

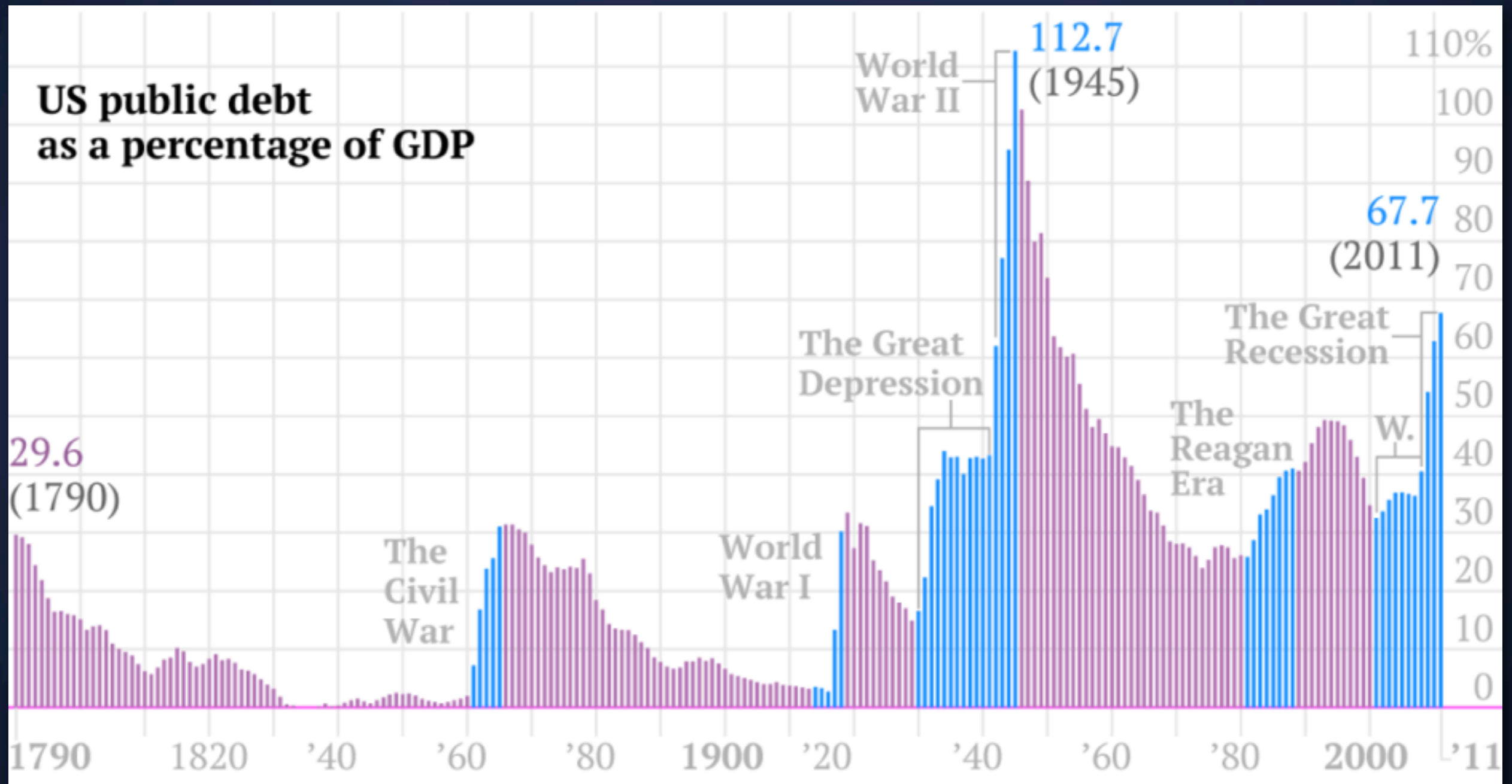
Information Visualization

Introduction

Jan 22, 2013 – Michael Porath (@poezn)

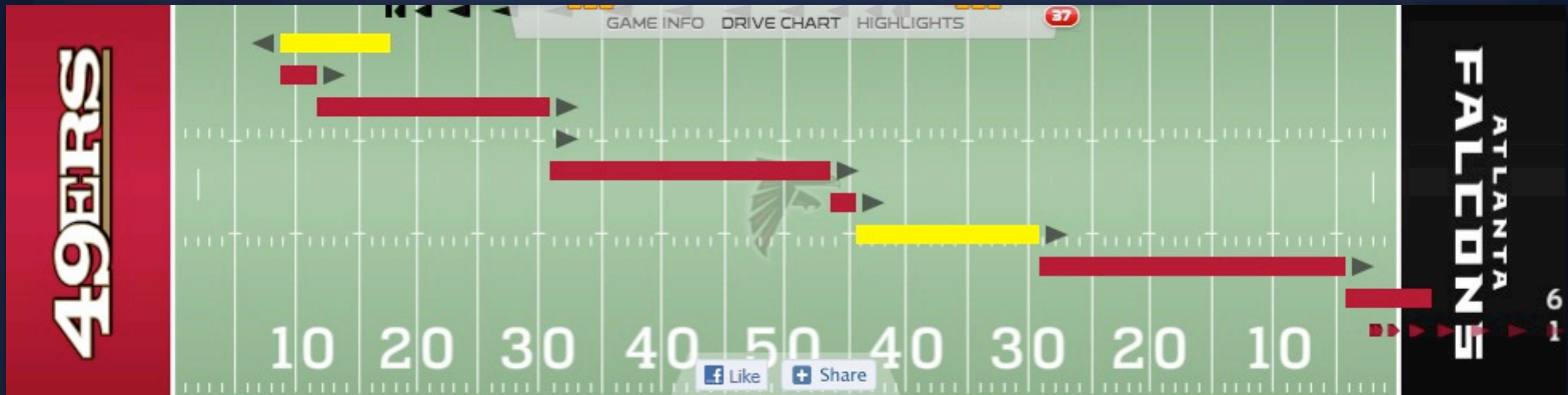
US Public Debt Since 1790

The Atlantic, 2013



49ers vs Falcons

NFL.com (2013)



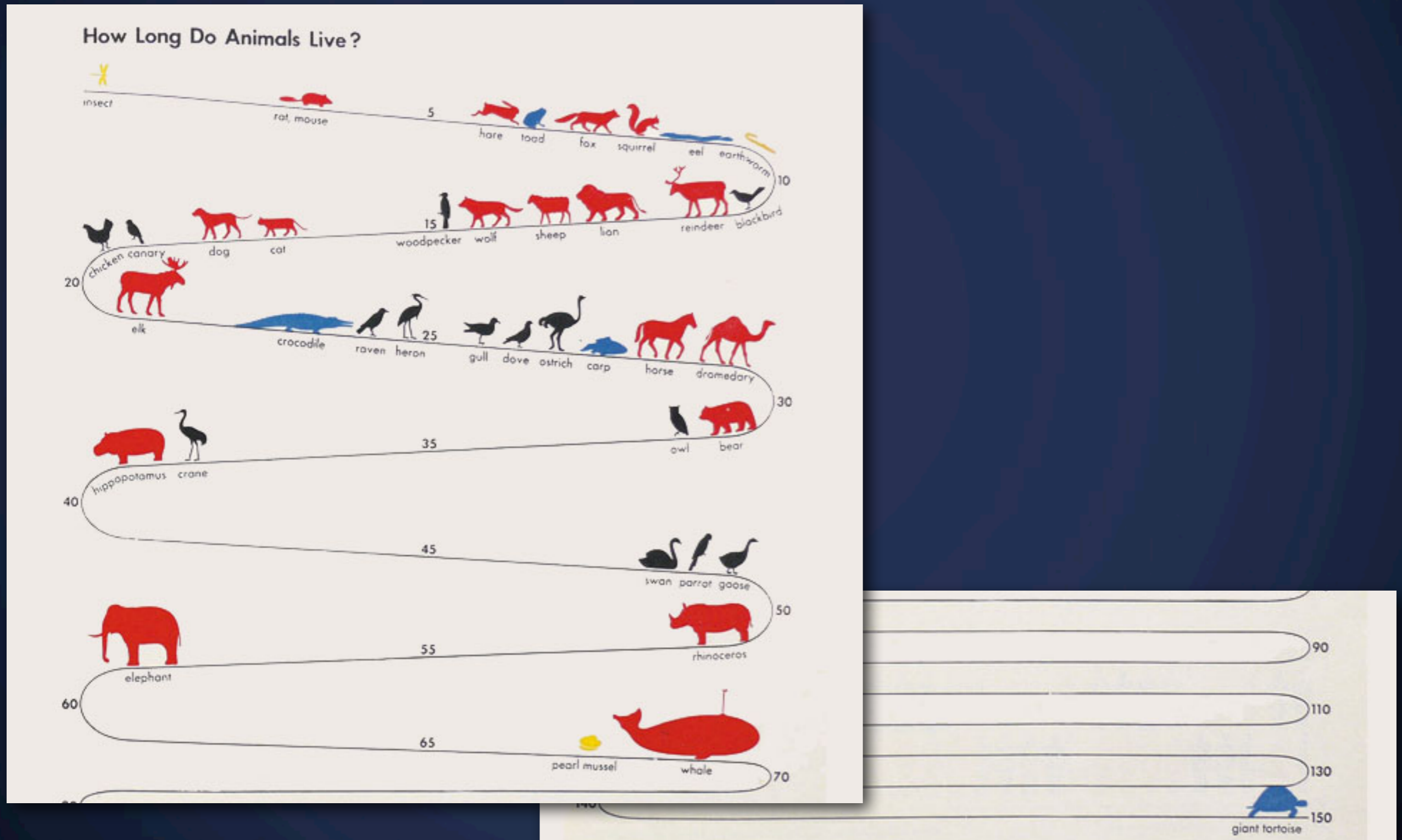
Walking SF

Eric Fischer (2010)



How Long do Animals Live?

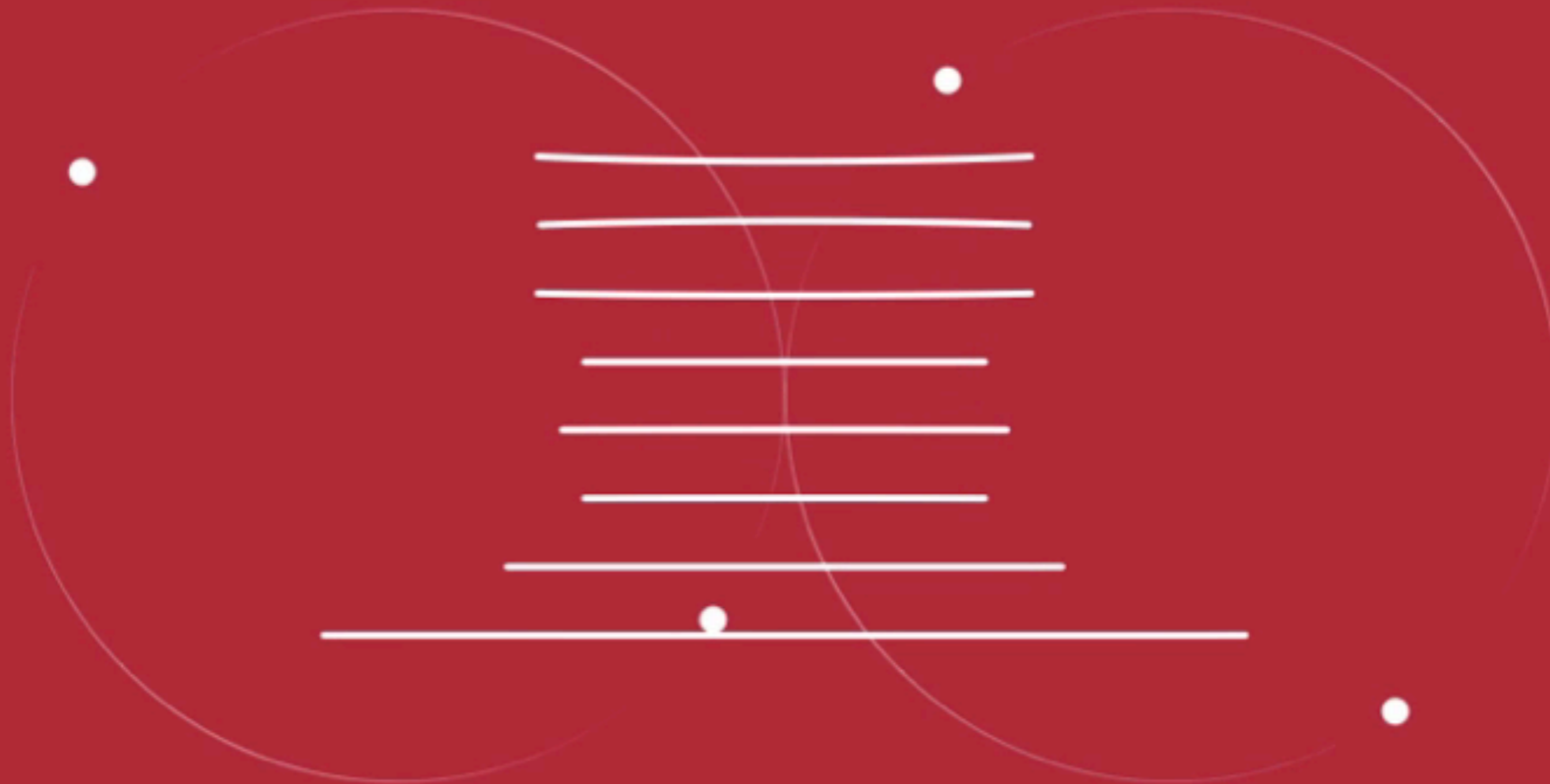
Otto Neurath, (1930s)



Pancakes!



Strings

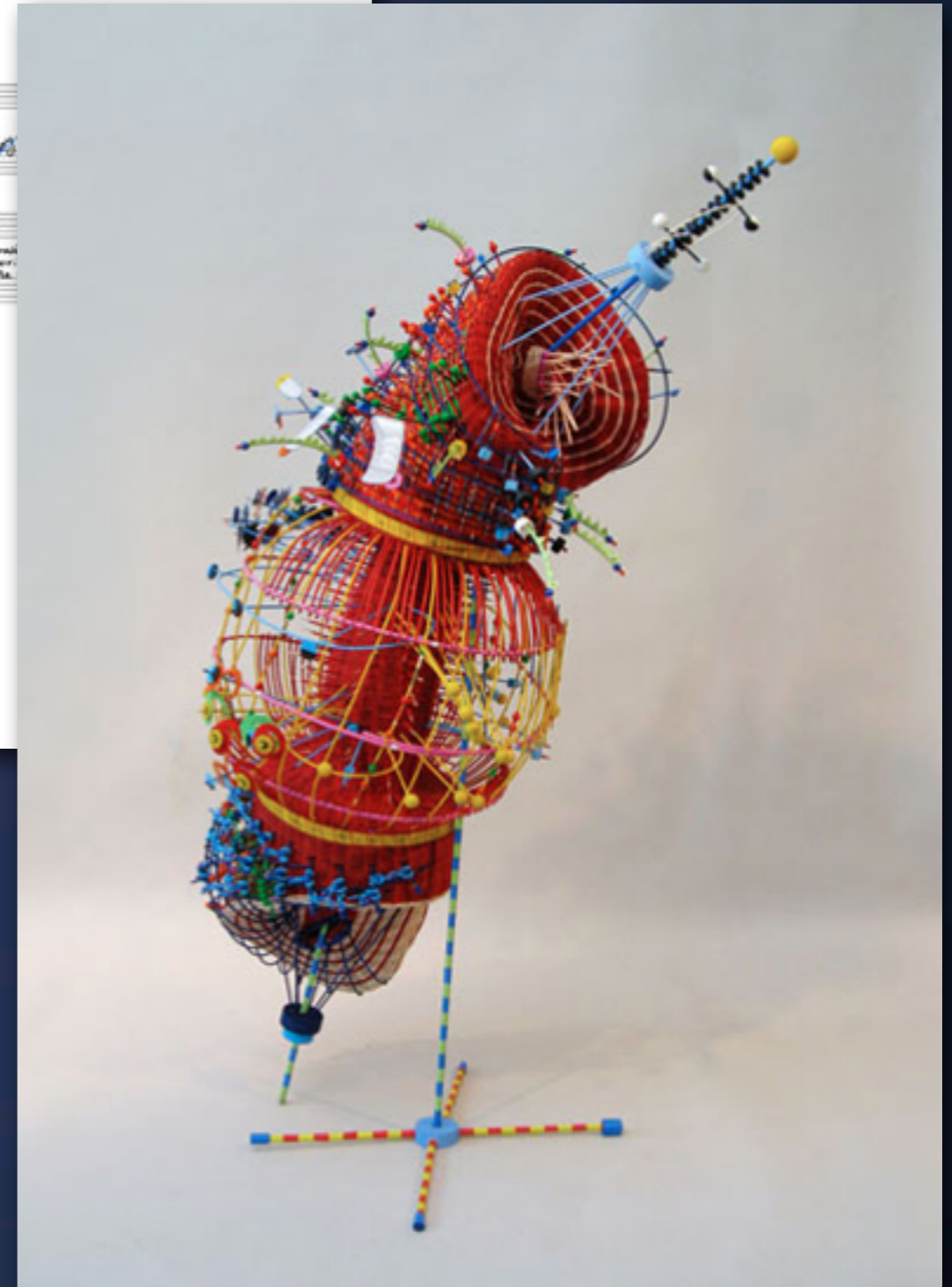


Music Score Sculptures

Natalie Miebach (2009)

Stormy Weather, Internal Storms
Score for Sculptor and Musician

The score is divided into two main sections, both labeled 'S'. The first section contains staves with notes and rests, annotated with letters N, NW, SW, and SE. The second section contains staves with notes and rests, annotated with letters NW and S. The score includes various musical notations such as notes, rests, and dynamic markings. It is annotated with colorful arrows and letters (N, NW, SW, SE, S) that correspond to the directions of the sculpture's components.

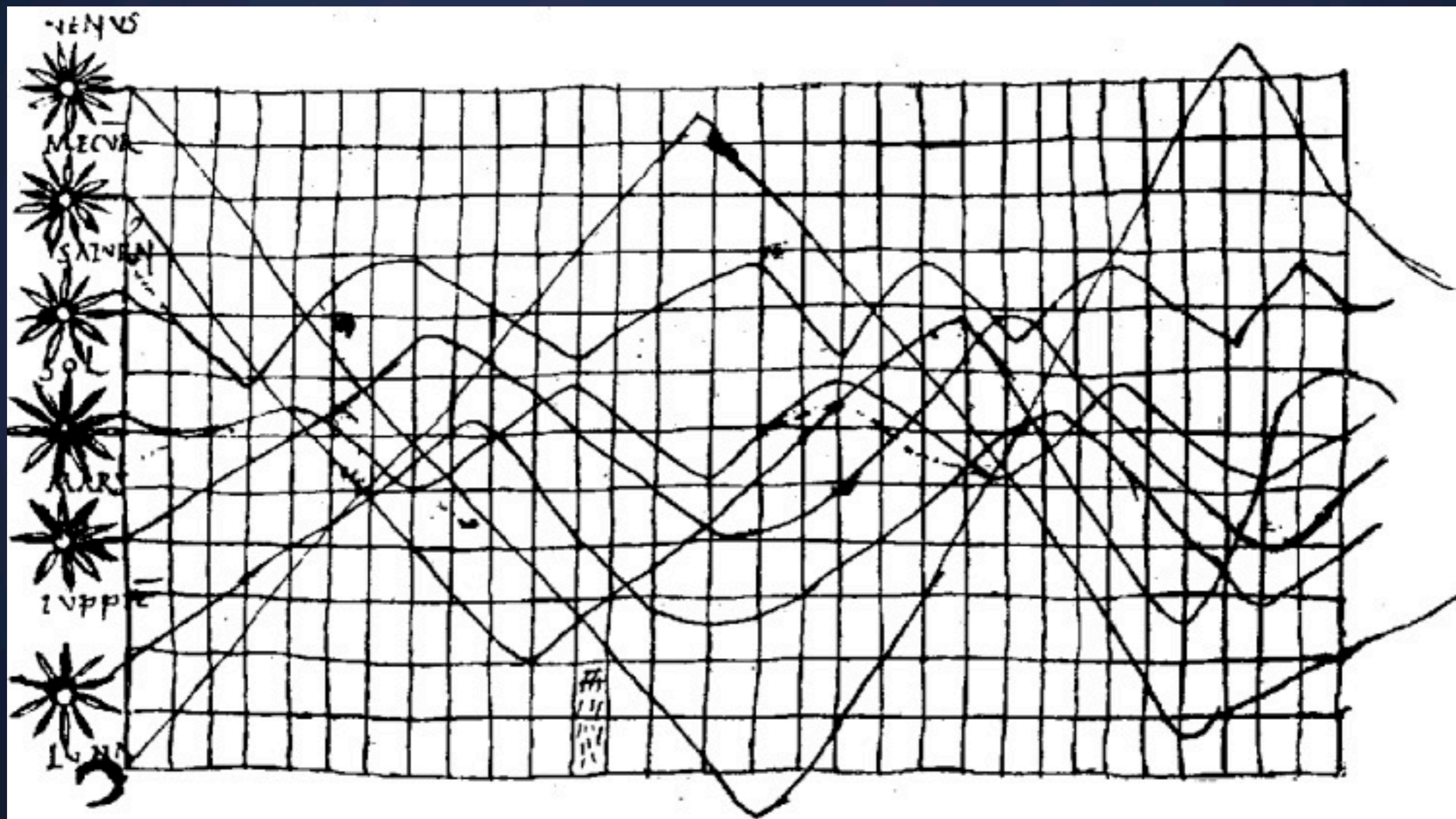


History

Just a little.

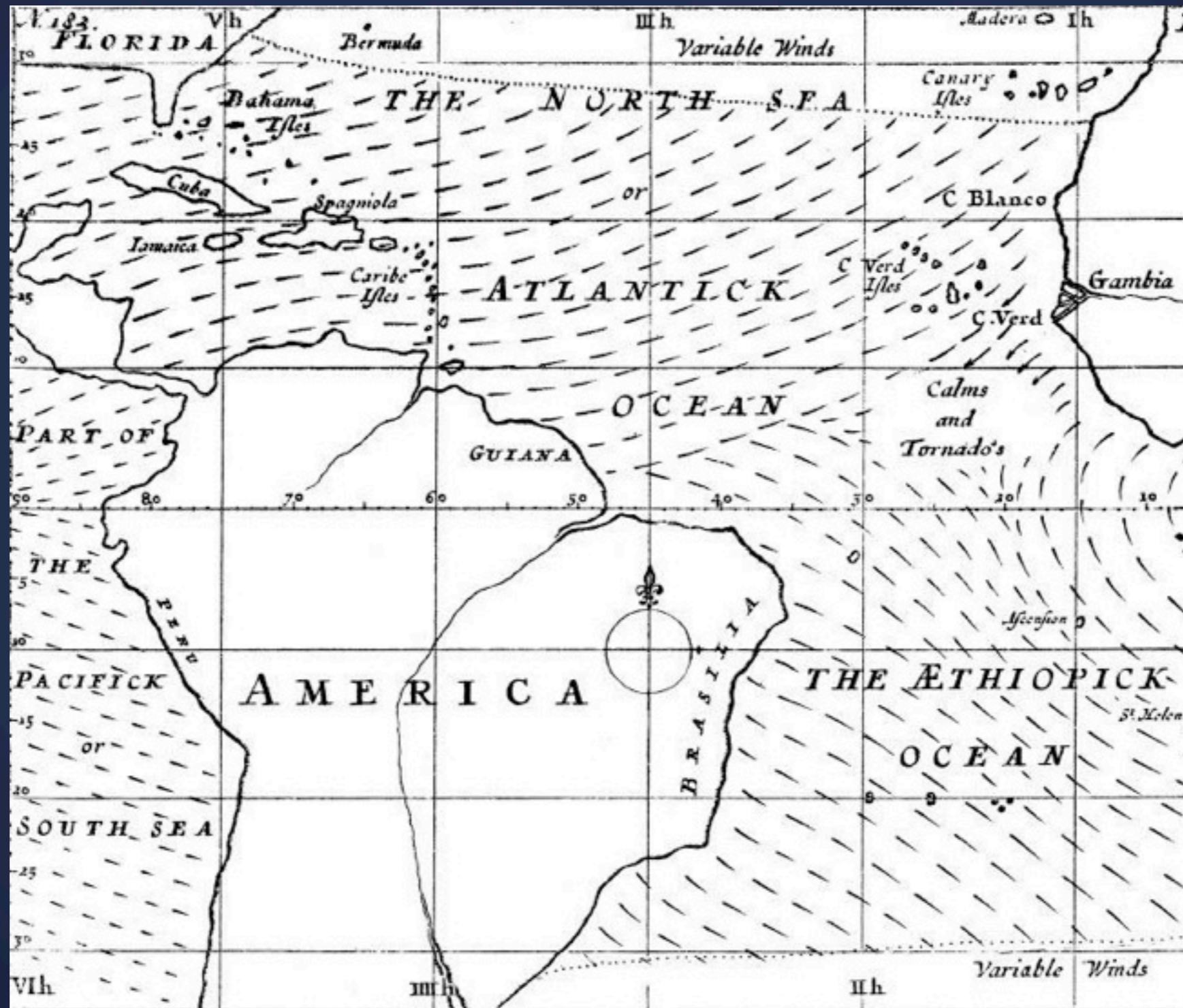
Planetary Movements

ca. 950



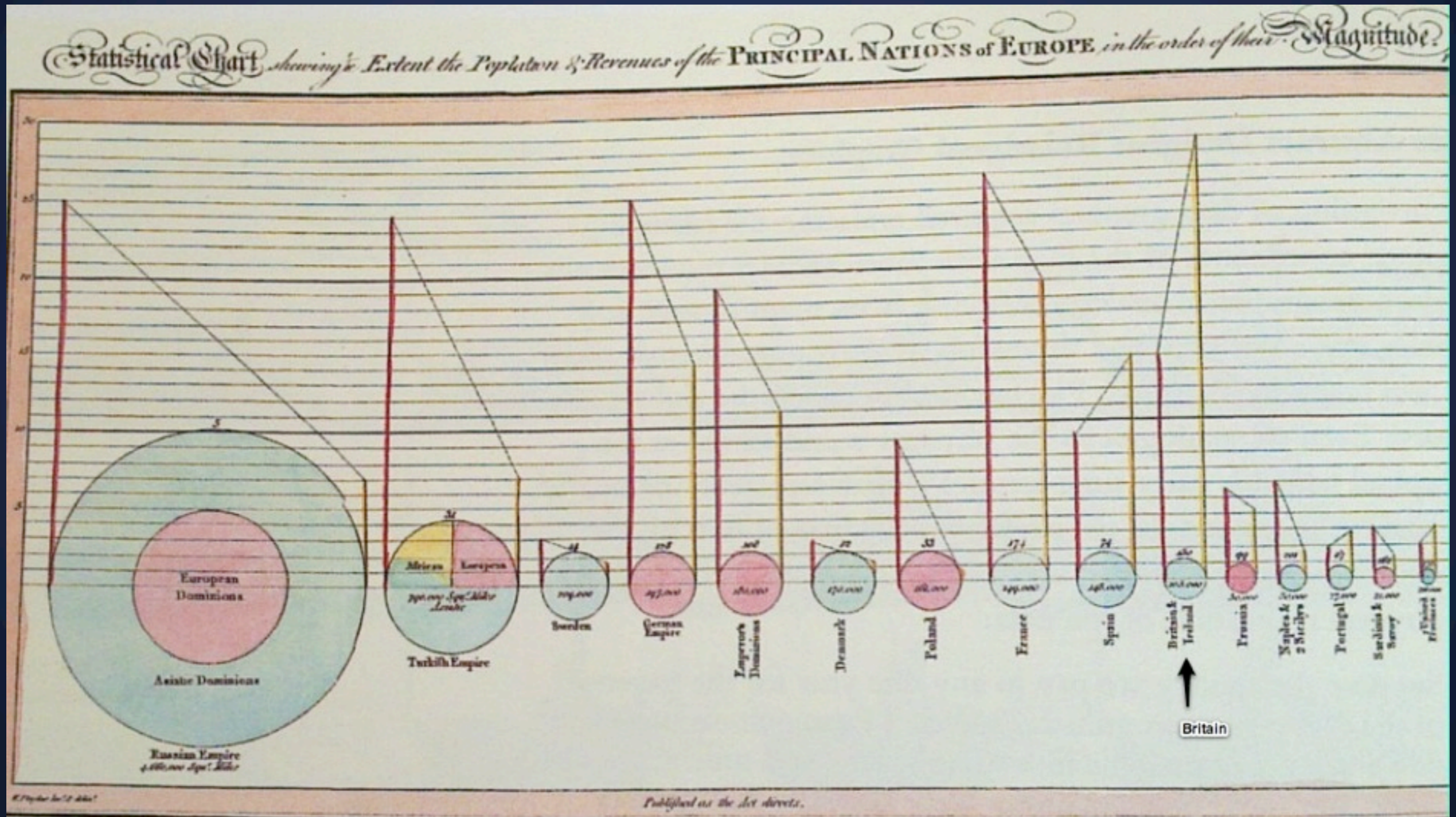
Weather Map

1686



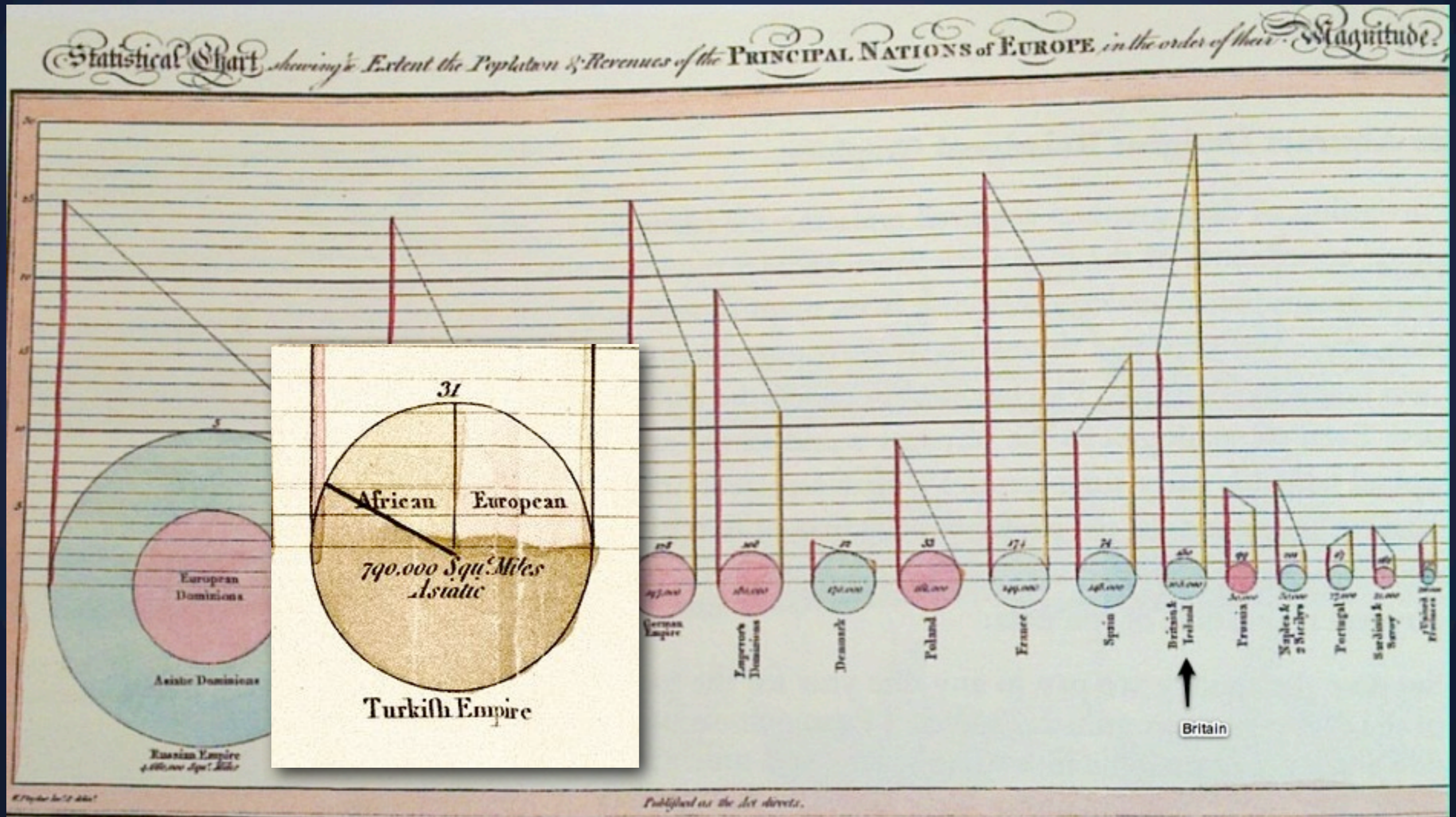
William Playfair

is credited with the invention of the pie chart. (1801)



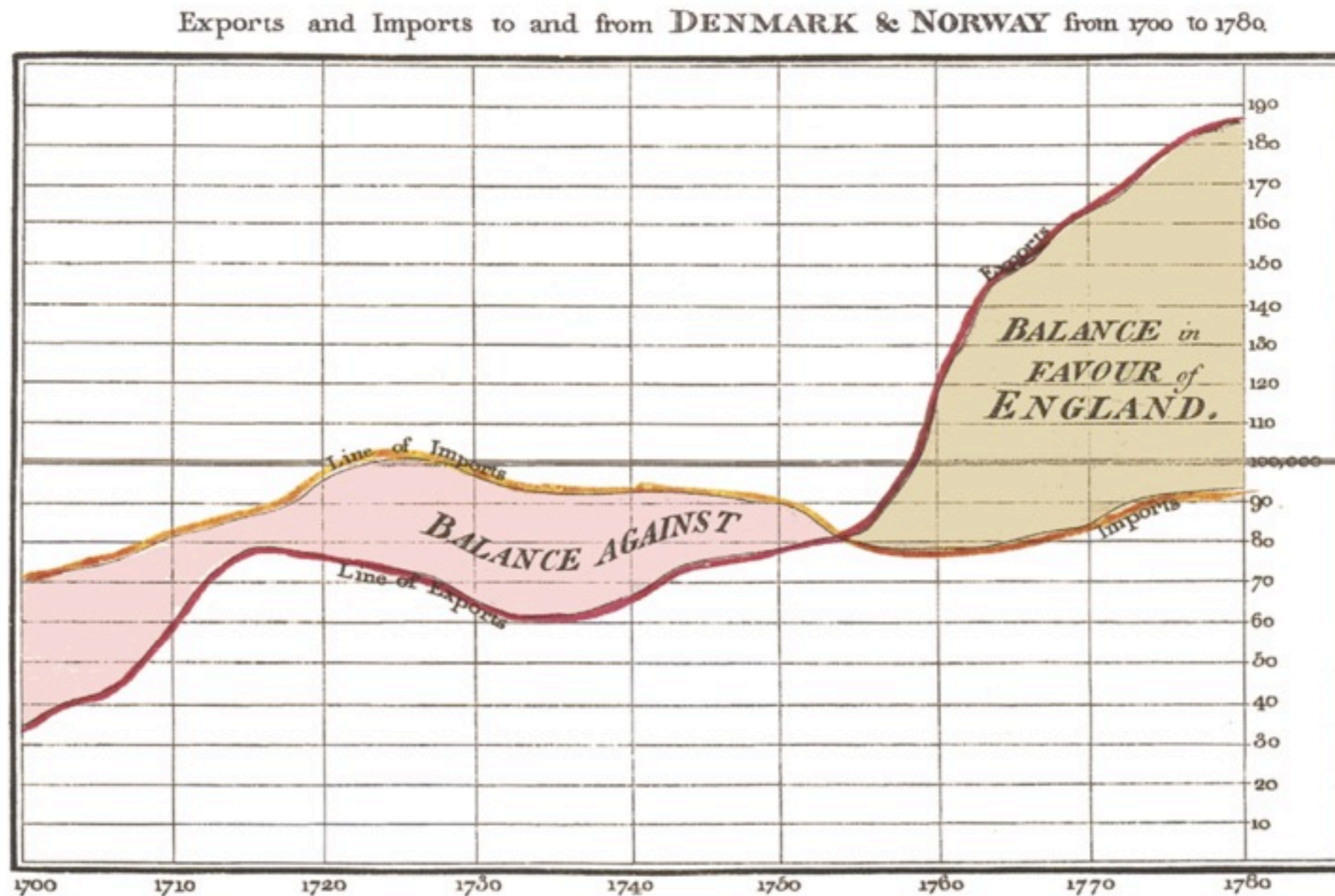
William Playfair

is credited with the invention of the pie chart. (1801)



William Playfair

... and the line / area chart based on time series



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

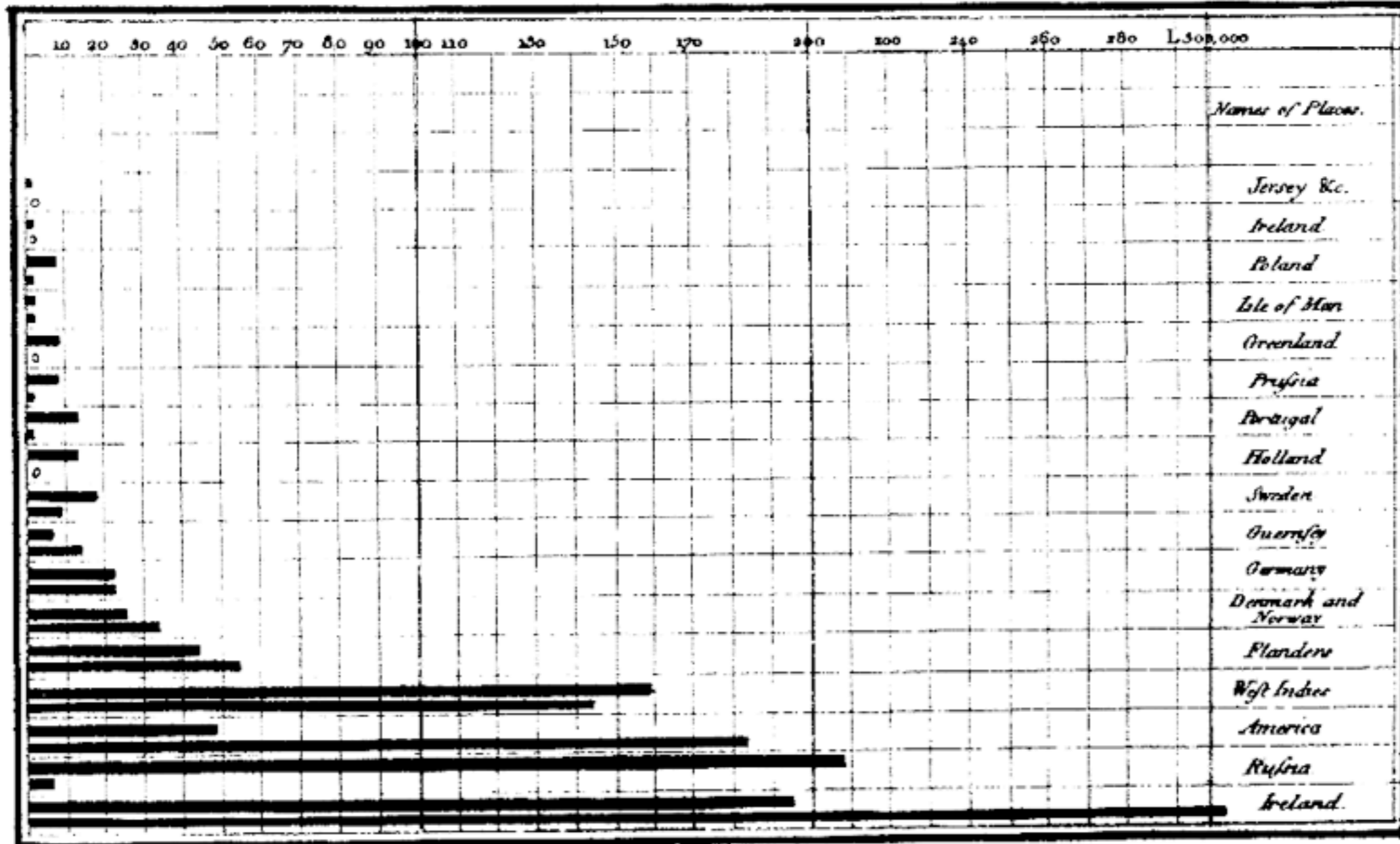
Published as the Act direct, 1st May 1786, by W^m Playfair

Next script 352, Strand, London.

William Playfair

... and the bar chart

Exports and Imports of SCOTLAND to and from different parts for one Year from Christmas 1780 to Christmas 1781.



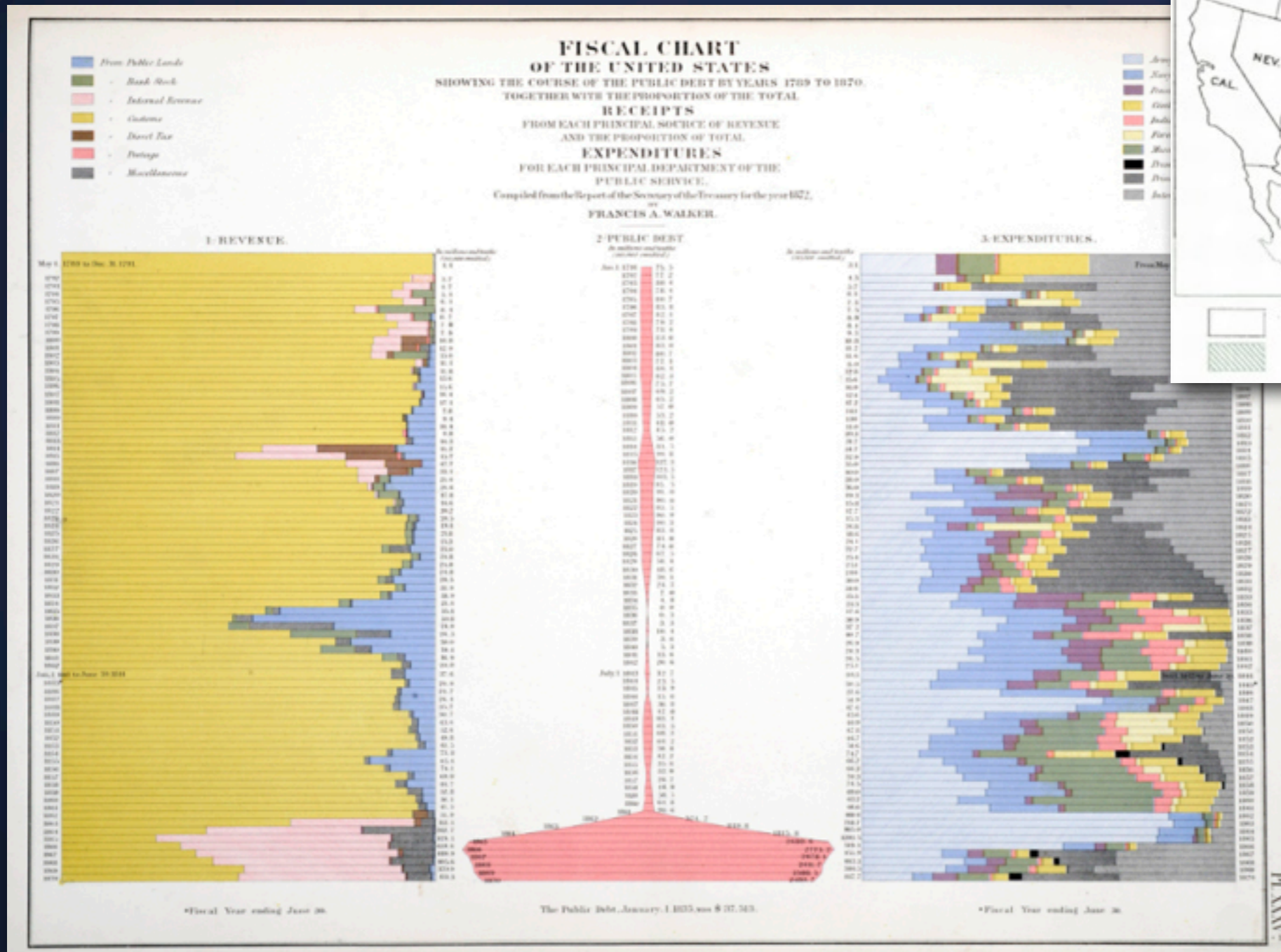
The Upright divisions are Ten Thousand Pounds each. The Black Lines are Exports the Ribbed Lines Imports.

Published in the Act done June 7th 1788 by W^m Playfair

Made up by J. S. S. Strand. London.

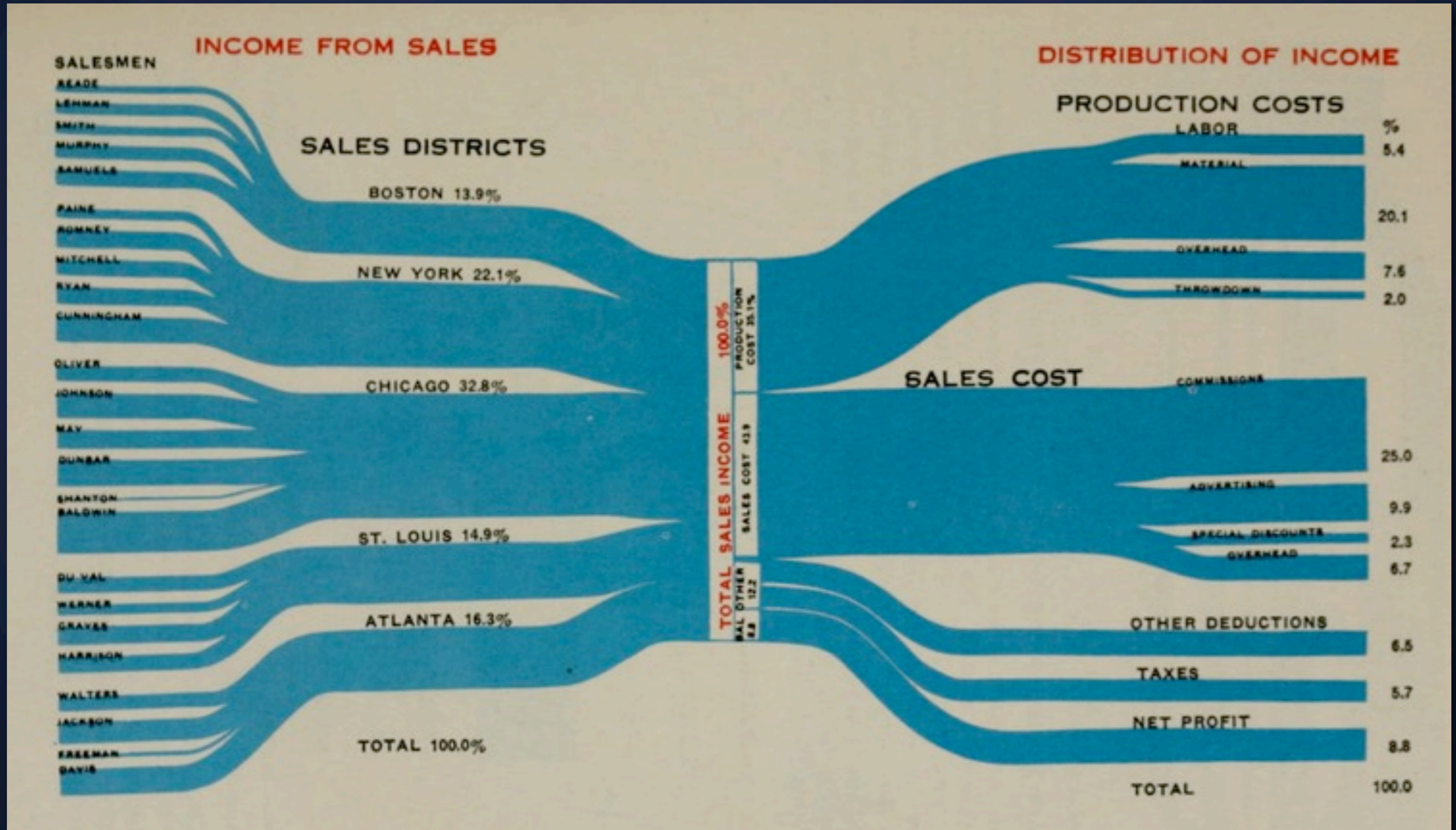
National Geographic

Pioneers using visualization in publishing (1893)



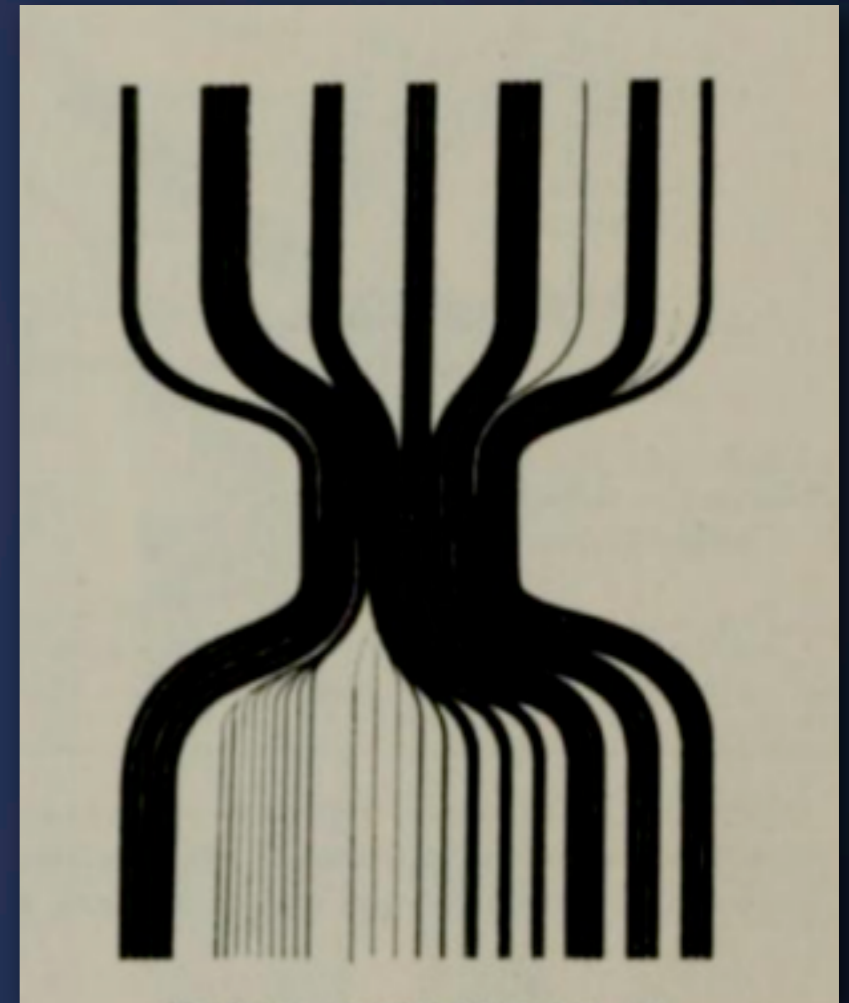
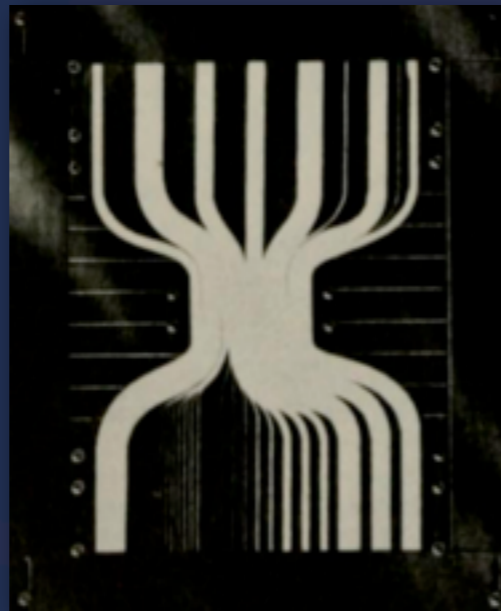
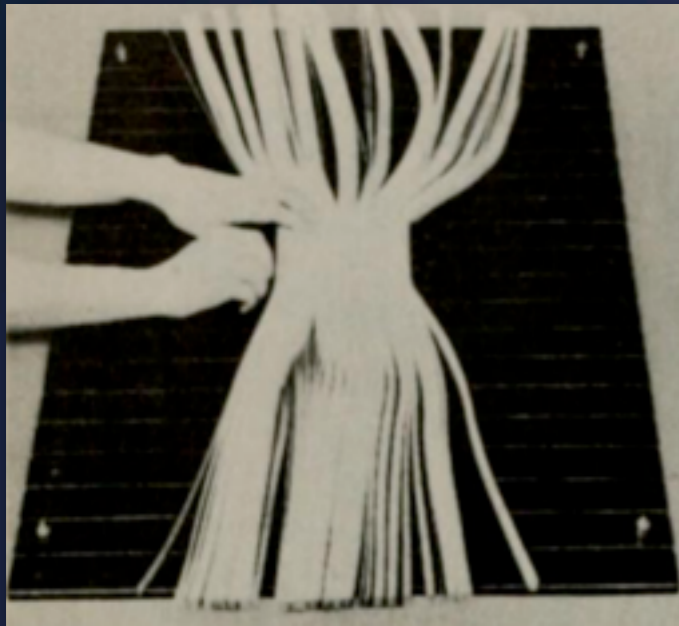
Willard Cope Brinton

Extensive collection of charts in his publication (1939)


















Willard Cope Brinton

Extensive collection of charts in his publication (1939)



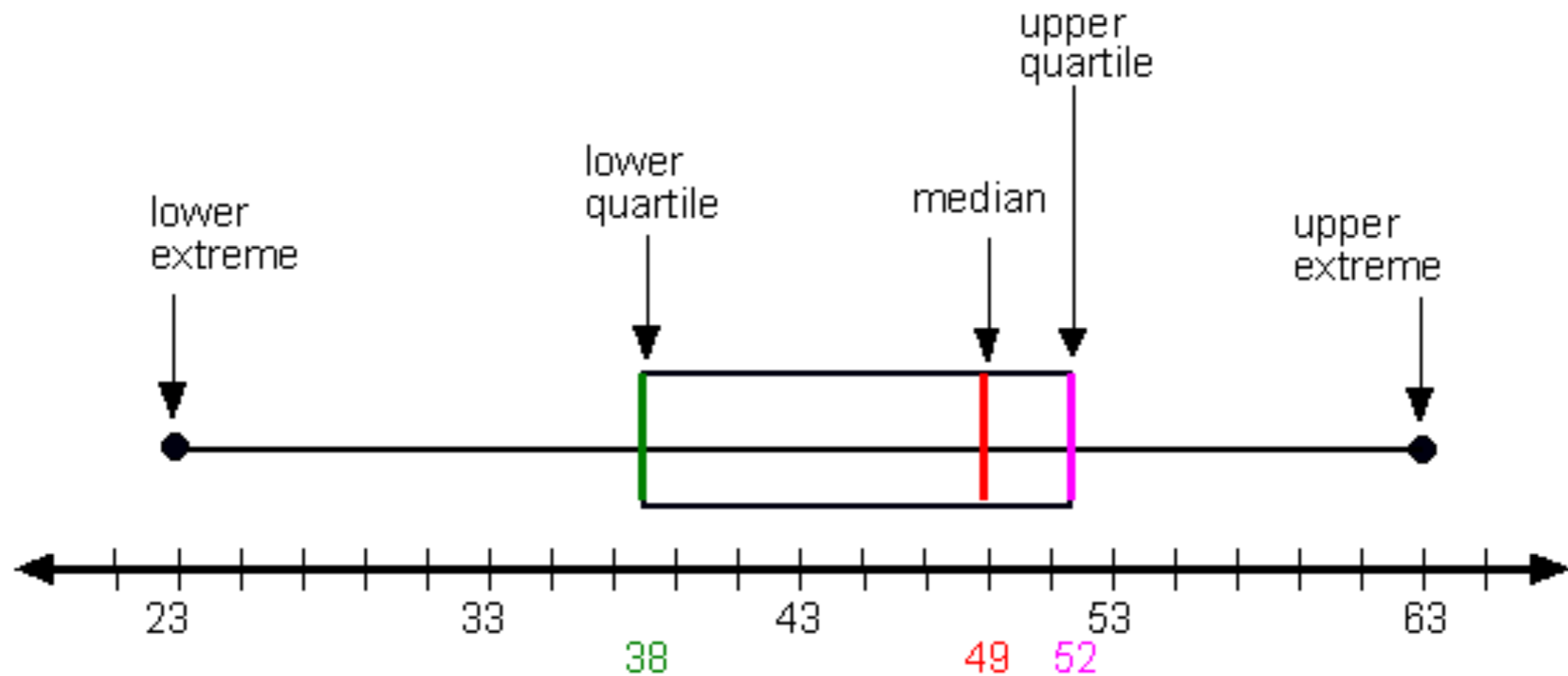
Semiology of Data

Jacques Bertin (1967)

	<i>Points</i>	<i>Lines</i>	<i>Areas</i>	<i>Best to show</i>
<i>Shape</i>		<i>possible, but too weird to show</i>	<i>cartogram</i>	<i>qualitative differences</i>
<i>Size</i>			<i>cartogram</i>	<i>quantitative differences</i>
<i>Color Hue</i>				<i>qualitative differences</i>
<i>Color Value</i>				<i>quantitative differences</i>
<i>Color Intensity</i>				<i>qualitative differences</i>
<i>Texture</i>				<i>qualitative & quantitative differences</i>

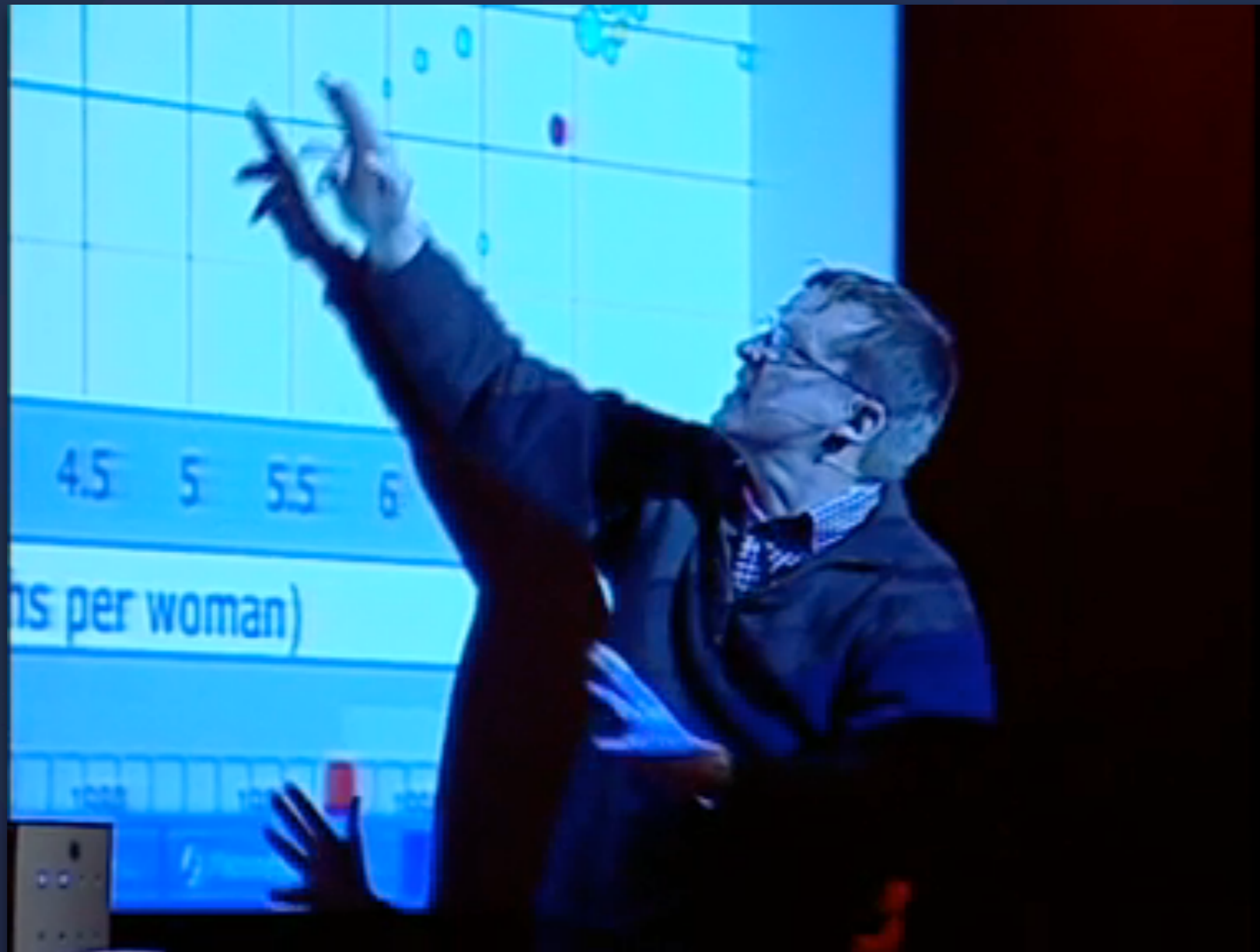
Box-And-Whisker Plot

Tukey (1977)



Visualizations Are Mainstream

Hans Rosling's famous TED talk in 2007



http://www.ted.com/talks/hans_rosling_reveals_new_insights_on_poverty.html

Today

Data



	A	B	C	D
1	Weekday	Hour	Count	
2		0	0	1
3		0	1	0
4		0	2	1
5		0	3	3
6		0	4	0
7		0	5	0
8		0	6	0
9		0	7	0
10		0	8	0
11		0	9	0

+

Tools & Frameworks



d3.js



=

More Access
More Resources
Bigger Community

Why do we create Visualizations?

Function And Objective

Three Functions

Record

Analyze

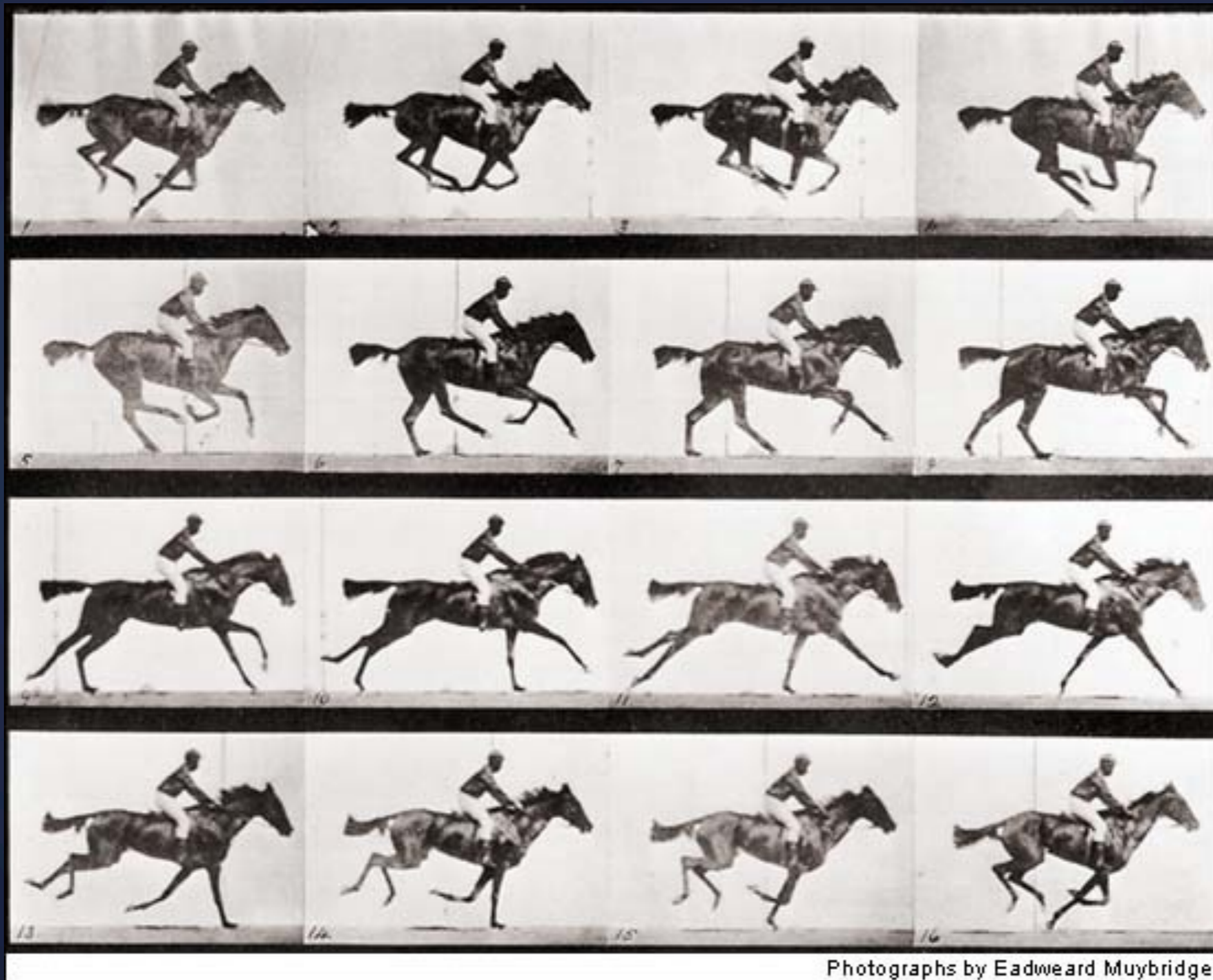
Communicate

Record



Record

Galloping Horse (Eadweard Muybridge, 1872)



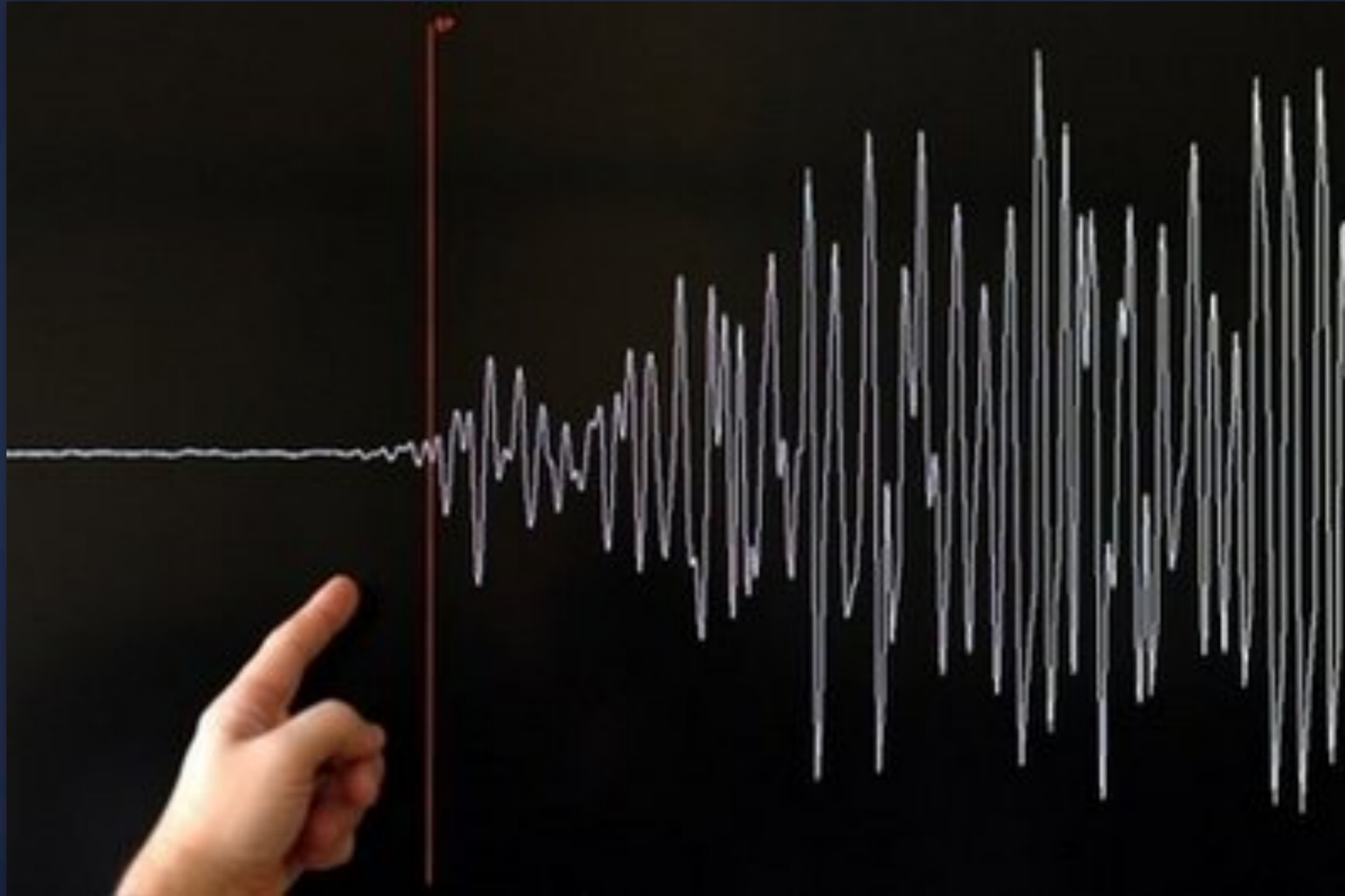
Photographs by Eadweard Muybridge

Record



Record

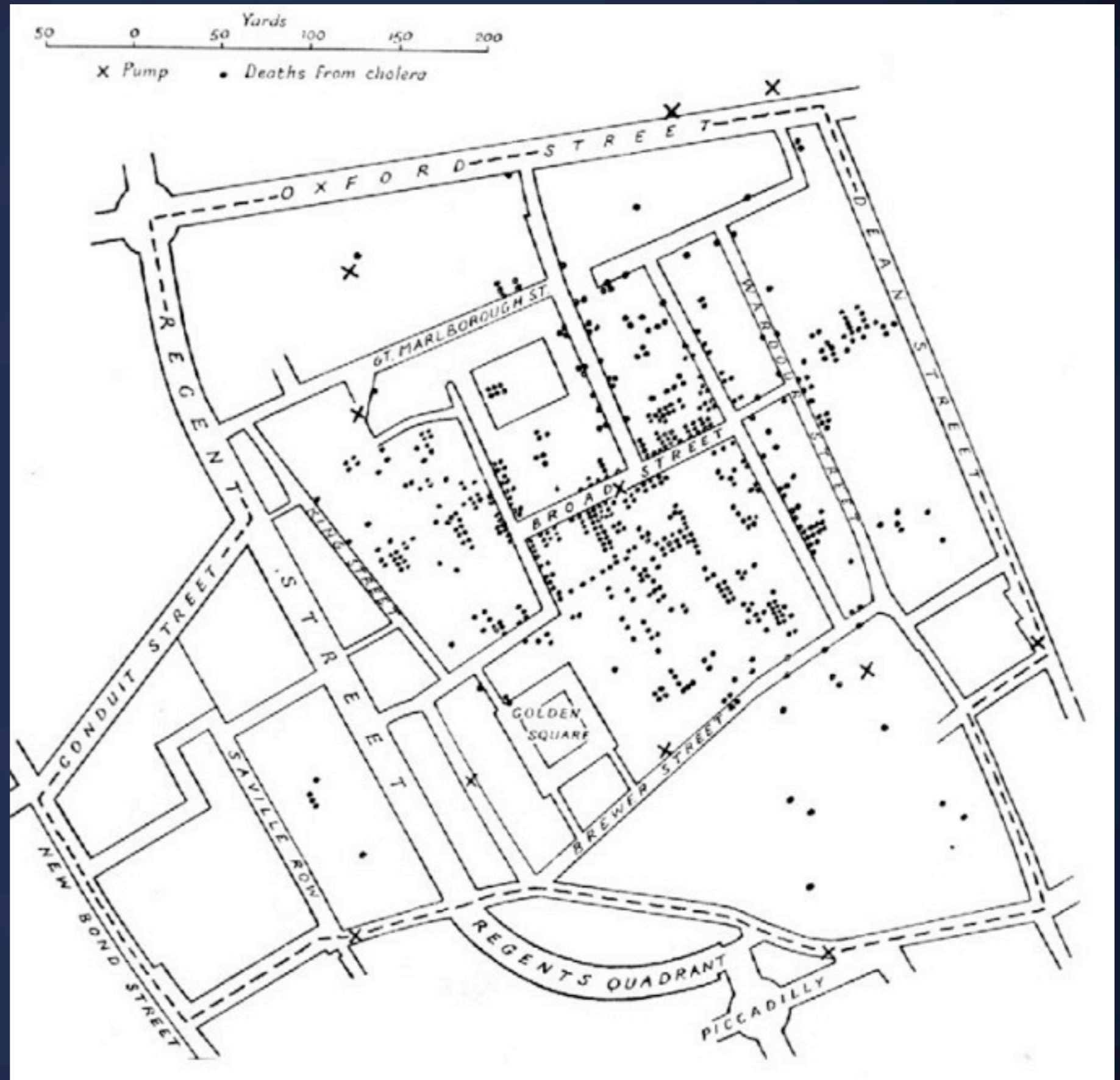
Seismograph, 8.9-magnitude earthquake, Japan



<http://globaleconomicanalysis.blogspot.com/2011/03/videos-images-news-of-japan-earthquake.html>

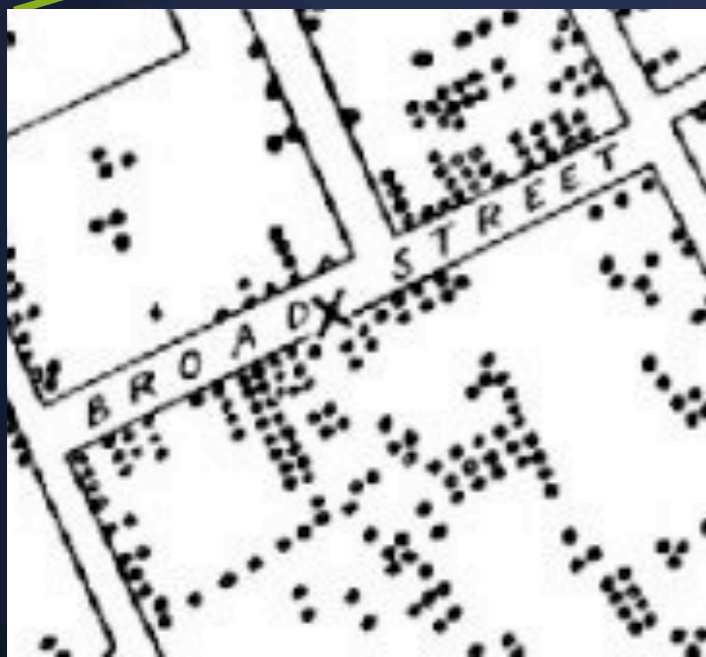
Analyze

Cholera Outbreak
(John Snow, 1854)



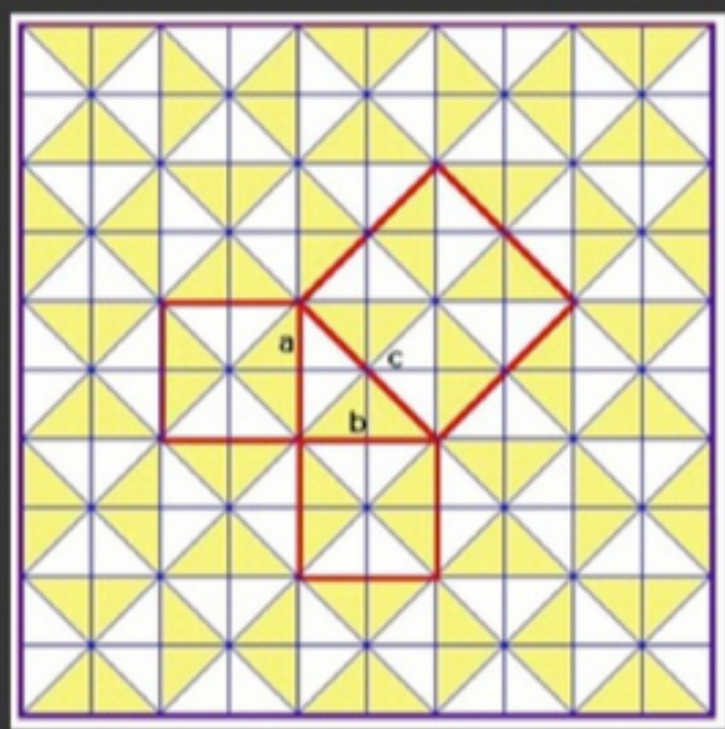
Analyze

Cholera Outbreak
(John Snow, 1854)



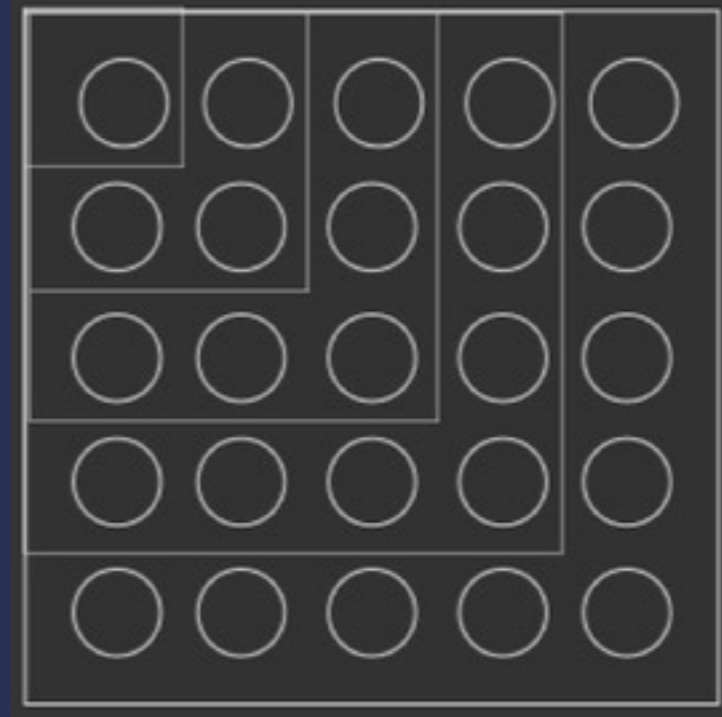
Analyze

Graphical calculation: Visual Proofs



Pythagorean Theorem

Chinese proof by dissection

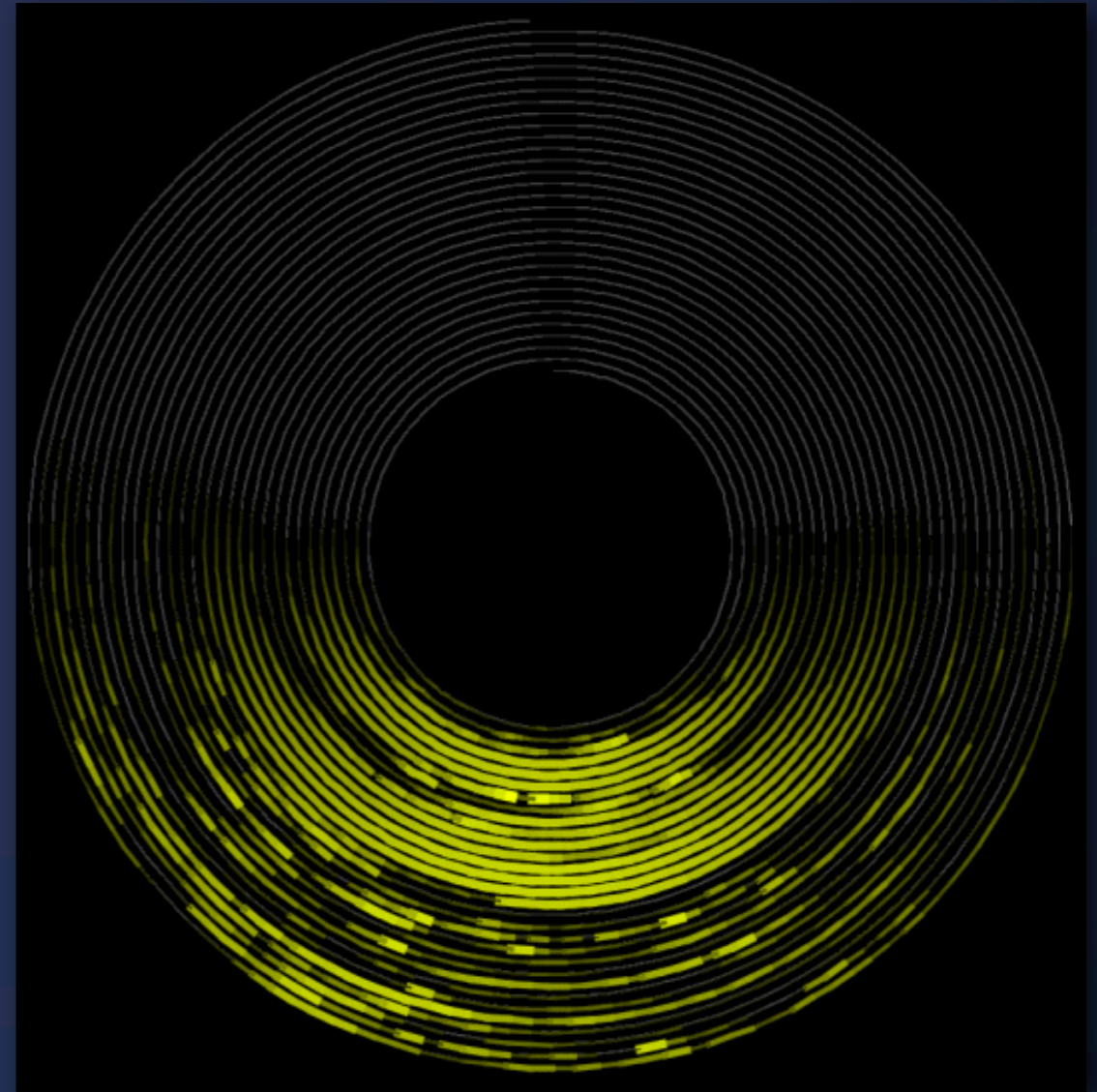
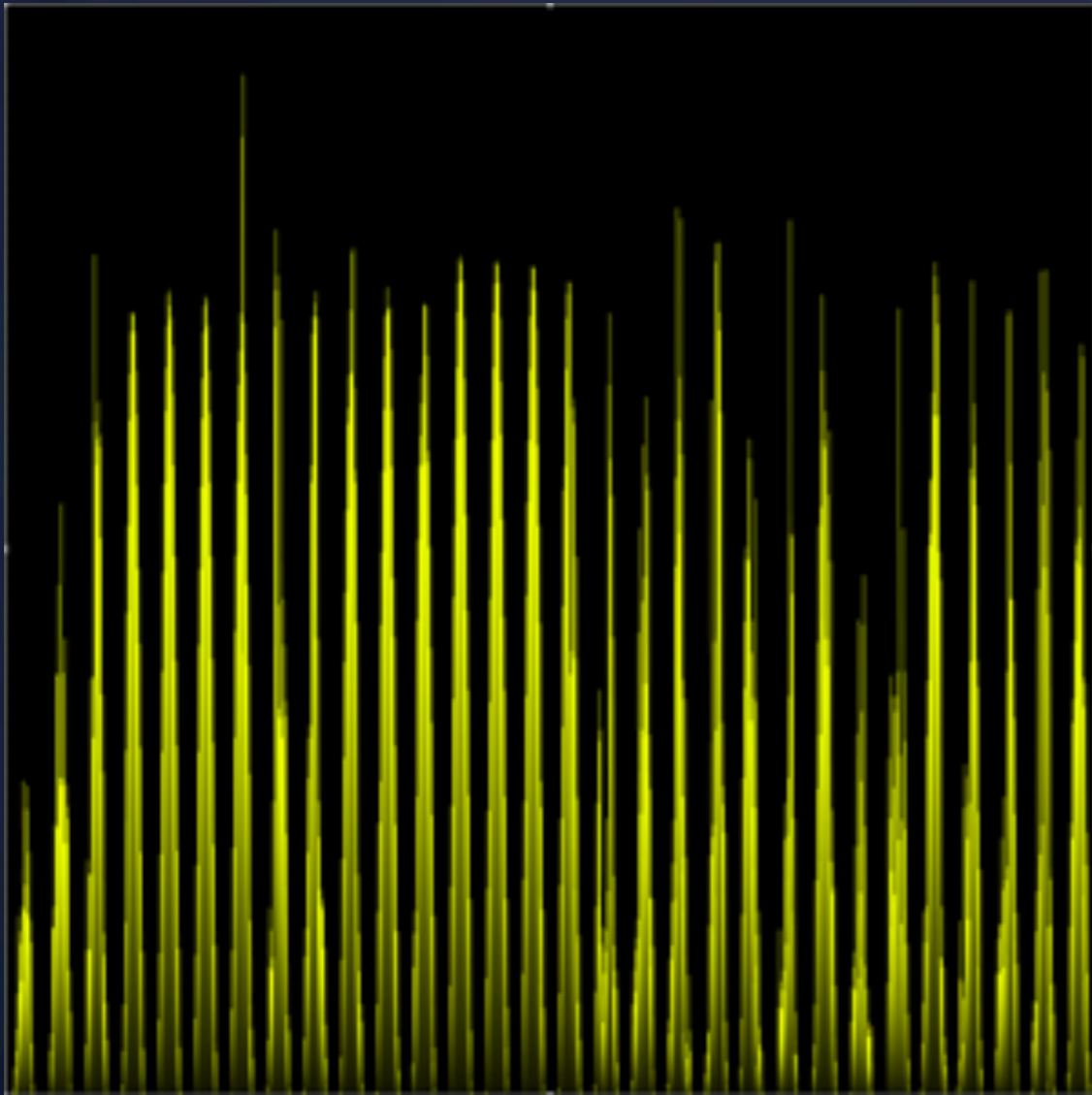


Sum of odd numbers

$$1 + 3 + 5 + 7 + 9 = 5^2$$

Analyze

Time Series (Here: Sunshine Intensity) on Spirals (Weber et al., 2001)



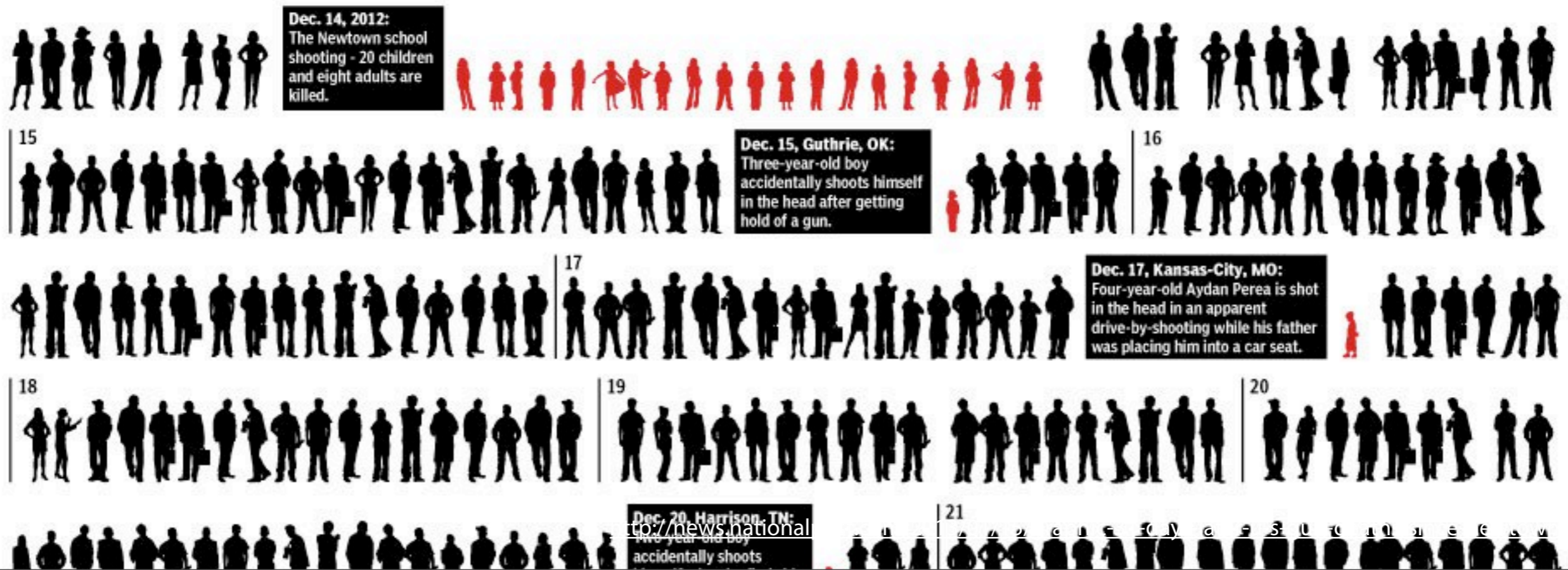
Communicate

"31 Days Later", National Post (2013)

31 DAYS LATER

How many people have died by guns in America since the shooting deaths at Sandy Hook Elementary School in Newtown, Conn. a month ago, that resulted in 20 children and eight adults being killed? The Slate news website and the twitter feed @GunDeaths have been collecting crowd sourced data on the number of people killed by guns. The following data is likely incomplete as some news reports probably escaped the attention of @GunDeaths and its followers. Also, suicides, estimated to make up about 60% of gun deaths, typically go unreported.

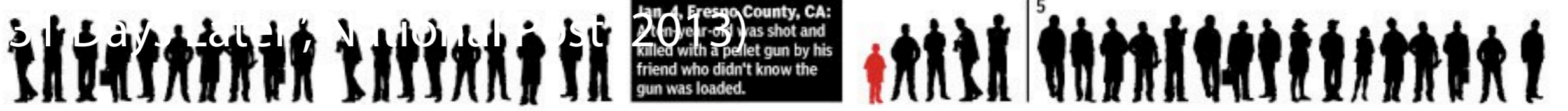
NUMBER OF AMERICANS KILLED BY FIREARMS SINCE THE NEWTOWN SCHOOL SHOOTING ■ CHILDREN AGED 0-13 ■ TEENS AND ADULTS AGED 14+



Communicate



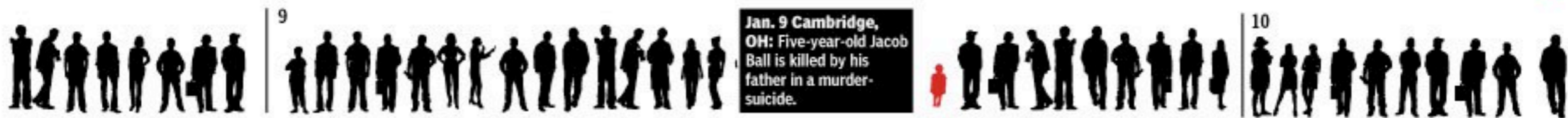
Jan. 4, Ocala, FLA: One-year-old Jonah Mendoza is shot and killed by his mother in an attempted murder-suicide.



Jan. 4, Fresno County, CA: A 10-year-old was shot and killed with a pellet gun by his friend who didn't know the gun was loaded.



Jan. 8 Pleasant Valley, AL: A 12-year-old is killed when his cousin pretends to shoot his cousin - with his Christmas gift shotgun - not realizing the gun was loaded.



Jan. 9 Cambridge, OH: Five-year-old Jacob Ball is killed by his father in a murder-suicide.



Jan. 12, Breckenridge, MO: Stephen Curtis, a 12-year-old who grew up learning about gun safety and had a hunter's safety certification, mishandled a handgun and shot himself.



According to @gundeaths on Jan. 15, 2013, a total of 919 people have been killed by firearms since the massacre of the innocents in Newtown.

SOURCE: @GUNDEATHS

ANDREW BARR & RICHARD JOHNSON / NATIONAL POST

Communicate

GE infographic "What's an LED"

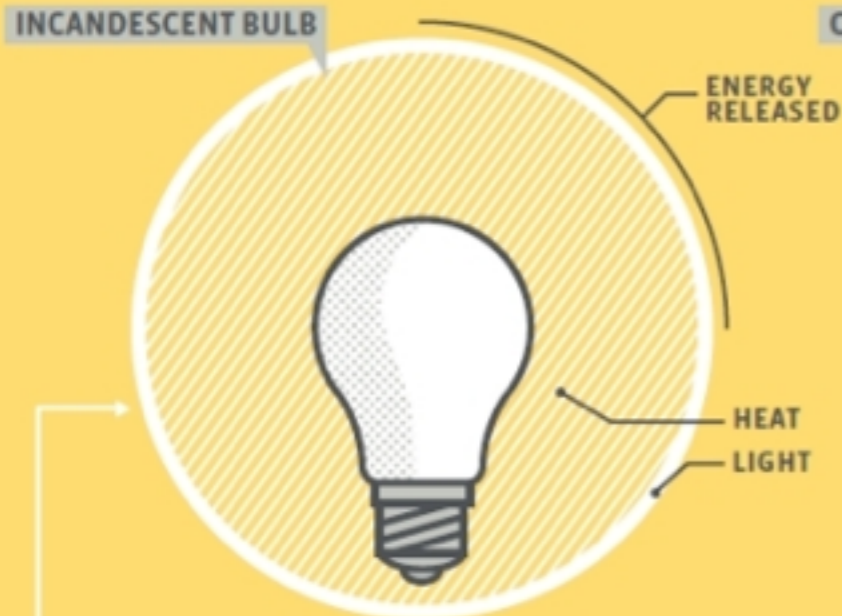
WHAT'S AN LED?

LEDs (or light-emitting diodes) are small sources of light that work when the movement from electrons illuminate semiconductor material. This longer lasting technology is usually found in traffic lights and exit signs, but now consumers can find options like LED light bulbs and even Christmas lights. Companies like GE are working to make LED technology more affordable and practical for homes. The Department of Energy estimates that rapid adoption of LED lighting in the U.S. over the next 20 years can reduce lighting electricity demand by 33% by 2027.

LED Benefits

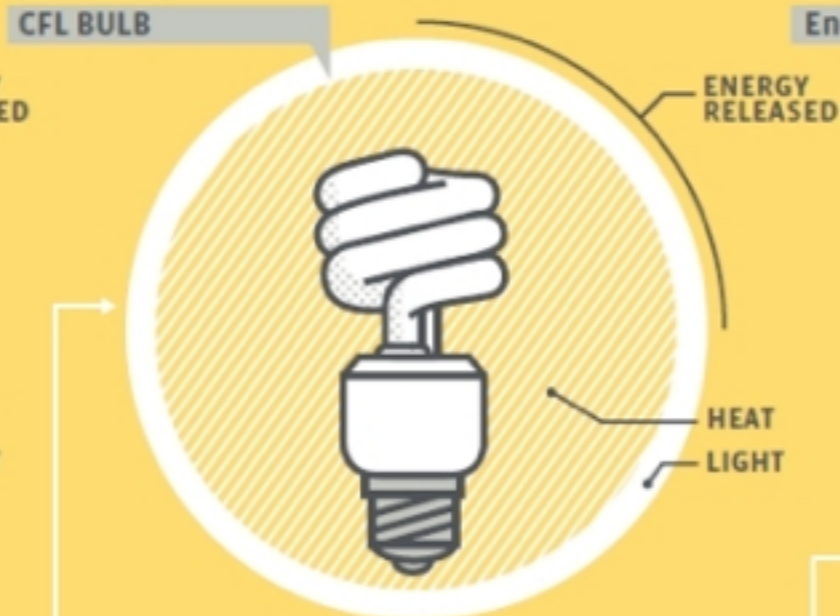
- Directs light more efficiently
- Has compact size
- Resists breakage
- Long lifetime
- Turns instantly on
- No infrared or UV emissions

INCANDESCENT BULB



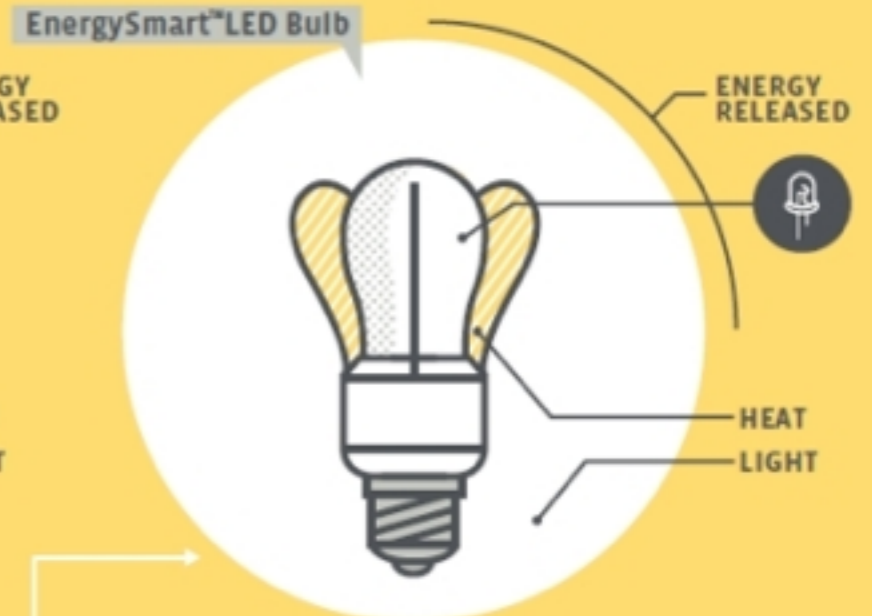
90% of the energy released from incandescent bulbs is heat.

CFL BULB



80% of the energy released from CFL bulbs is heat.

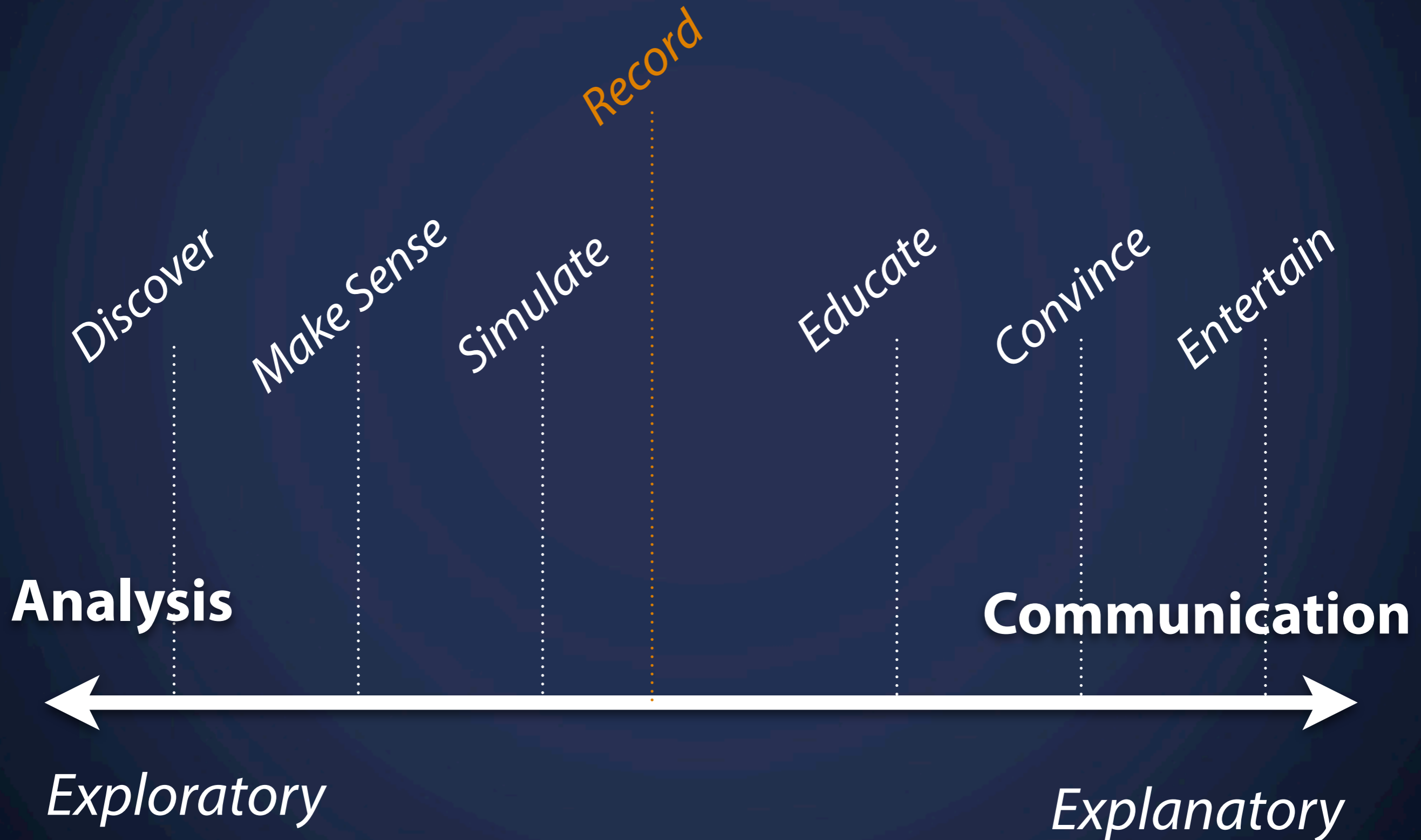
EnergySmart™ LED Bulb



75% of the energy released from an LED bulb is heat, which is channeled into a heat sink so it stays cool to the touch.

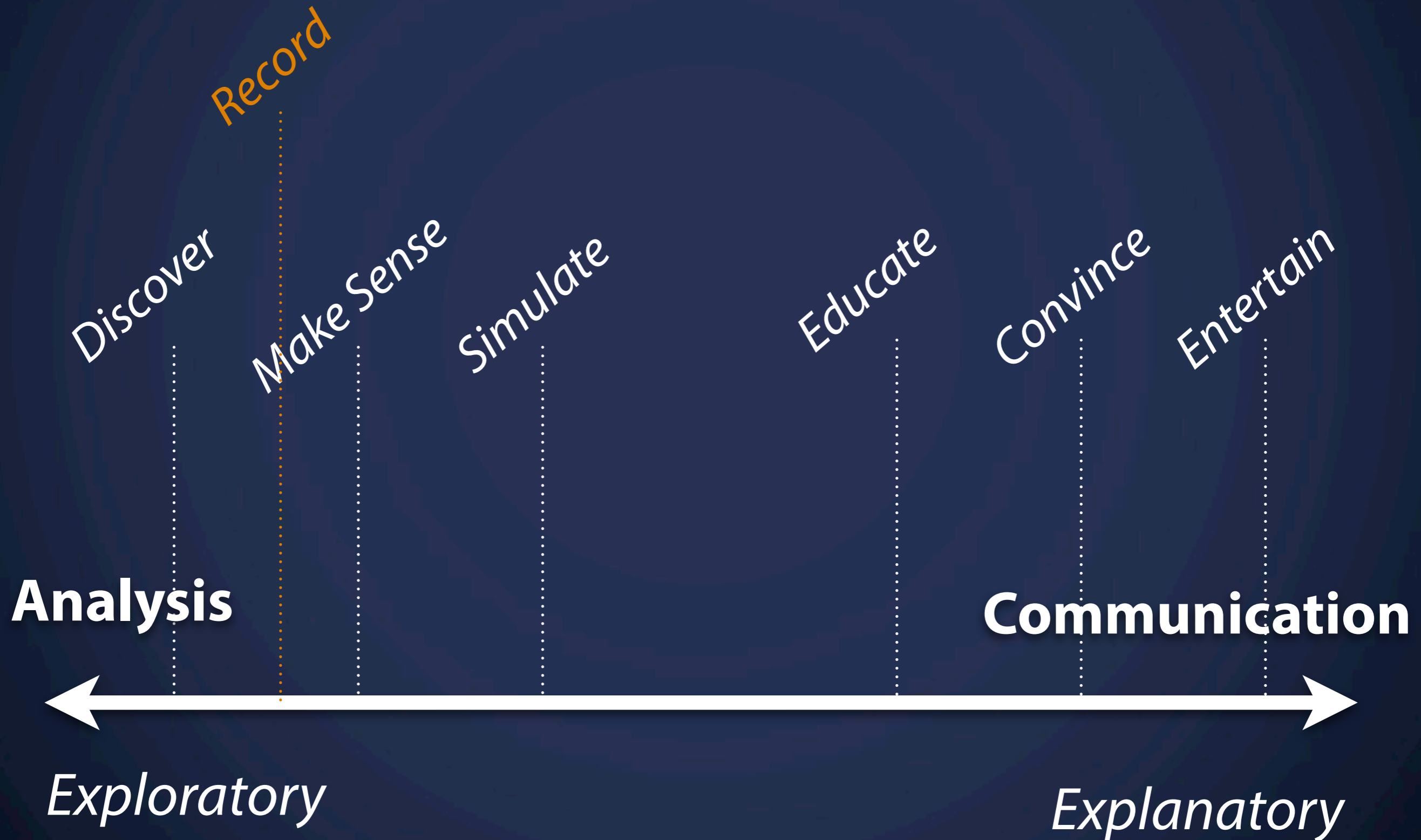
Analysis – Communication

What's the objective?



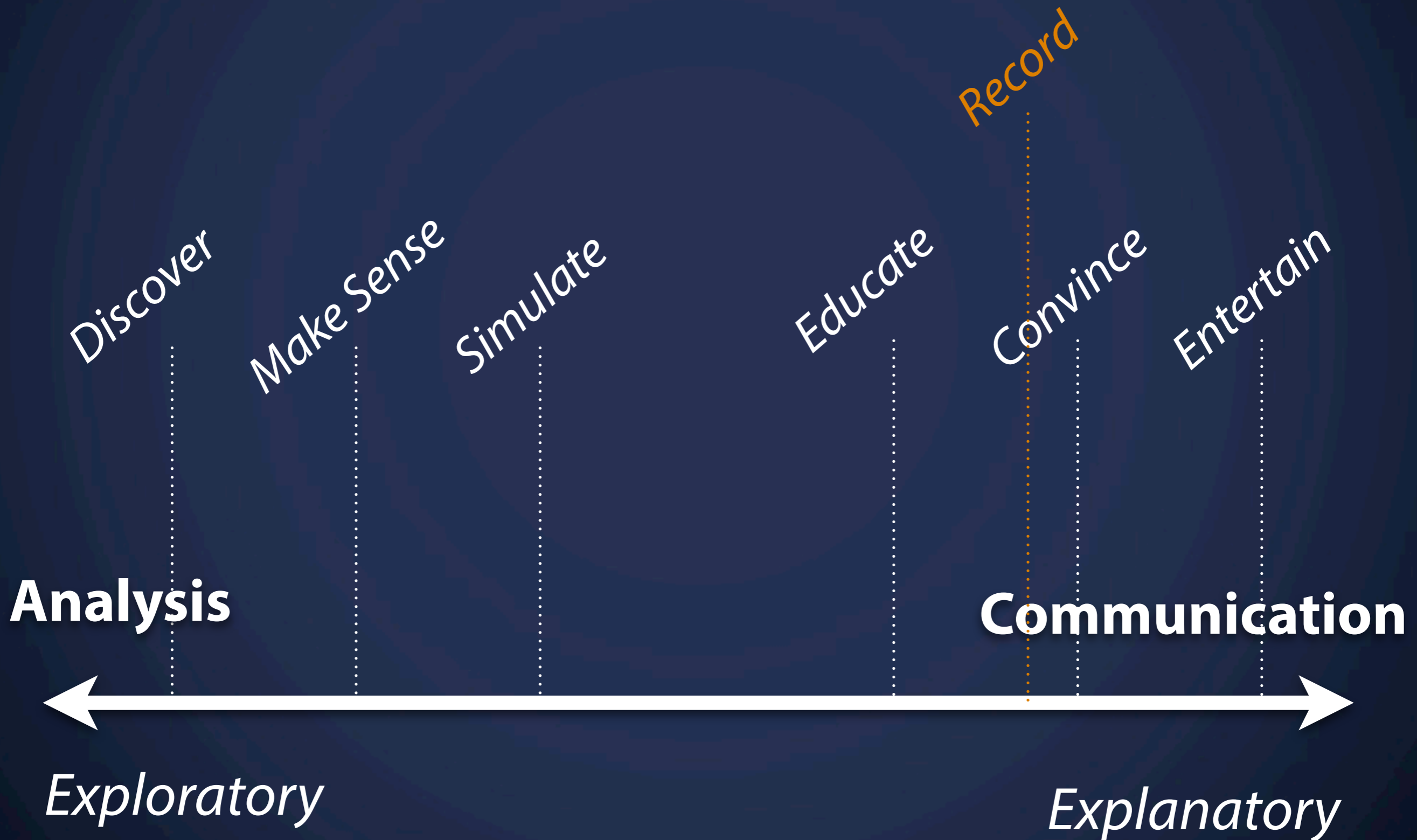
Analysis – Communication

What's the objective?



Analysis – Communication

What's the objective?



Recap

About me



UC Berkeley School of Information



*Data Visualization
Consultant*



Your Tutor

Galen Panger



This Semester

Course Mechanics And Topics

Course Goals

Know the foundations

Learn the principles of information visualization

Critique

Learn how to critique and evaluate information visualizations

Build

Build your own visualizations

Apply theoretical foundations

Syllabus

and Class Website

<http://blogs.ischool.berkeley.edu/i247s13/>

Requirements



Assignments

4 Assignments
throughout the course
of the semester

30%

Labs / Participation

Attend and participate
in labs

Participate in class
discussions

Discuss on the class
blog

20%

Final Project

Build an interactive
information
visualization in groups

50%

Participation on The Blog

- Submissions **must include a screenshot and link/embed**
- Minimum **one paragraph**
 - critiquing its effectiveness *and/or*
 - tying it into what we cover in class
- Use the **Visualization** category for your posts

*If you just want to share visualizations, use hashtag **#i247** on your social network of choice.*

Assignments

Dates

Assignment 1 ● due Jan 29

Assignment 2 ● due Feb 12

Assignment 3 ● due Feb 26

Assignment 4 → ● due Mar 19
Data excerpt due Feb 5



Semester

Announcement

Assignment 1

Task Find and document 2 visualizations

- 1 online
- 1 “in the wild”

Deliverable 2 visualizations; 1 page writeup

Due Tuesday Jan 29, 3:00PM

More information on the class blog

Announcement

Assignment 4

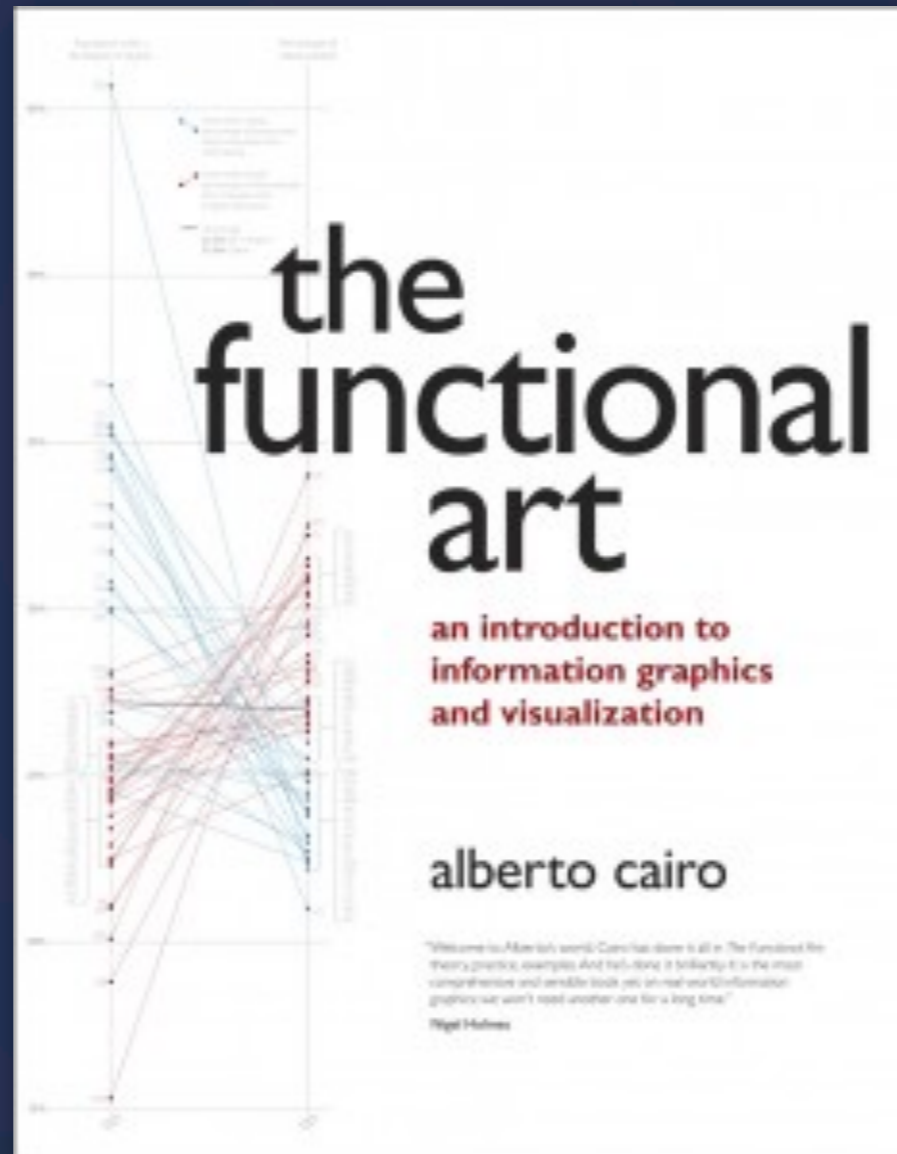
Task (for now) start collecting 2 or more daily metrics of your everyday life

Deliverable Your data set (so far)

Due Tuesday Feb 5, 3:00PM

More information on the class blog

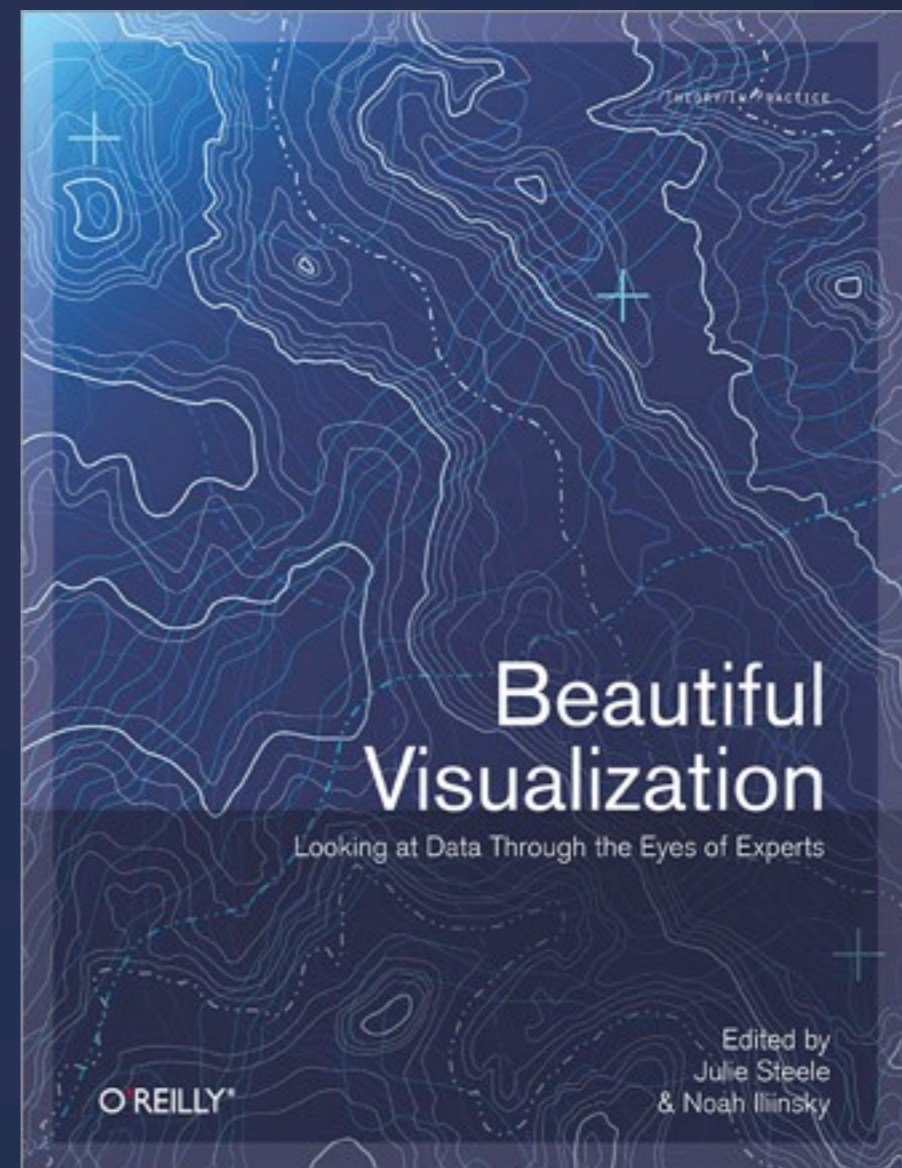
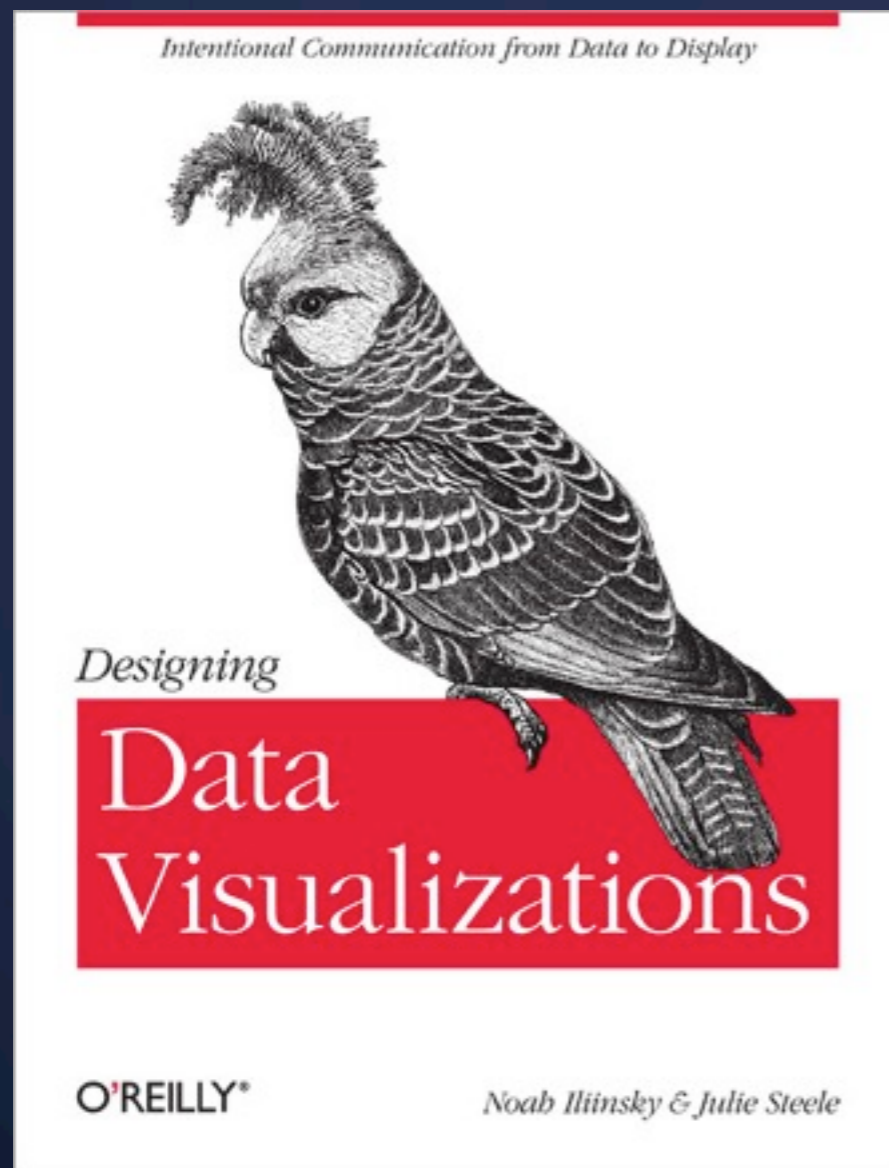
Required Textbook



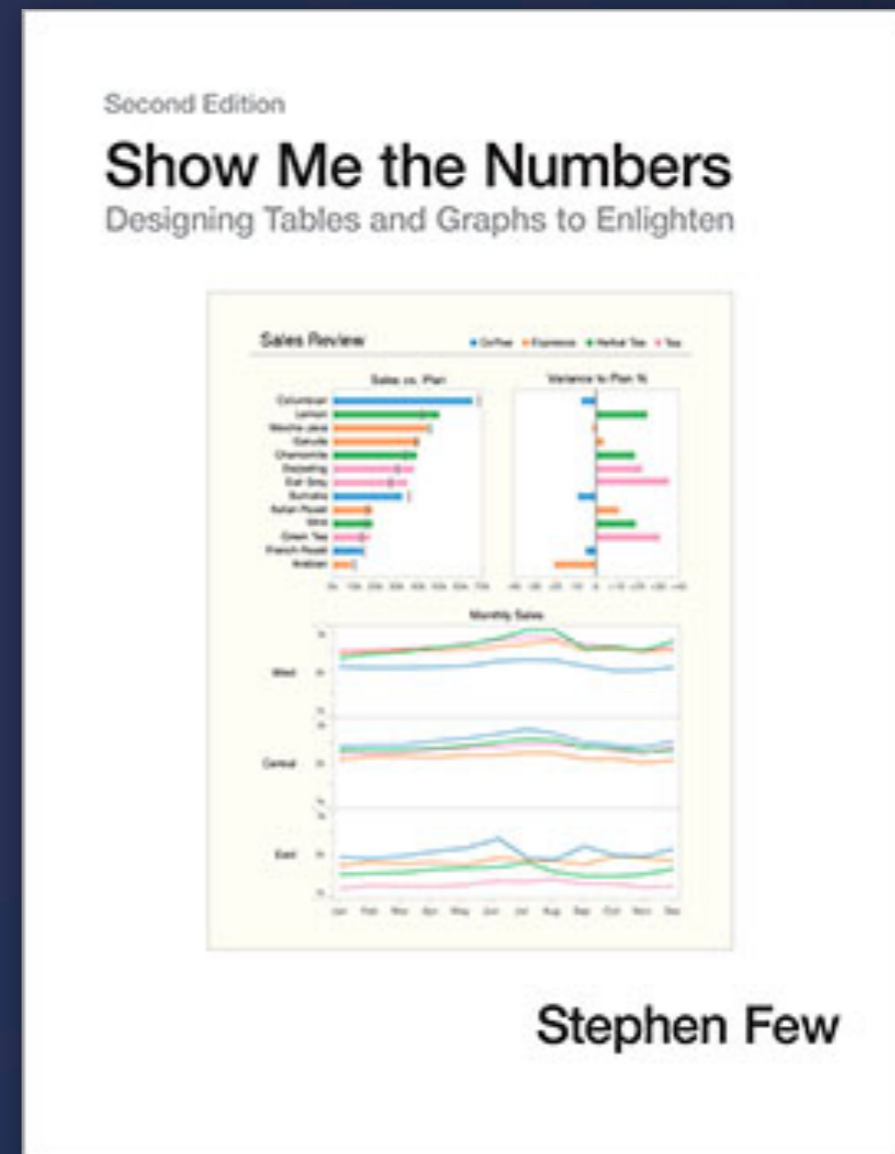
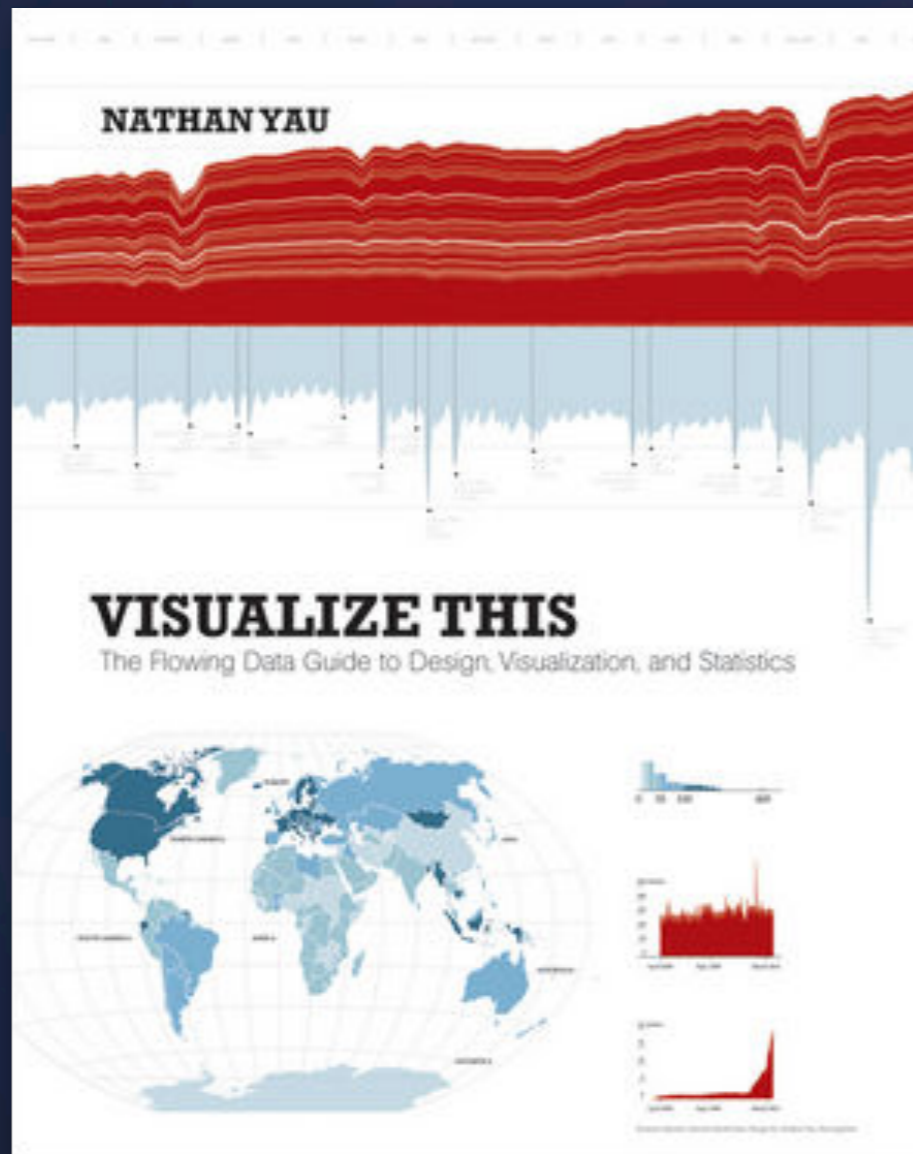
Other Textbooks

Selected chapters.

Through safaribooksonline.com (UC Berkeley Library Proxy)



Also Recommended

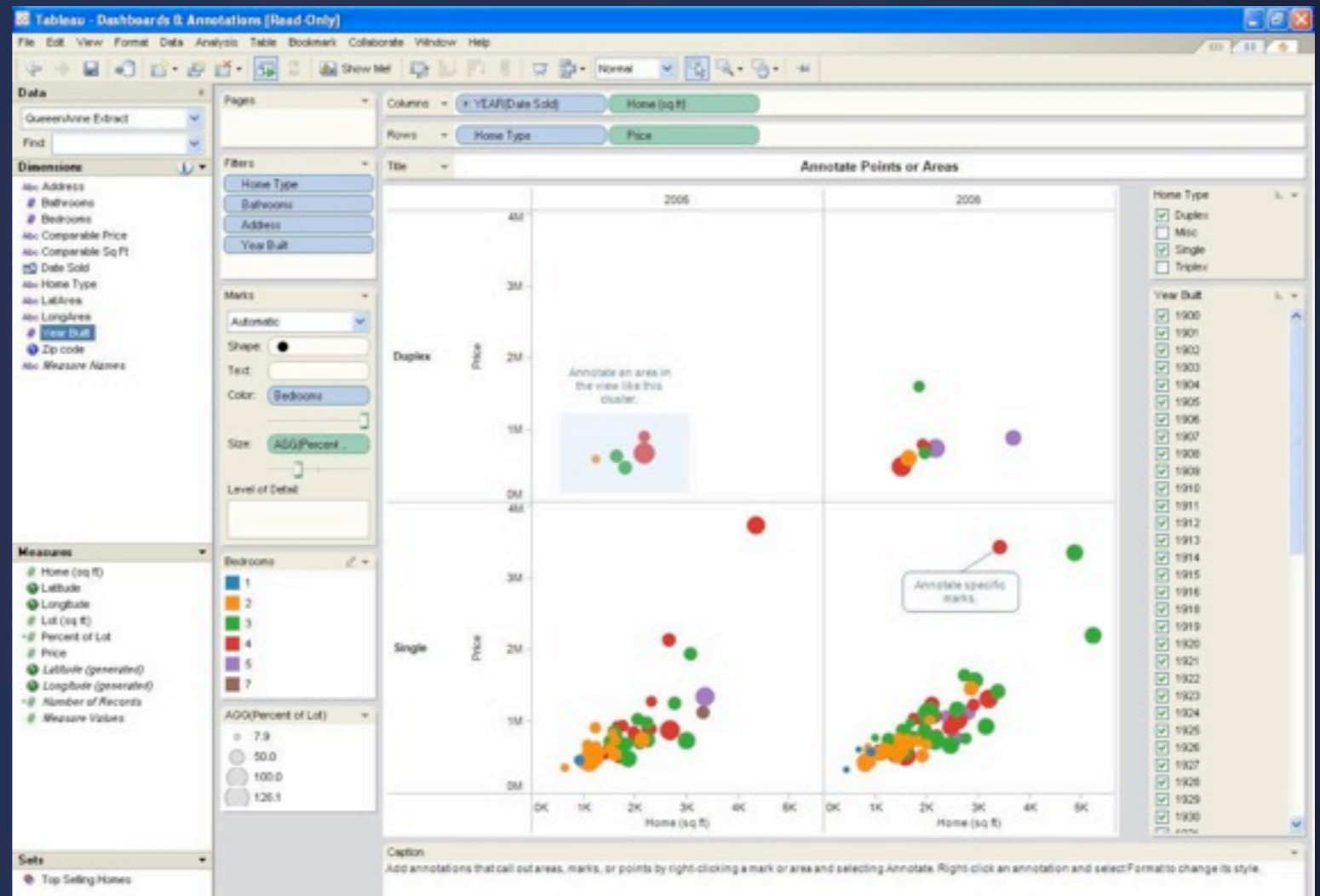


Software

Free license of Tableau for the course of the semester

Windows only

Check your email for instructions tonight



Contact

Office Hours

Michael

Tue/Thu 2-3PM
Room 211

Galen

Monday
afternoon by
appointment

Email

Michael

mike@ischool.berkeley.edu

Galen

gpanger@ischool.berkeley.edu

Labs

This Thursday: Data

Next Lecture

From Data to Visualization