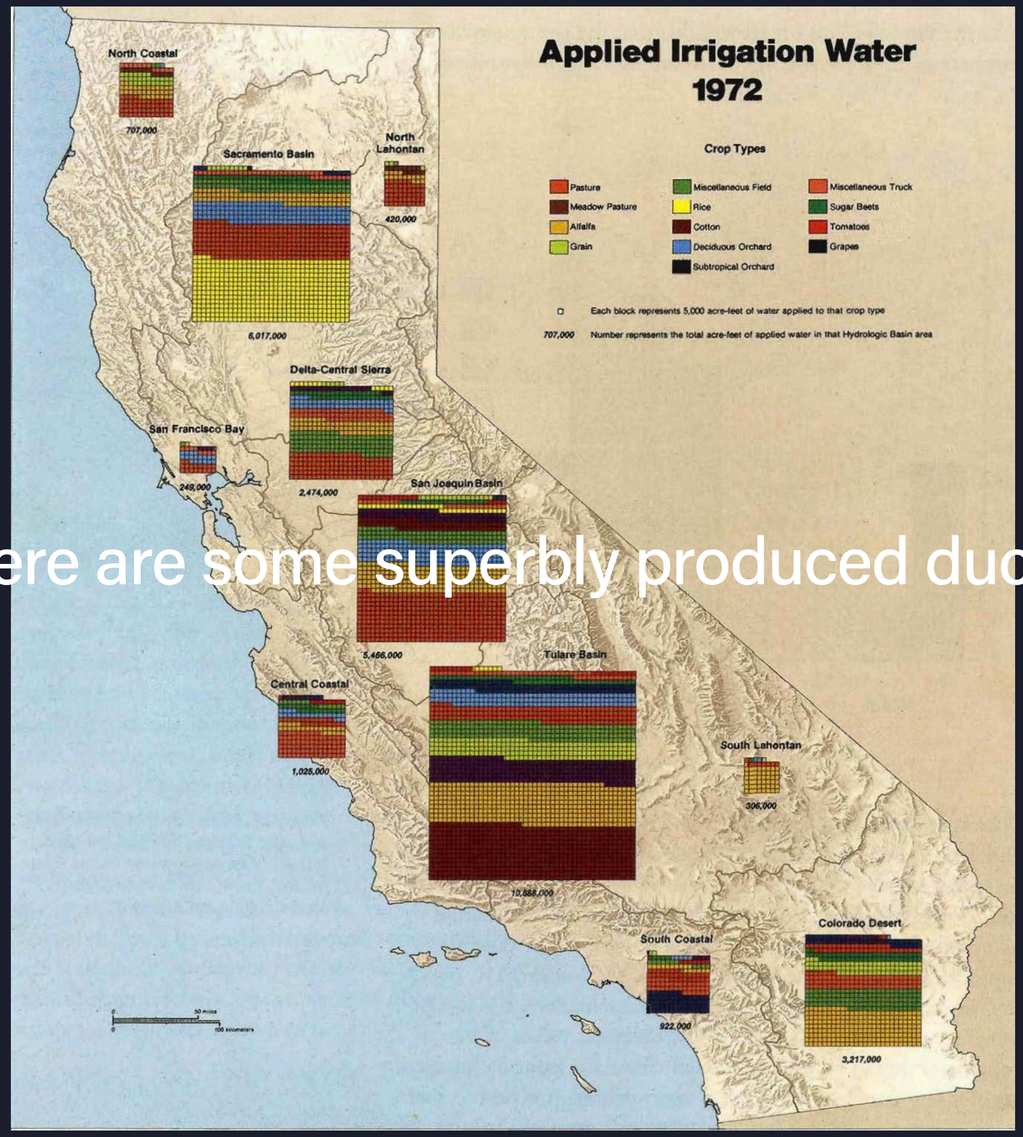

PARIS
6 7 8 9 10 11 MIDI 1 2 3 4 5 6 7 8 9 10 11 MINUIT 1 2 3 4 5 6
Moret
MONTEREAU
Laroche
TONNERRE
Nuits-s-Ravière
Les Laumes
DIJON
Chagny
Chalons-s-Cône
MACON
St Germain-au-Mt d'Or
LYON Perrache
(512 Kil.)
6 7 8 9 10 11 MIDI 1 2 3 4 5 6 7 8 9 10 11 MINUIT 1 2 3 4 5 6

3. The Duck




AGE STRUCTURE OF COLLEGE ENROLLMENT
Percent of total enrollment
72
71
70
69
68
67
66
34
33
32
31
30
29
28
72.0
70.8
67.2
66.4
67.0
UNDER 25
25 AND OVER
33.6
32.8
33.0
29.2
28.0
1972
1973
1974
1975
1976

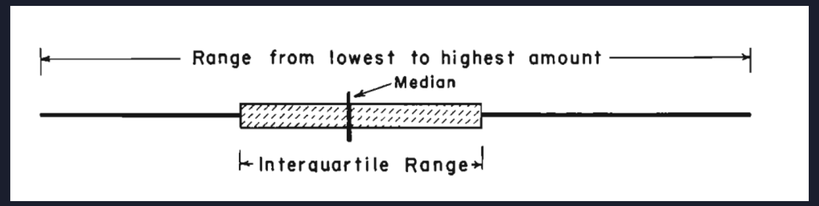
“This may well be the worst graphic ever to find its way into print.”

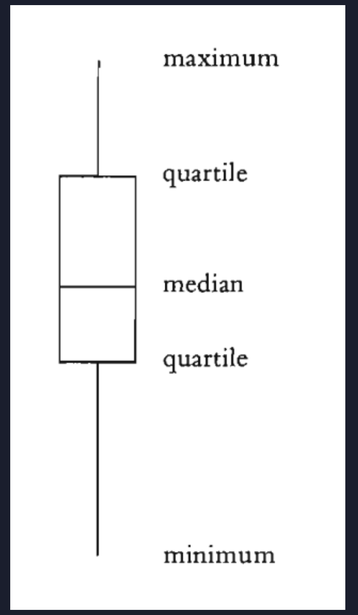


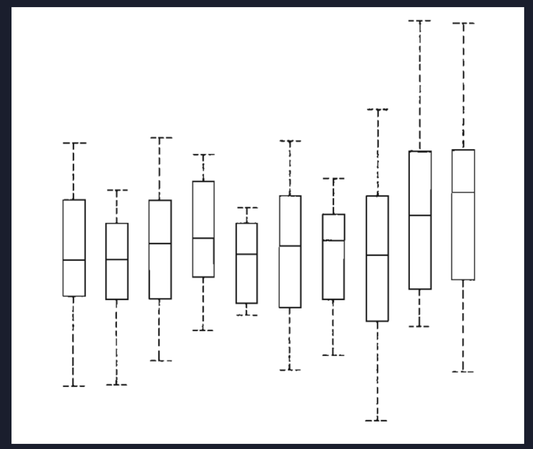
"There are some superbly produced ducks:"

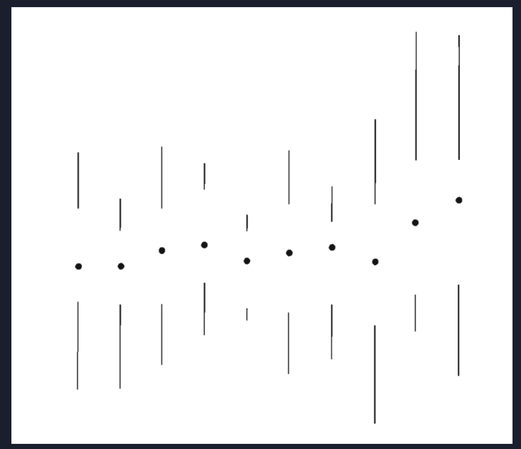
Data-Ink Maximization and Graphical Design

Redesign of Box Plot

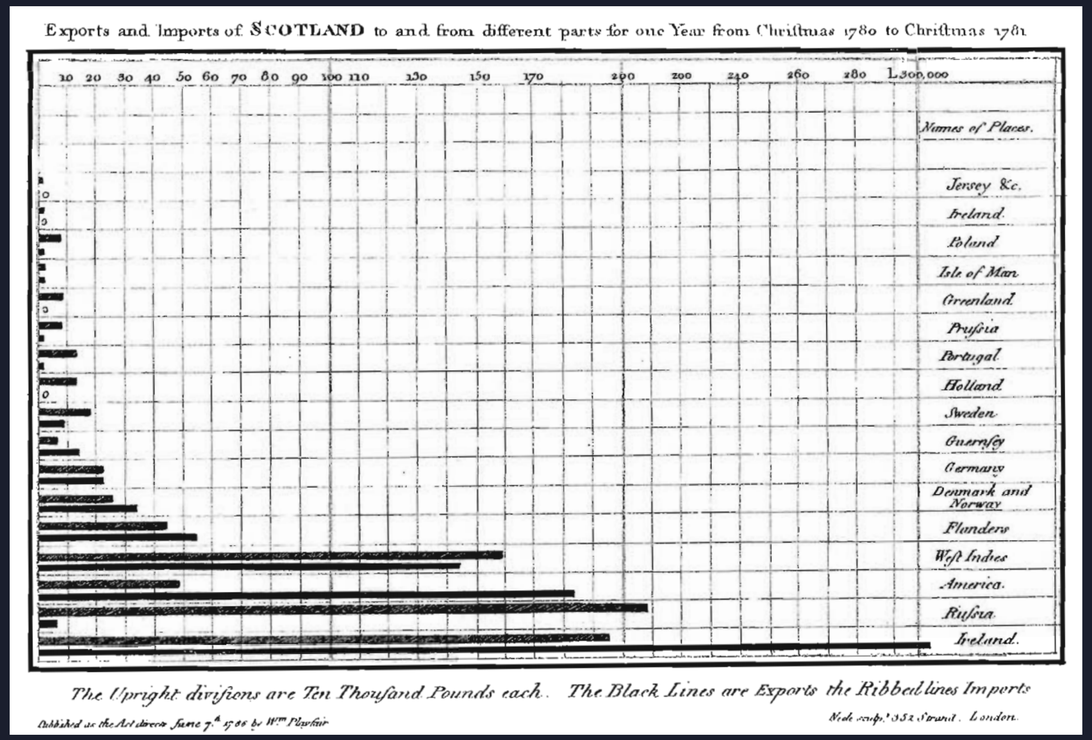

Range from lowest to highest amount
Median
Interquartile Range

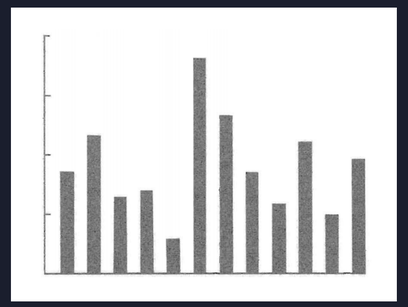

maximum
quartile
median
quartile
minimum

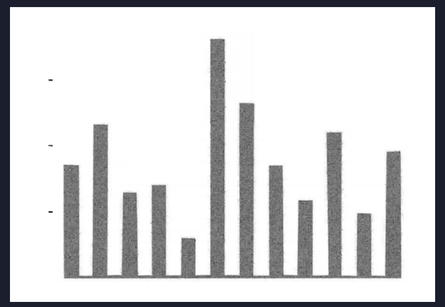


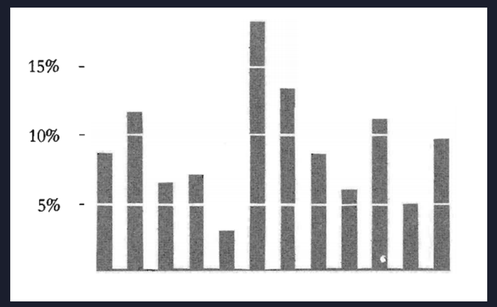


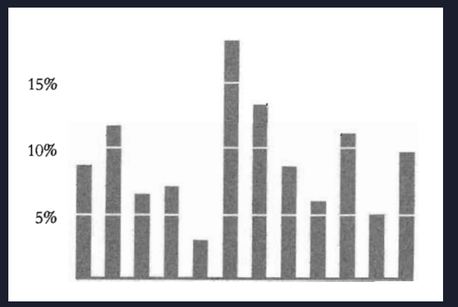
Redesign of Bar Chart


Exports and Imports of SCOTLAND to and from different parts for one Year from Christmas 1780 to Christmas 1781
10 20 30 40 50 60 70 80 90 100 110 130 150 170 190 200 240 260 280 L300,000
Names of Places.
Jersey &c.
Ireland
Poland
Isle of Man
Greenland
Prussia
Portugal
Holland
Sweden
Guernsey
Germany
Denmark and Norway
Flanders
West Indies
America.
Russia
Ireland.
The Upright divisions are Ten Thousand Pounds each. The Black Lines are Exports the Ribbed lines Imports
Published as the Act directs June 7th 1786 by Wm Playfair
Nich. sculp. 352 Strand. London.

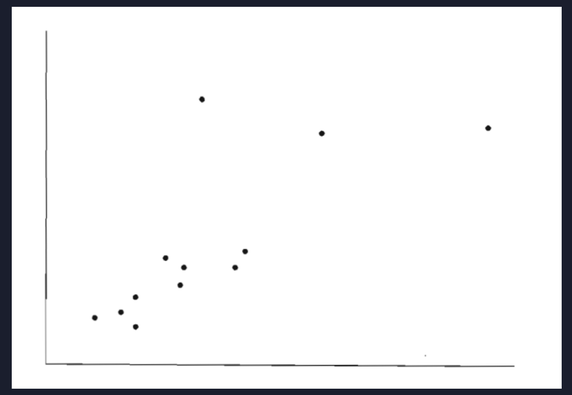


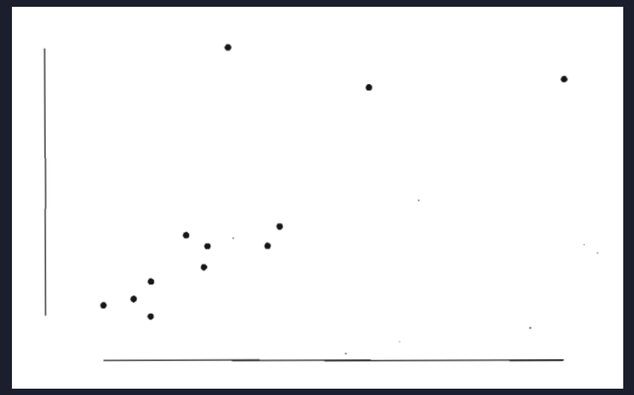


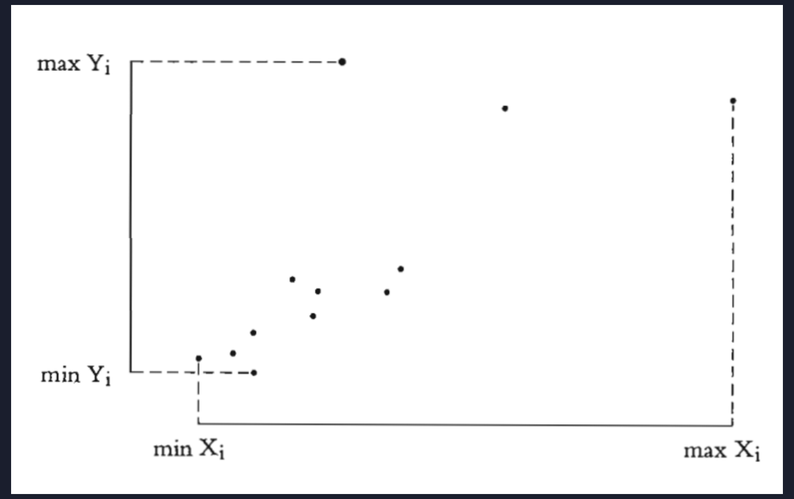

15%
10%
5%

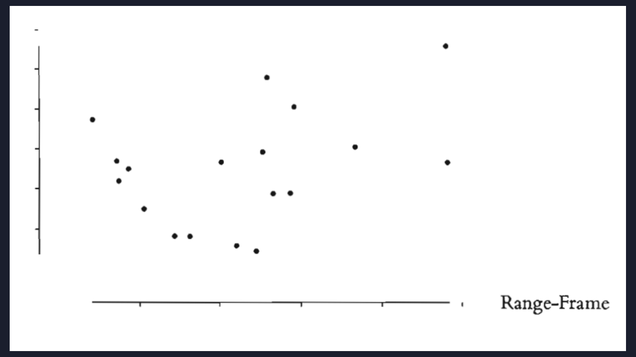

15%
10%
5%

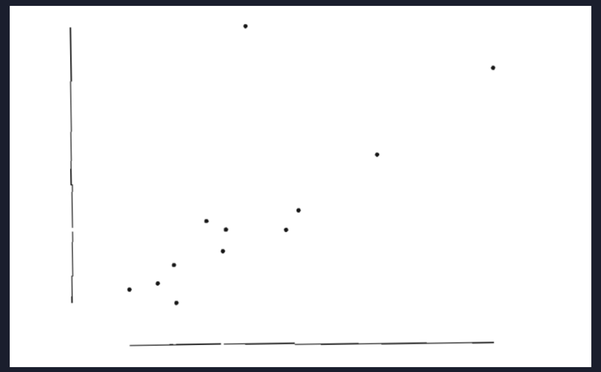
Redesign of Scatterplot

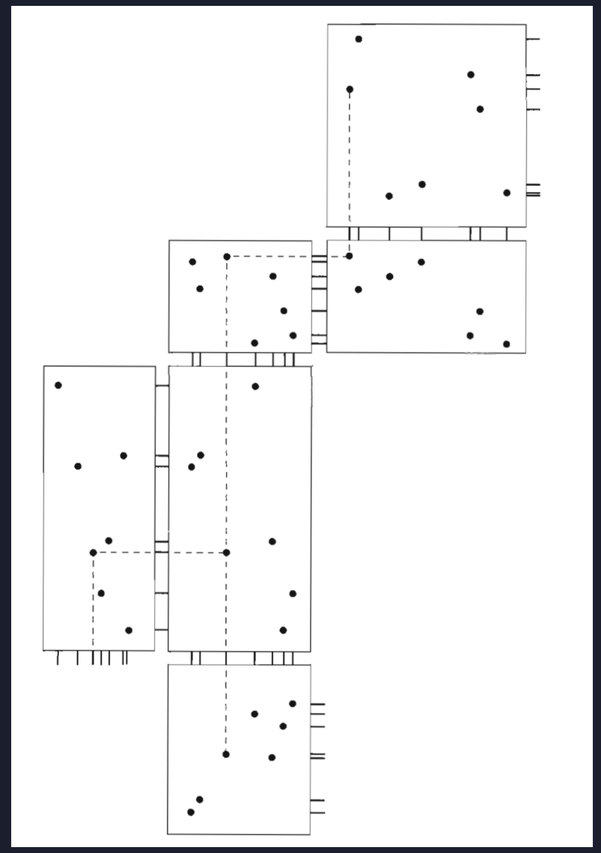





max Y_i
min Y_i
min X_i
max X_i


Range-Frame





Data-Ink Maximization

- Efficient in communication and production
- Revisions are always part of design
- New designs may appear odd, but time makes them conventional