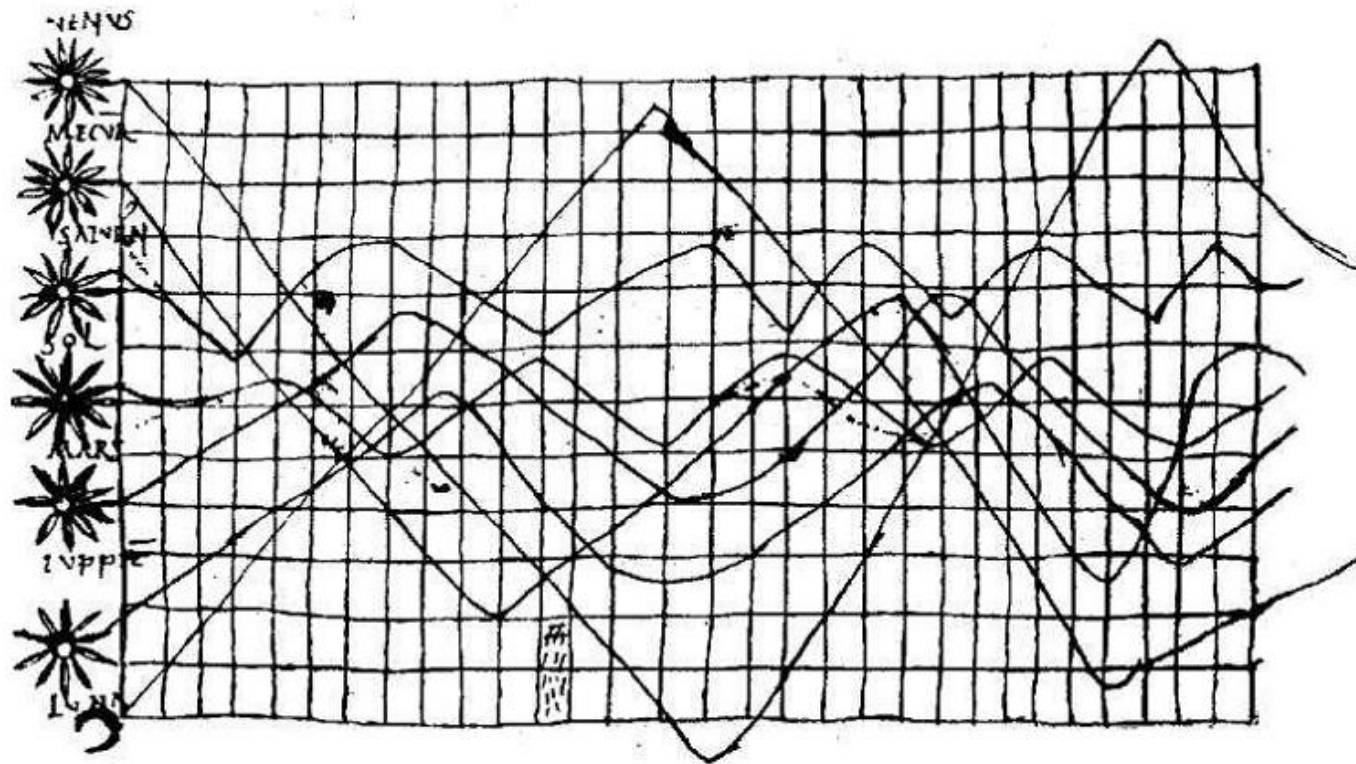


Historie vizualizace dat





Proč historie?

Protože ikonické příklady dokazují, jak efektivní vizualizace je.

Vizualizace jako prostředek k řešení problému.

Vizualizace jako prostředek k ověřování hypotéz.

Vizualizace jako prostředek k přesvědčování.

Vizualizace jako zachránce životů.



BABYLON.

677 **2520** **7**
 677 **12**
 1843. **84**
 30
538 **2300** **2520.**
 457
 1843.

A CHRONOLOGICAL CHART
OF THE
VISIONS OF DANIEL & JOHN.

332 **164**
 158

MEDIA AND PERSIA.

GRECIA.

PAGAN ROME.

THE TEN KINGDOMS.

1335 **490** **33**
1290 **508** **12**
45. **538** **42**
 30
 1260.

PAPAL ROME.

606 **1299** **1449**
 1798 **508**
 45 **1335**
1843. **1843.**

GOD'S EVERLASTING KINGDOM

MAHOMETANS.

1843.

Chapter

Handbook of Data Visualization

Part of the series Springer Handbooks Comp.Statistics pp 15-56

A Brief History of Data Visualization

Michael Friendly

Buy chapter

\$29.95 / €24.95 / £19.95 *

Buy eBook

\$379.00 / €296.31 / £251.50*

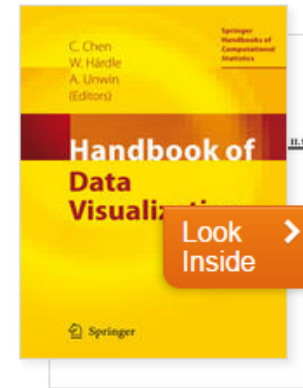


Get Access

* Final gross prices may vary according to local VAT.

Abstract

It is common to think of statistical graphics and data visualization as relatively modern developments in statistics. In fact, the graphic representation of quantitative information has deep roots. These roots reach into the histories of the earliest map making and visual depiction, and later into thematic cartography, statistics and statistical graphics, medicine and other fields. Along the way, developments in technologies (printing, reproduction), mathematical theory and practice, and empirical observation and recording enabled the wider use of graphics and new advances in form and content.



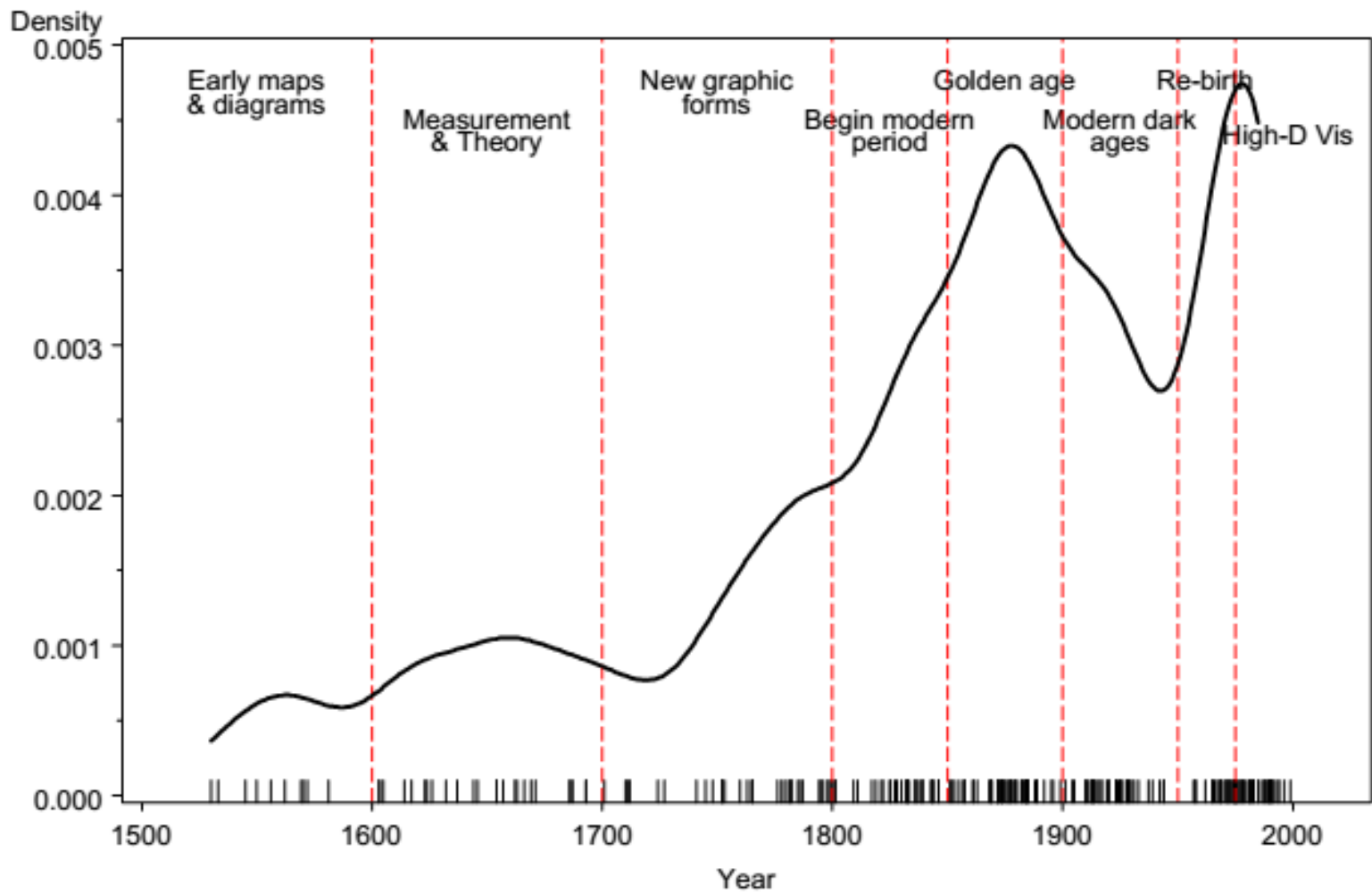
Chapter Metrics

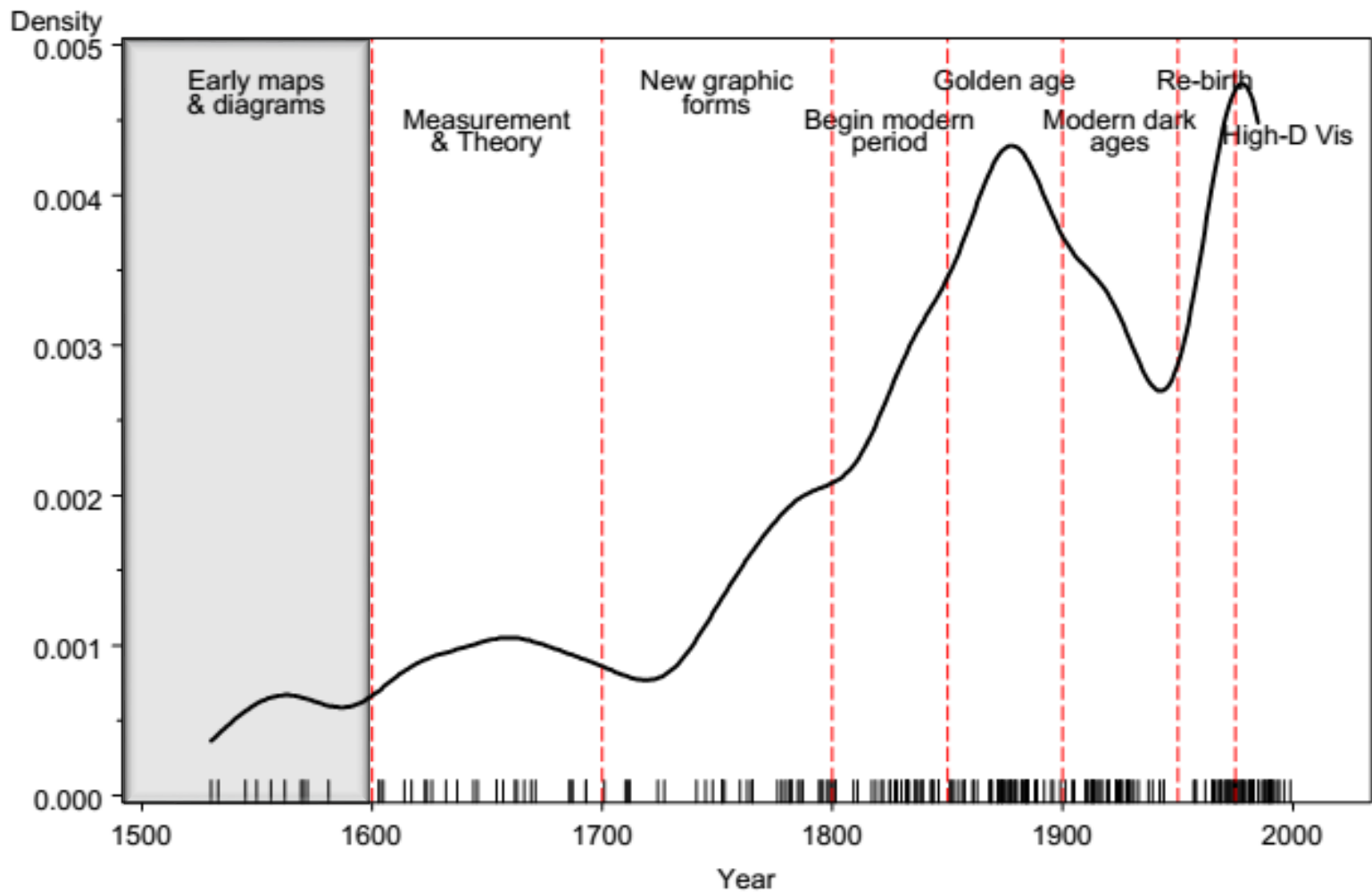
	Citations	6
	Mentions	2
	Readers	40
	Downloads	4K

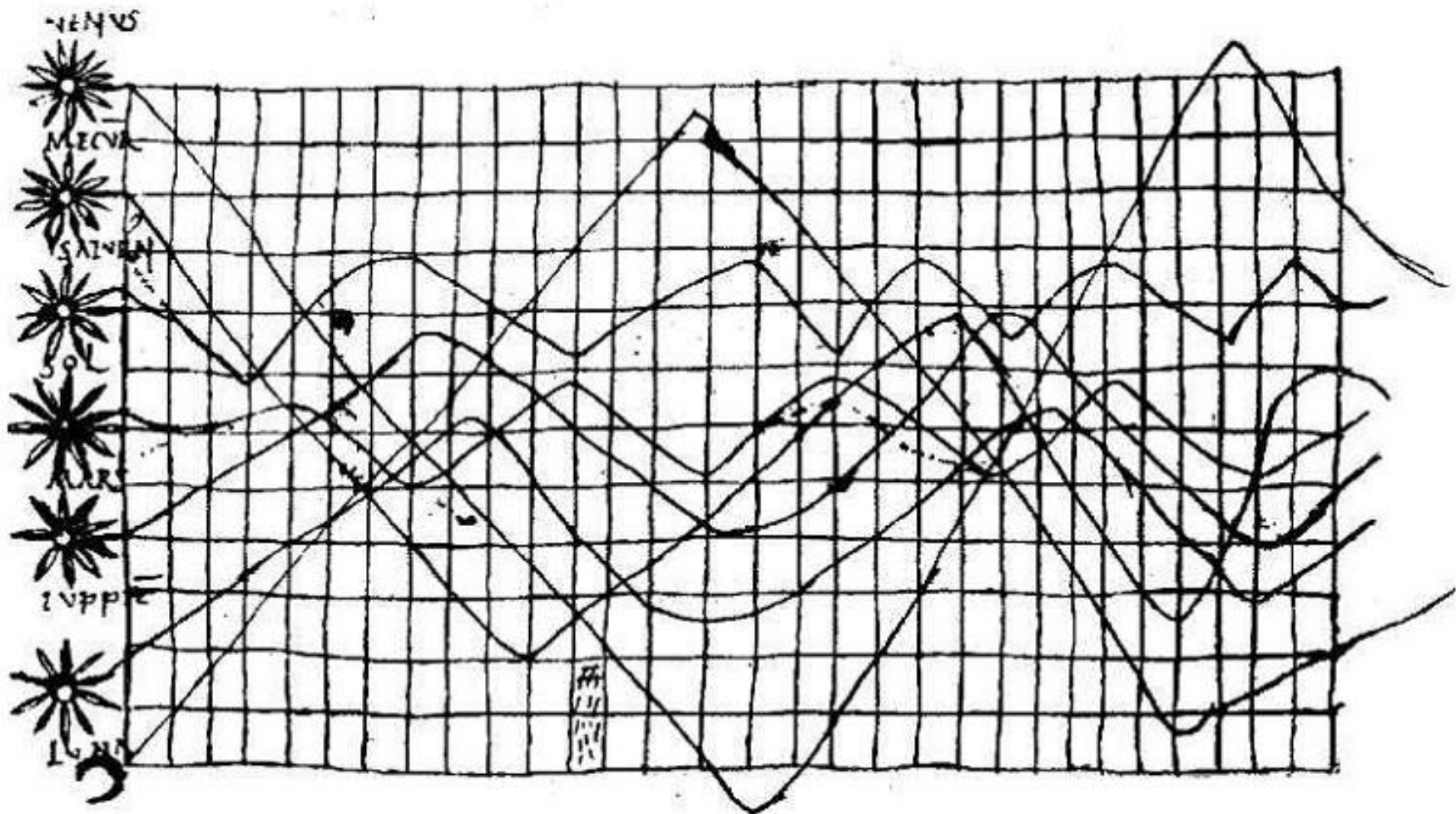
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difformis uniformiter variatio reddit unifor-
 miter difformiter difforme. ¶ Latine: uni-
 formis est diuorsus est illa quae inter excessus graduum
 equidistantium fuerit eadem proportio eadem in eadem p-
 portione equitatis. Nam si inter excessus graduum
 inter se equidistantium fuerit proportio equita-
 tis ut est. ¶ Latine: uniformiter difformis ut per ex-
 diffinitionibus membrorum secundae diuorsiois
 Rursus si nulla proportio seruetur tunc nulla
 potest attendi uniformitas in latitudine tali et
 sic non esset uniformiter difformis est difformis
 ¶ Latine: difformiter difformiter difformis
 est illa quae inter excessus graduum equidistantium
 non seruet eandem proportionem sicut in se-
 cunda parte patebit. Notandum tamen est
 quod sicut in supradictis diffinitionibus ubi loquitur
 de excessu graduum inter se equidistantium

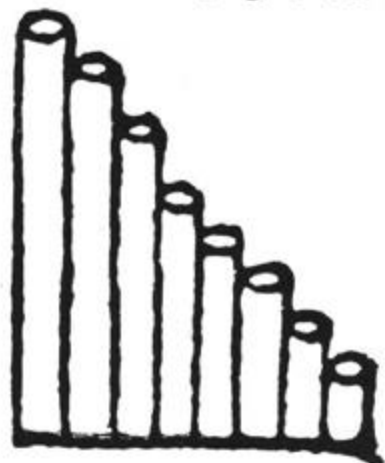
scilicet. et sicut ad in-

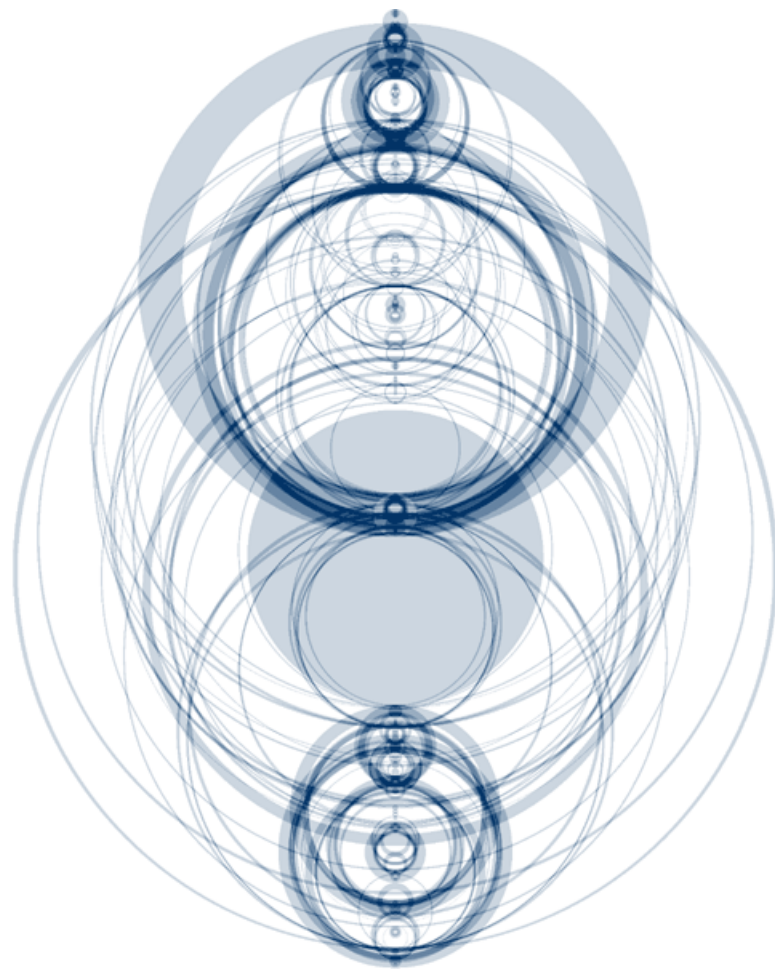
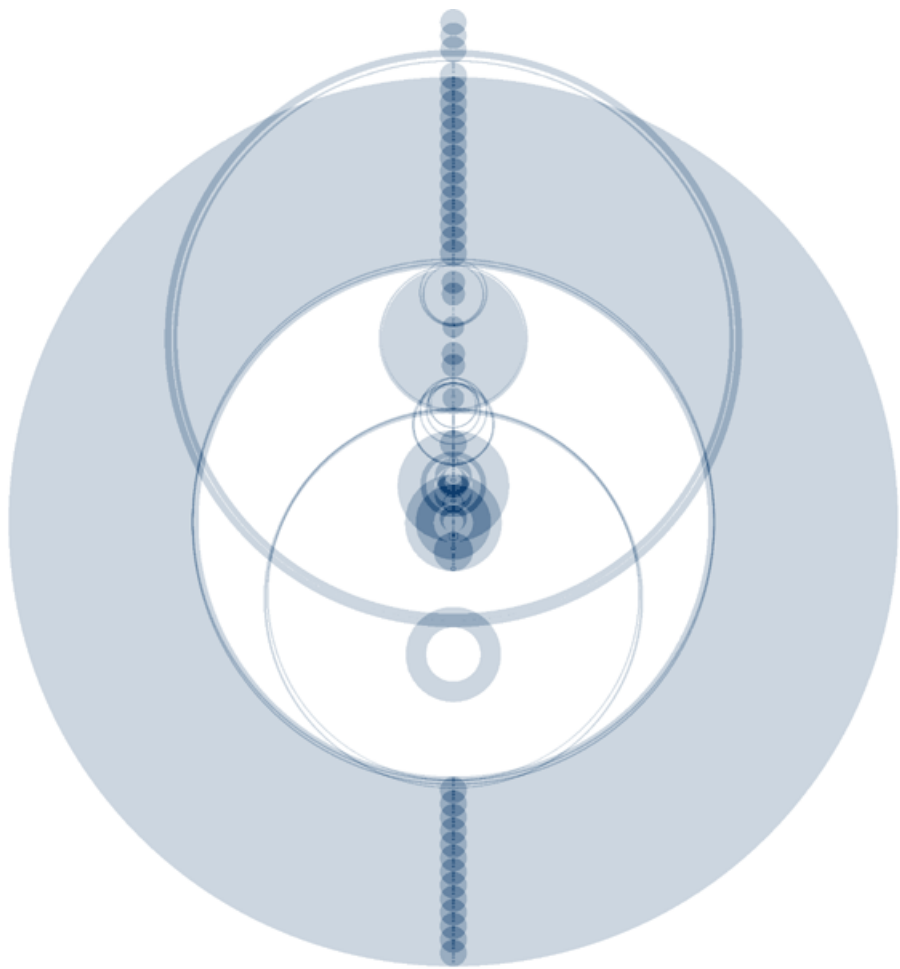


Diffōrū difforū



dif, dif, difforū







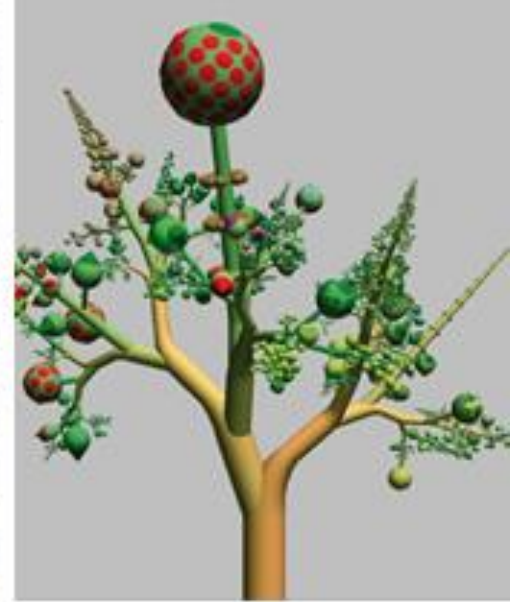
1202



1478

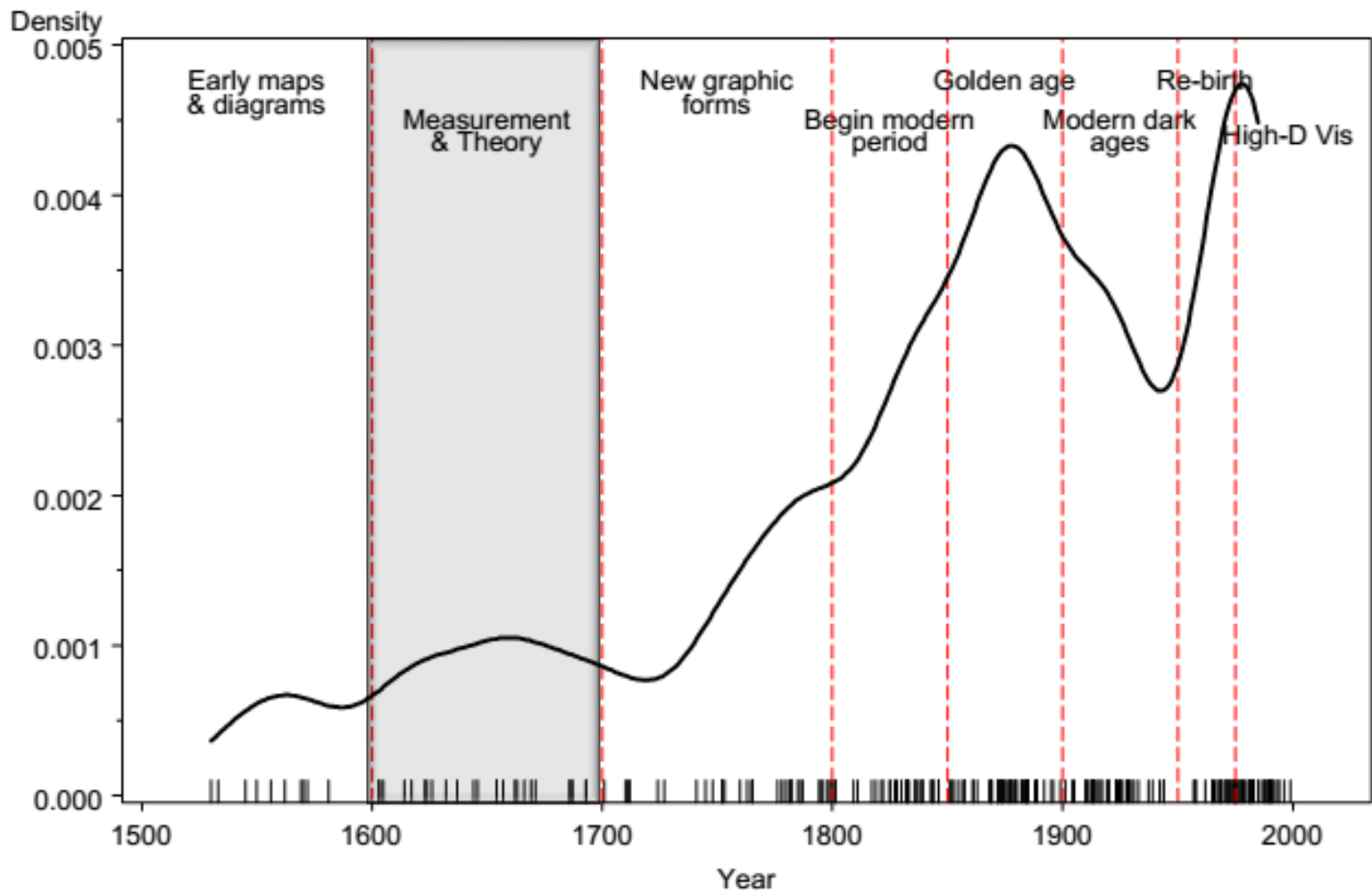


1780



2001

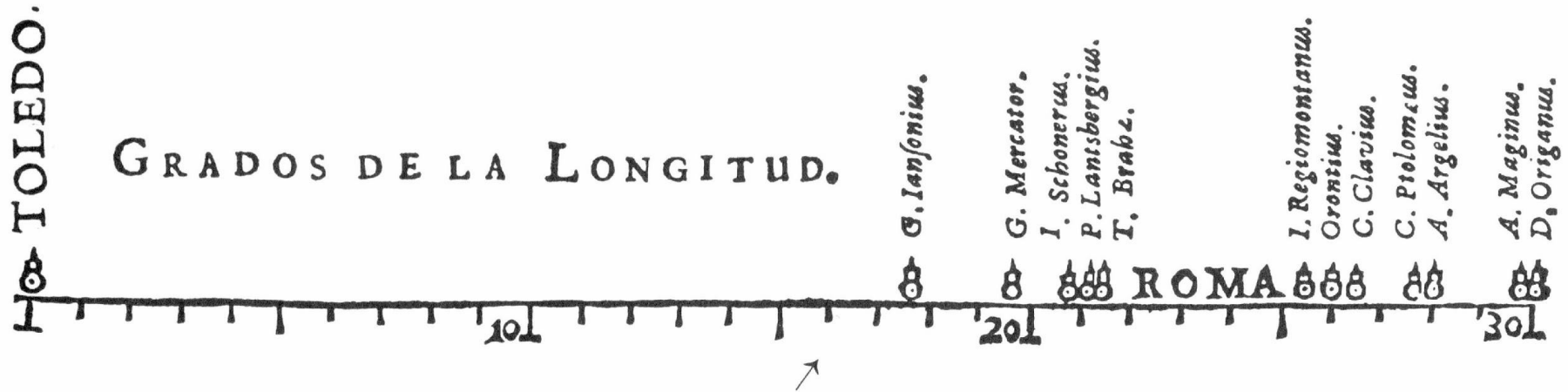
visualcomplexity.com



1644

Michael Florent van Langren

Rozdíly v odhadech zeměpisné délky

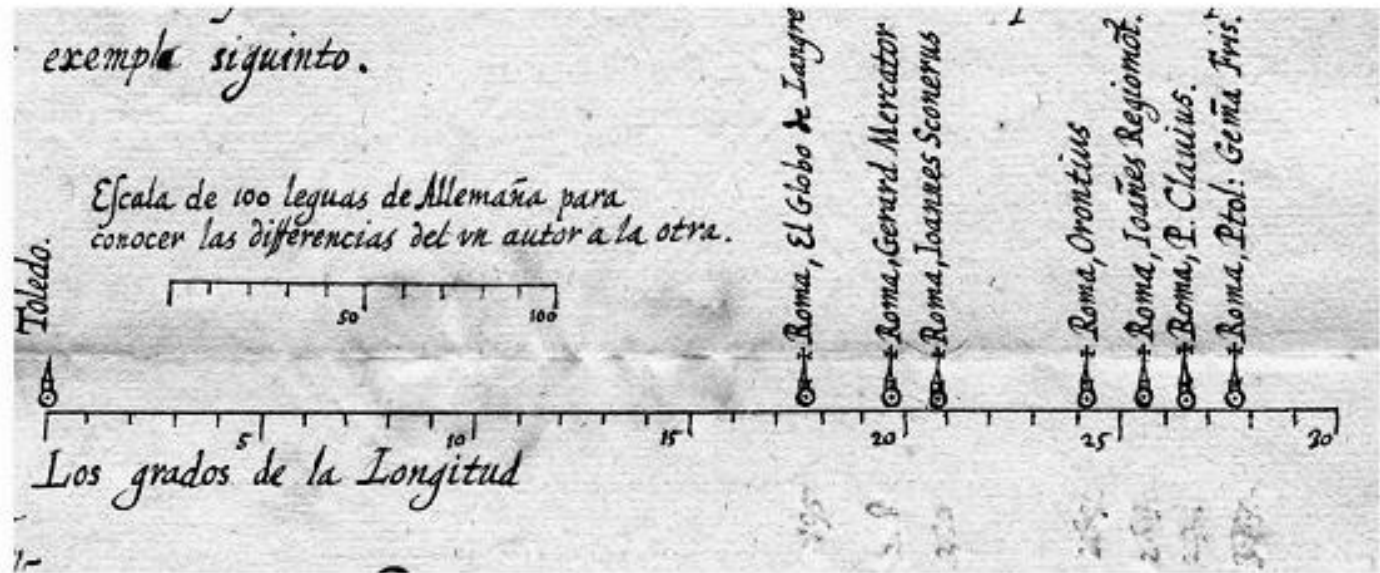


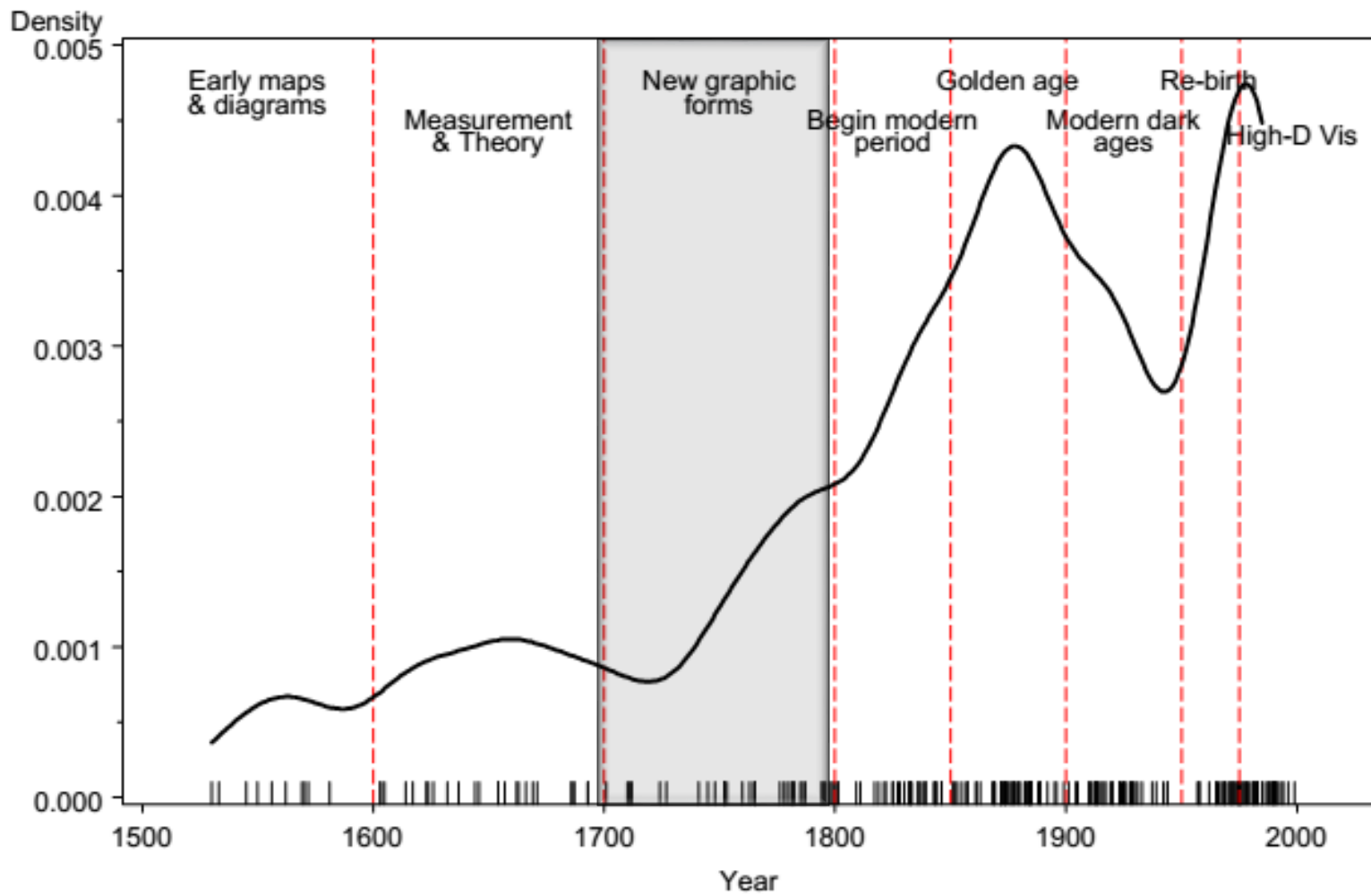
Michael Florent van Langren

Rozdíly v odhadech zeměpisné délky

Las distancias de
Roma y Toledo segun
los autores. Leg. de Allé

El Globo	195
Gerð. Mercat	210
Ioan sconer	230
Orontius	269
Ioan Regiöt	283
P. Clavius	294
Ptolomeus	307





1753

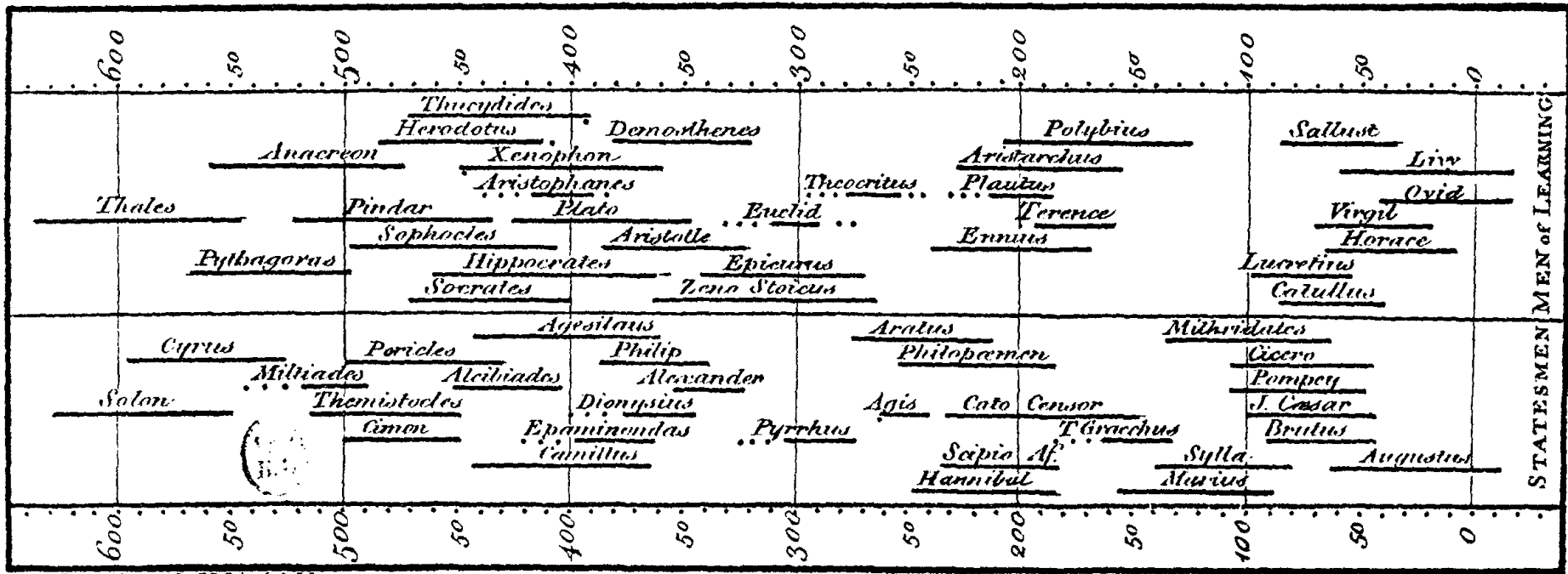
Jacques Barbeu-Dubourg

Časová osa



Joseph Priestly

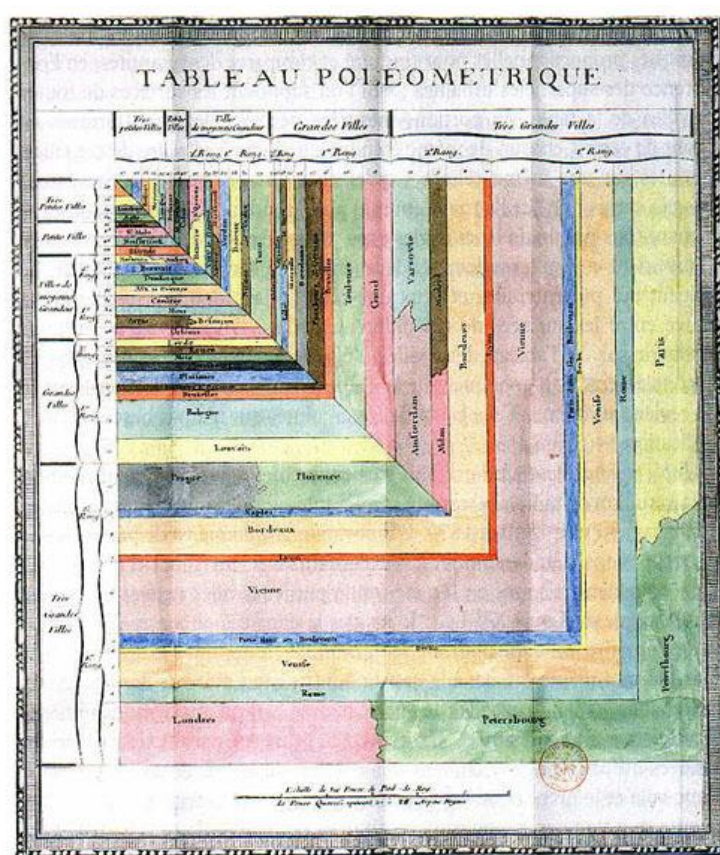
Časová osa



1782

Charles de Fourcroy

Předchůdce kartodiagramu



1780+

William Playfair

Skoro všechny základní statistické grafy

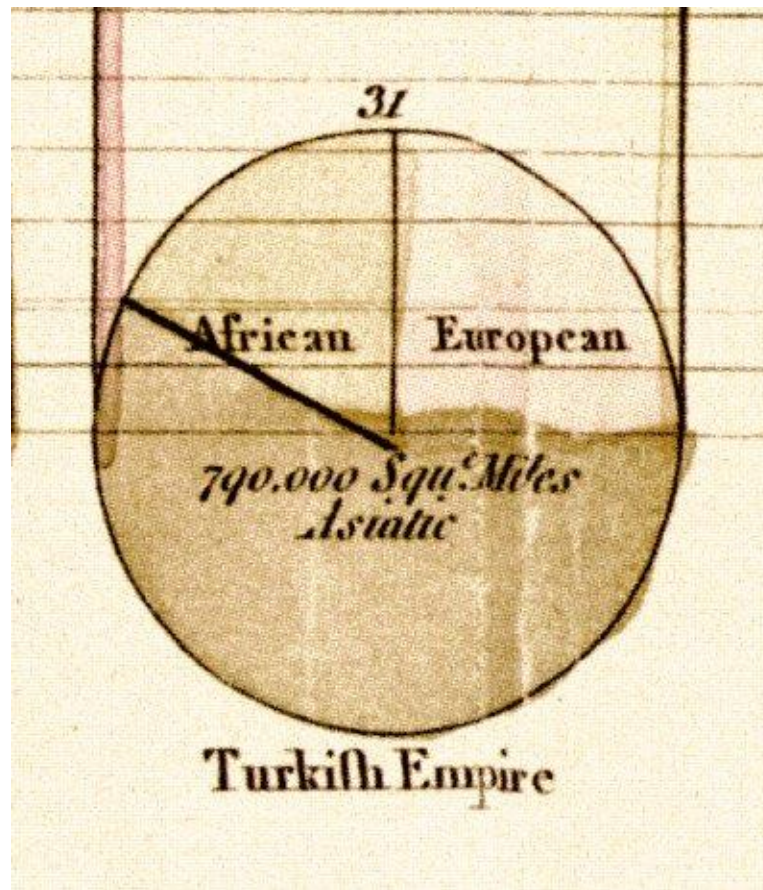
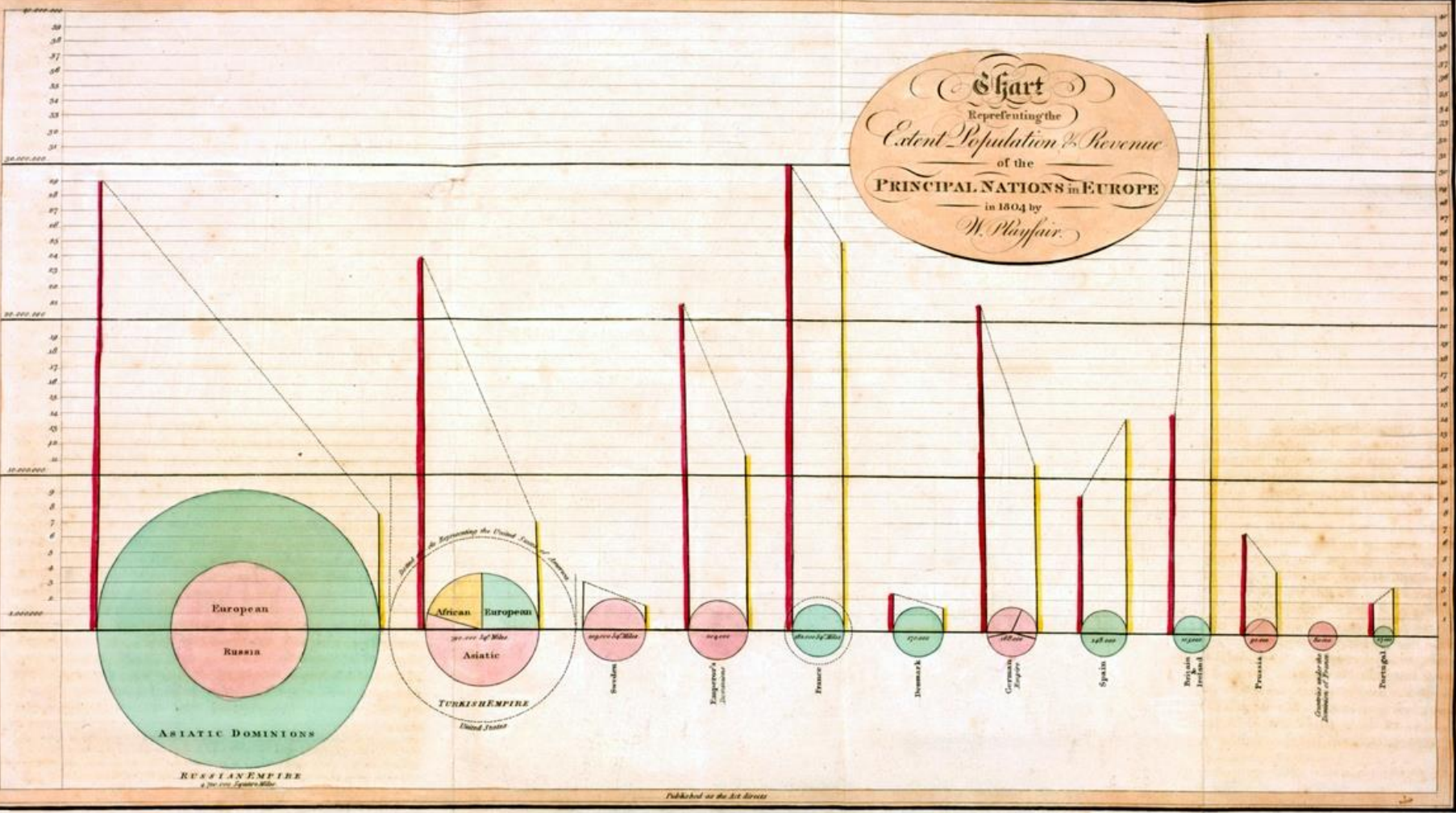
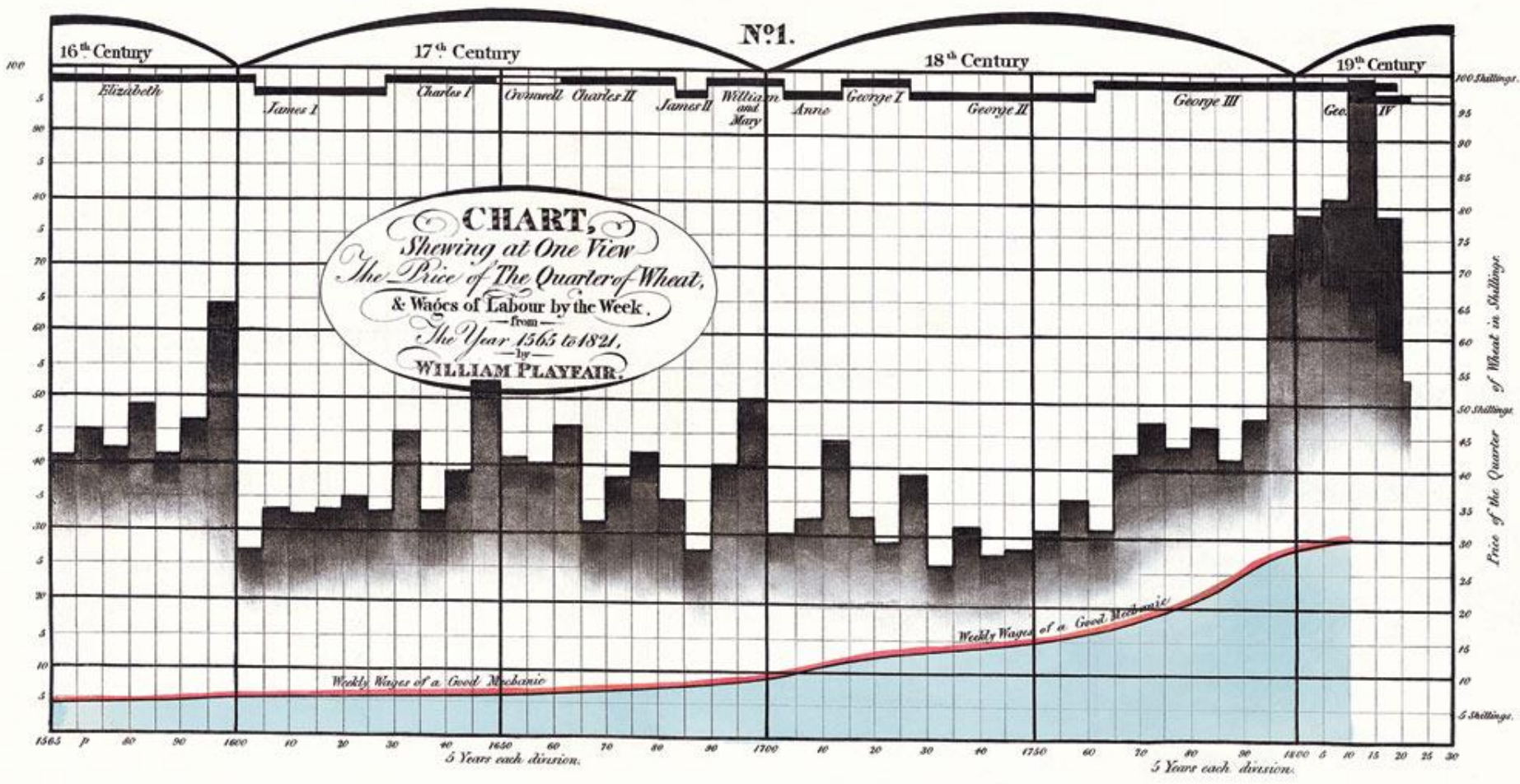


Chart
 Representing the
Extent, Population & Revenue
 of the
PRINCIPAL NATIONS in EUROPE
 in 1804 by
W. Playfair.





C. J. Harris

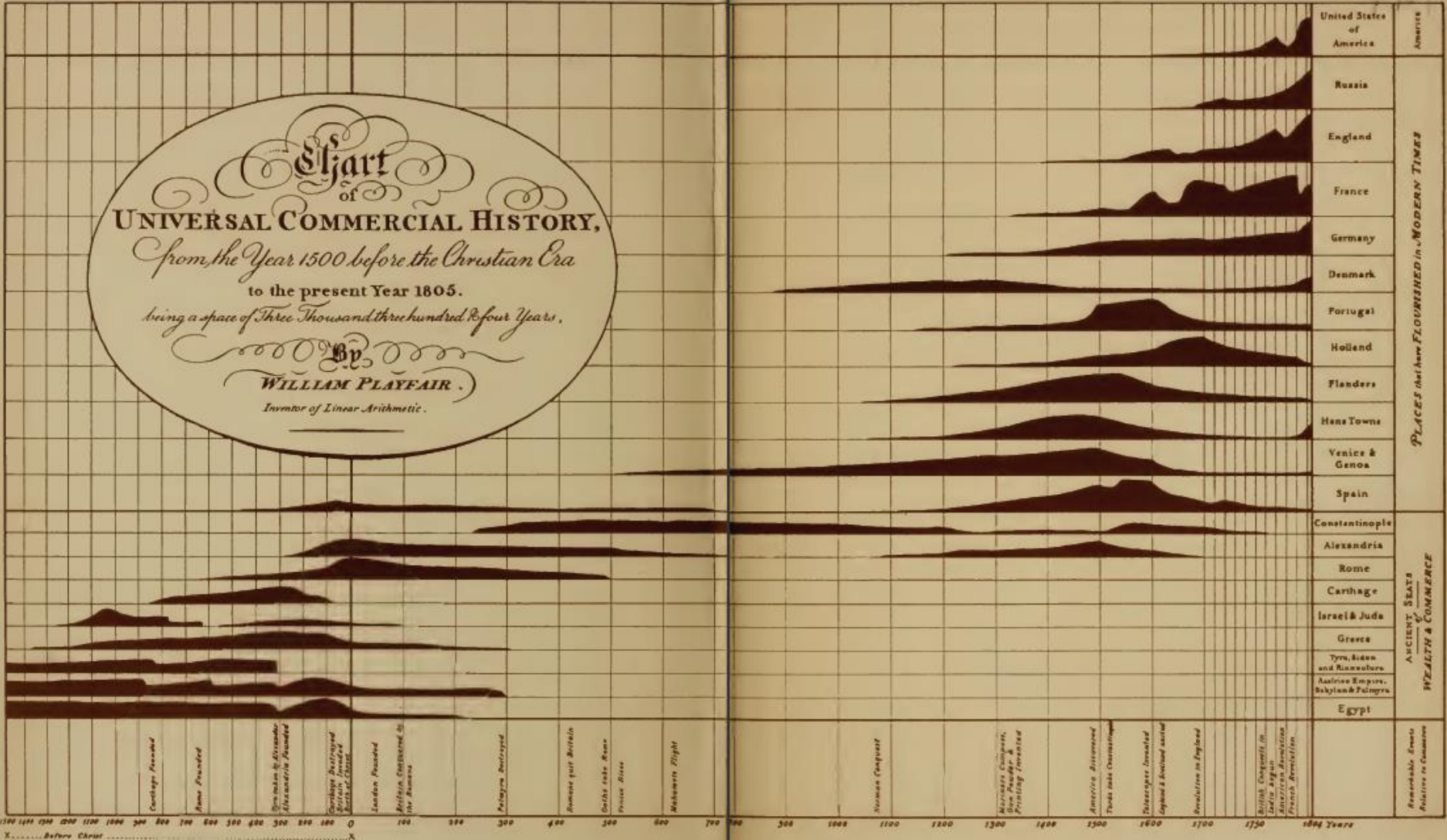
C. J. Harris

PC 11/91

581 PM

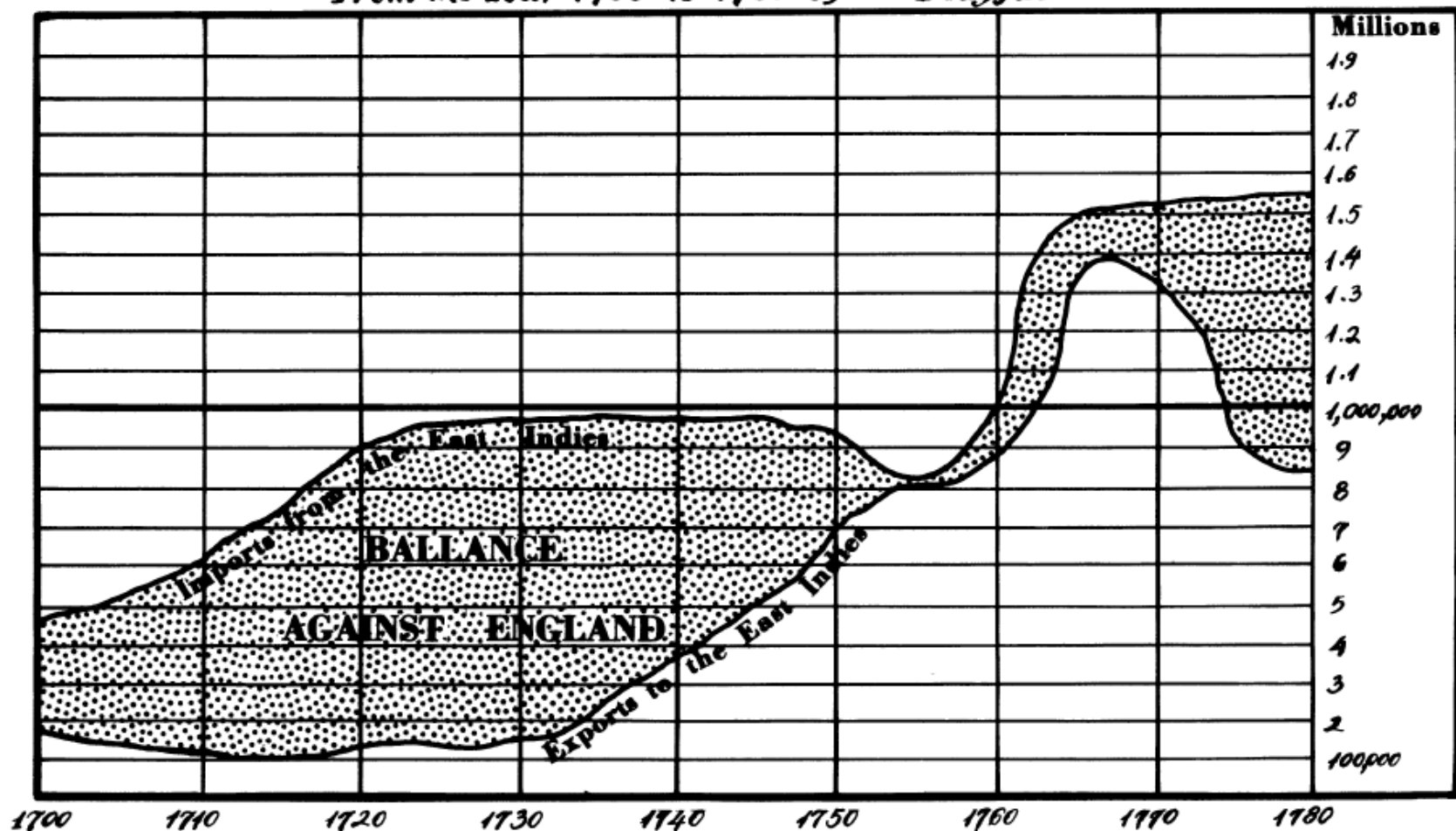


Start
 of
UNIVERSAL COMMERCIAL HISTORY.
From the Year 1500 before the Christian Era
 to the present Year 1805.
being a space of Three Thousand three hundred & four Years,
 By
WILLIAM PLAYFAIR.
Inventor of Linear Arithmetic.

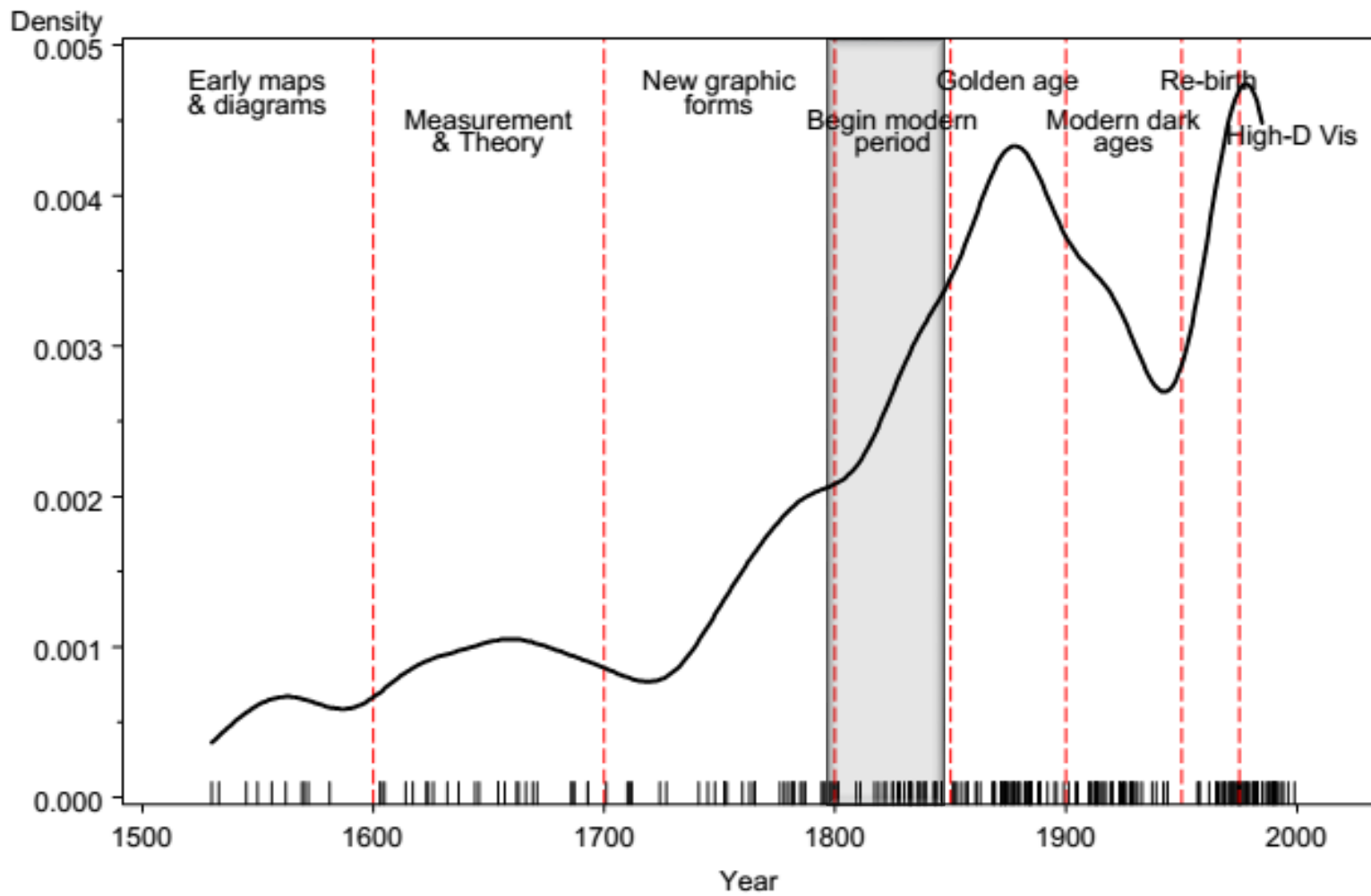


From Frontispiece of Book by WILLIAM PLAYFAIR, An Inquiry Into the Permanent Causes of the Decline and Fall of Powerful and Wealthy Nations, London, 1805.

CHART of EXPORTS and IMPORTS to and from the EAST INDIES
From the Year 1700 to 1780 by W. Playfair



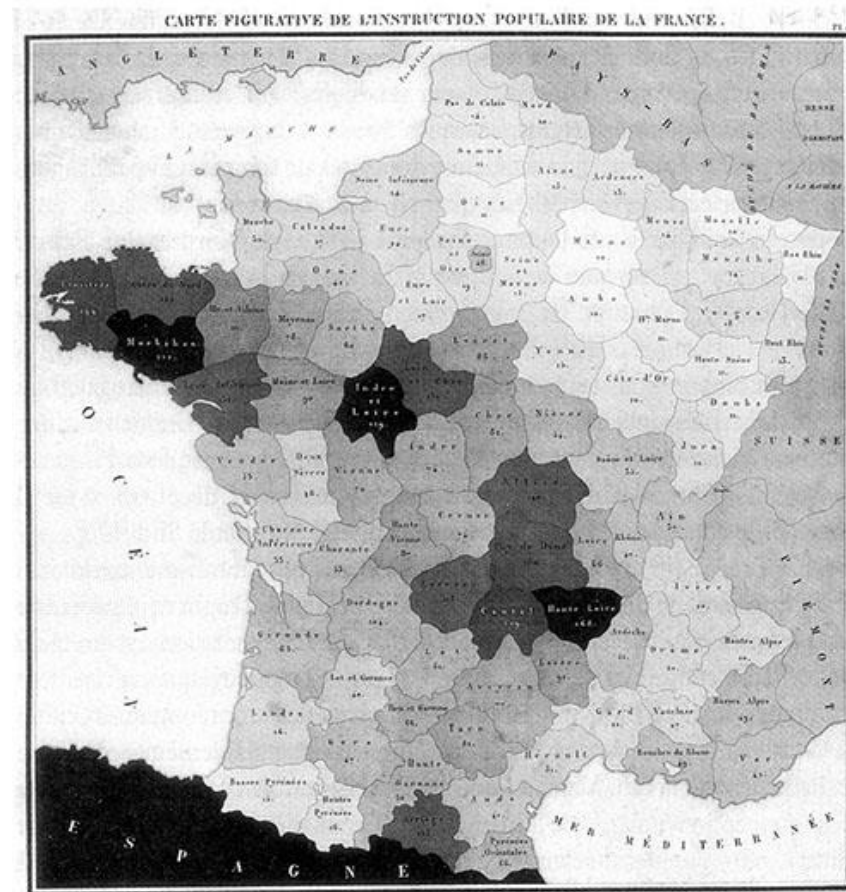
The Bottom Line is Divided into Years the Right hand Line into HUNDRED THOUSAND POUNDS
King of the Kings *is force Page 31st* *Published in the Act Divine 16th Aug. 1785*



1826

Charles Dupin

První choropleth (kartogram)



1833

André-Michel Guerry

Essai sur la statistique morale de la France.

„Let us now compare this map with the one for crimes against persons. The maximum crime rate is in Corsica. Is this because there is greater ignorance there? Our map supplies evidence to the contrary. Further, the minimum occurs in the western and central provinces. Can it be said that the highest level of education prevails there?“

„Clearly, the relationship people talk about does not exist.“

1833 / 1854

Robert Baker, **John Snow**

Mapy cholery (dot mapa)



1833 / 1854

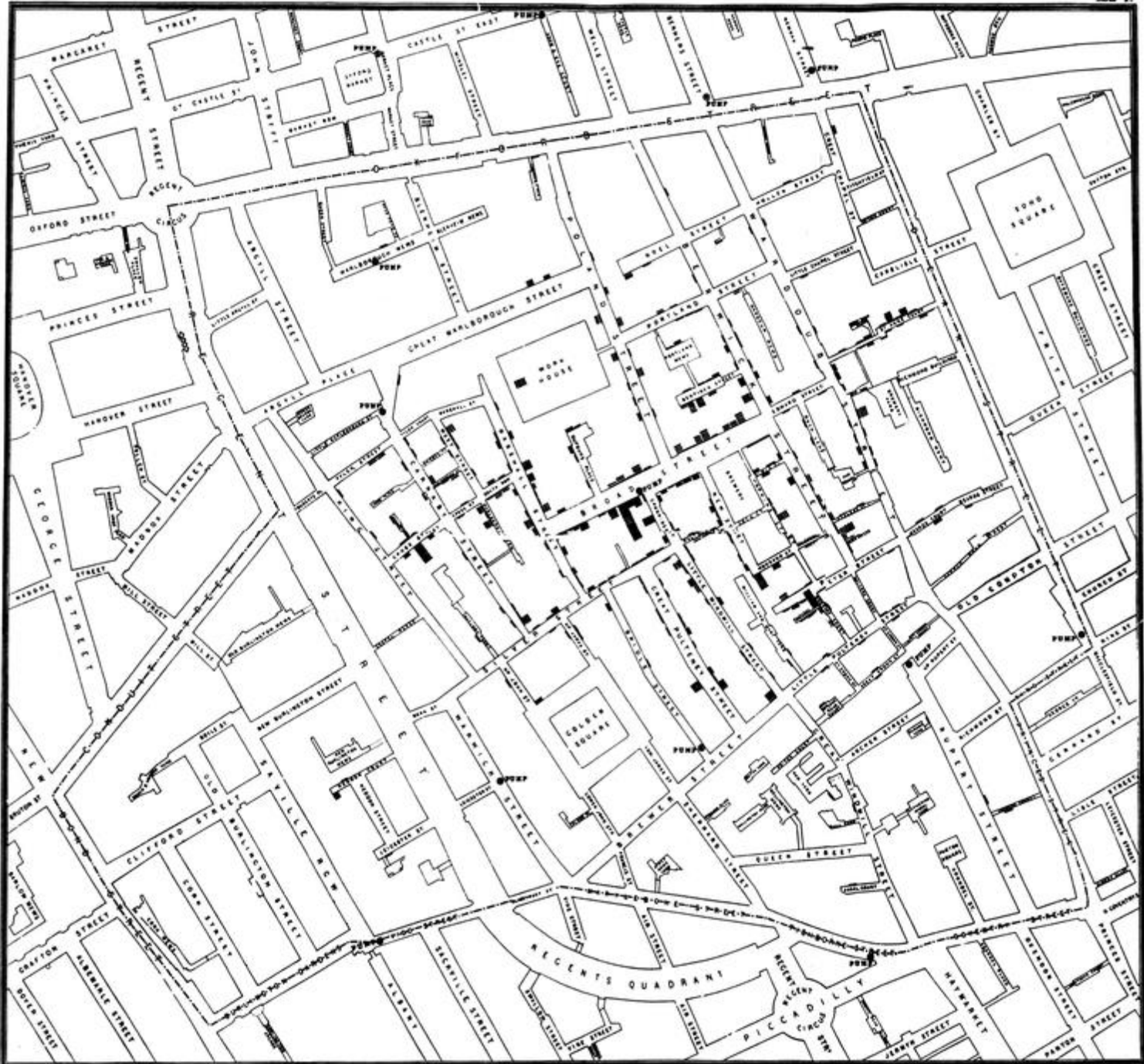
Robert Baker, **John Snow**

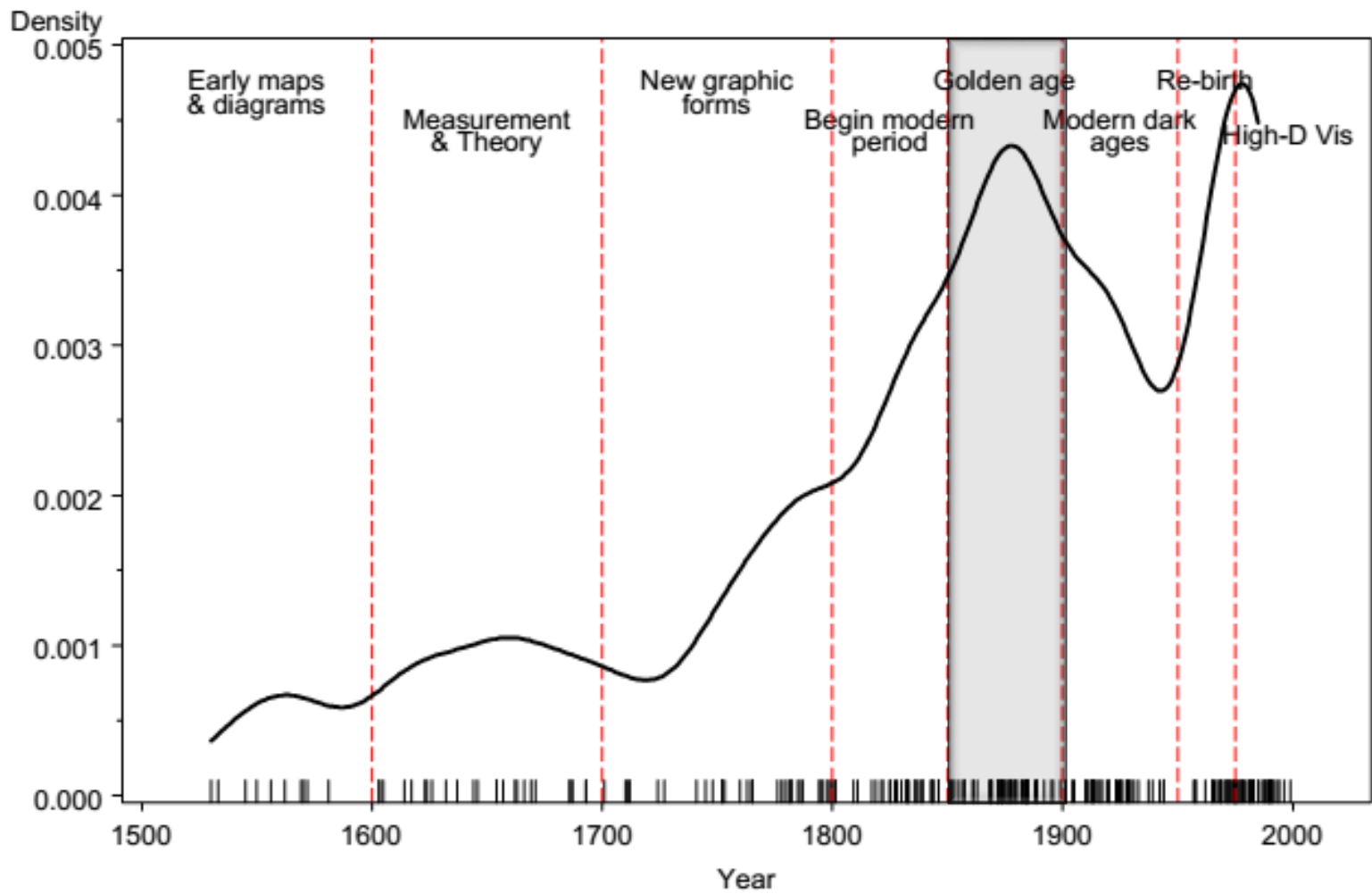
Mapy cholery (dot mapa)

„We are of the opinion that the streets in which malignant cholera prevailed most severely, were those in which the drainage was most imperfect; and that the state of the general health of the inhabitants would be greatly improved, and the probability of a future visitation from such malignant epidemics diminished, by a general and efficient system of drainage, sewerage and paving, and the enforcement of better regulations as to the cleanliness of the streets.“



https://books.google.cz/books?id=-N0_AAAcAAJ&printsec=frontcover&hl=cs&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false





1869

Charles Joseph Minard

Napoleonův pochod na Rusko a zpět

* * * * *

„Probably the best statistical graphic ever drawn.“

- *Edward Tufte*

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Legur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre. — Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Nètome et du Maréchal Davout qui avoient été détachés sur Minsk et Mohilow et qui rejoindrent vers Orscha et Witebsk, avoient toujours marché avec l'armée.

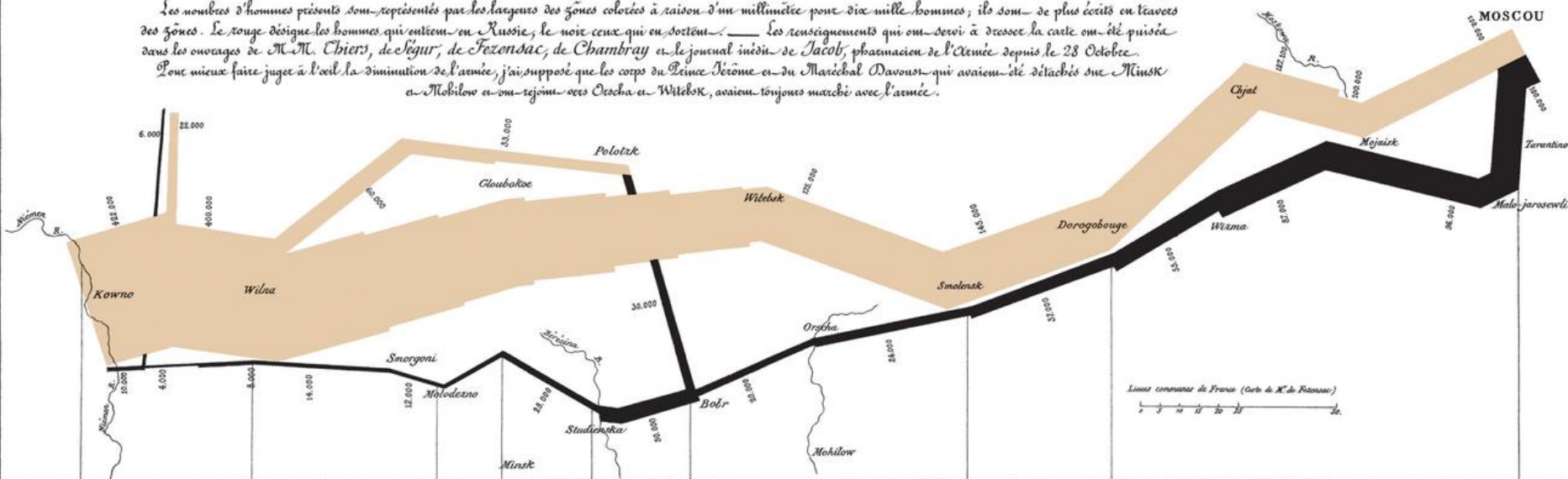
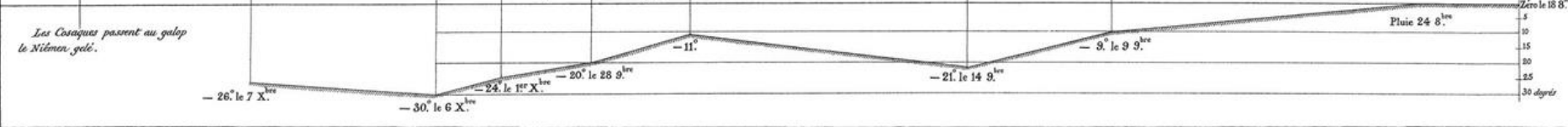
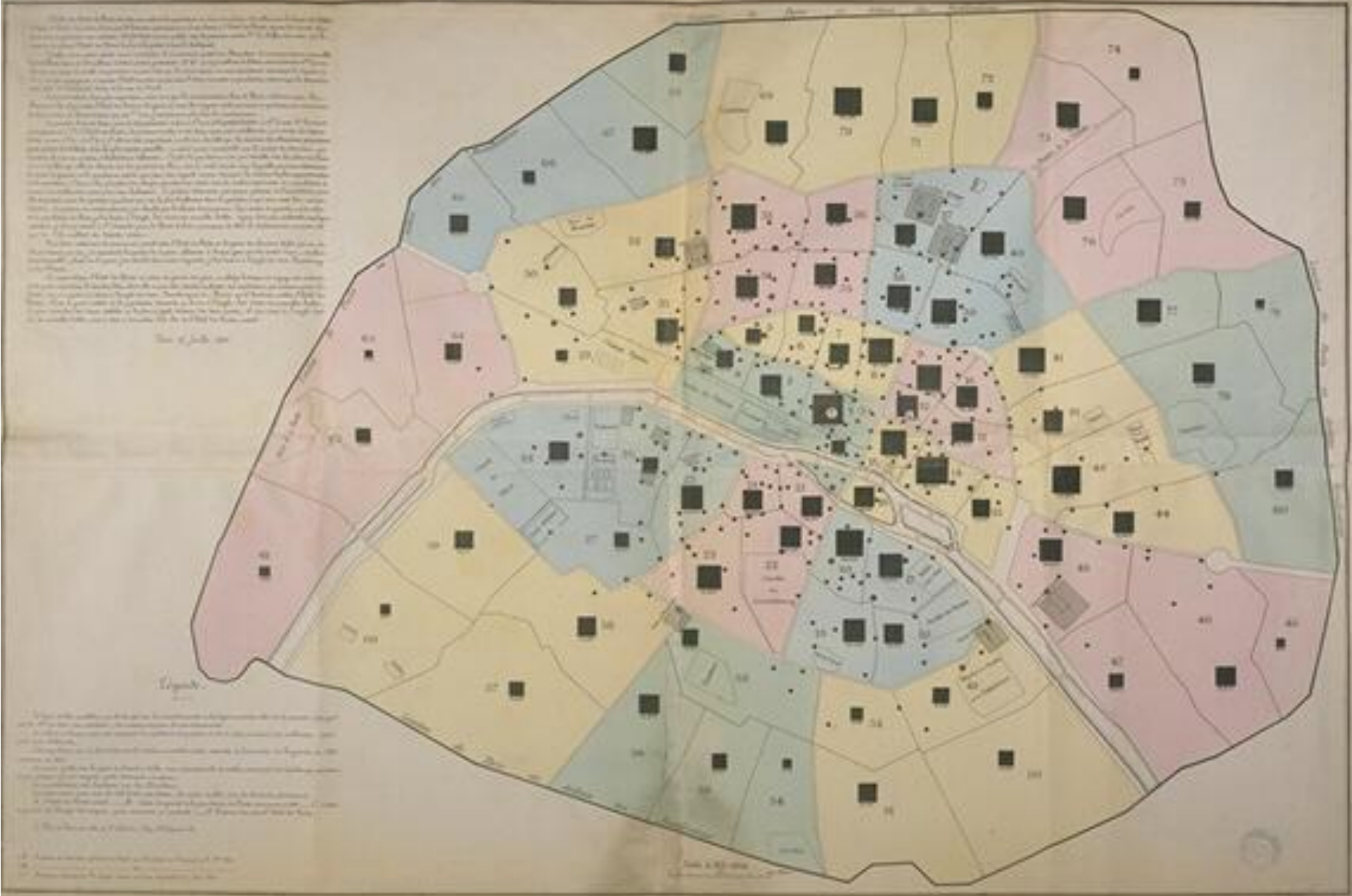


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niémen gelé.



Plan de l'Empire

Empire

Textual content on the left side of the map, likely a legend or descriptive text in French.

Textual content at the bottom left of the map, likely a legend or descriptive text in French.

Scale and date information at the bottom center of the map.

1858

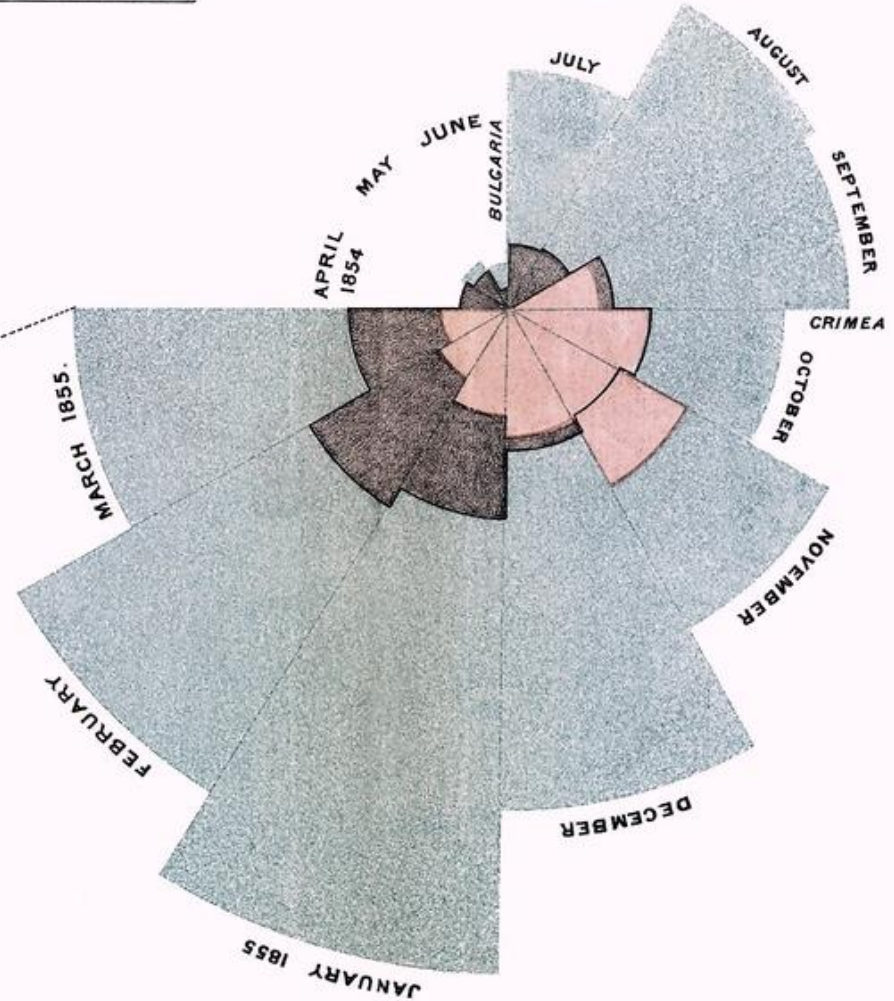
Florence Nightingale

Coxcomb

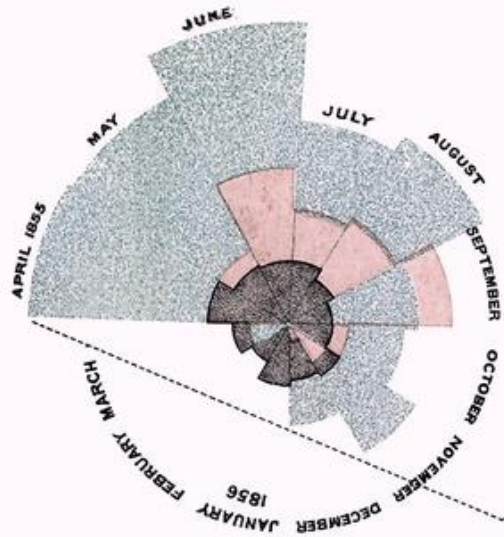


DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.

1.
APRIL 1854 TO MARCH 1855.



2.
APRIL 1855 TO MARCH 1856.



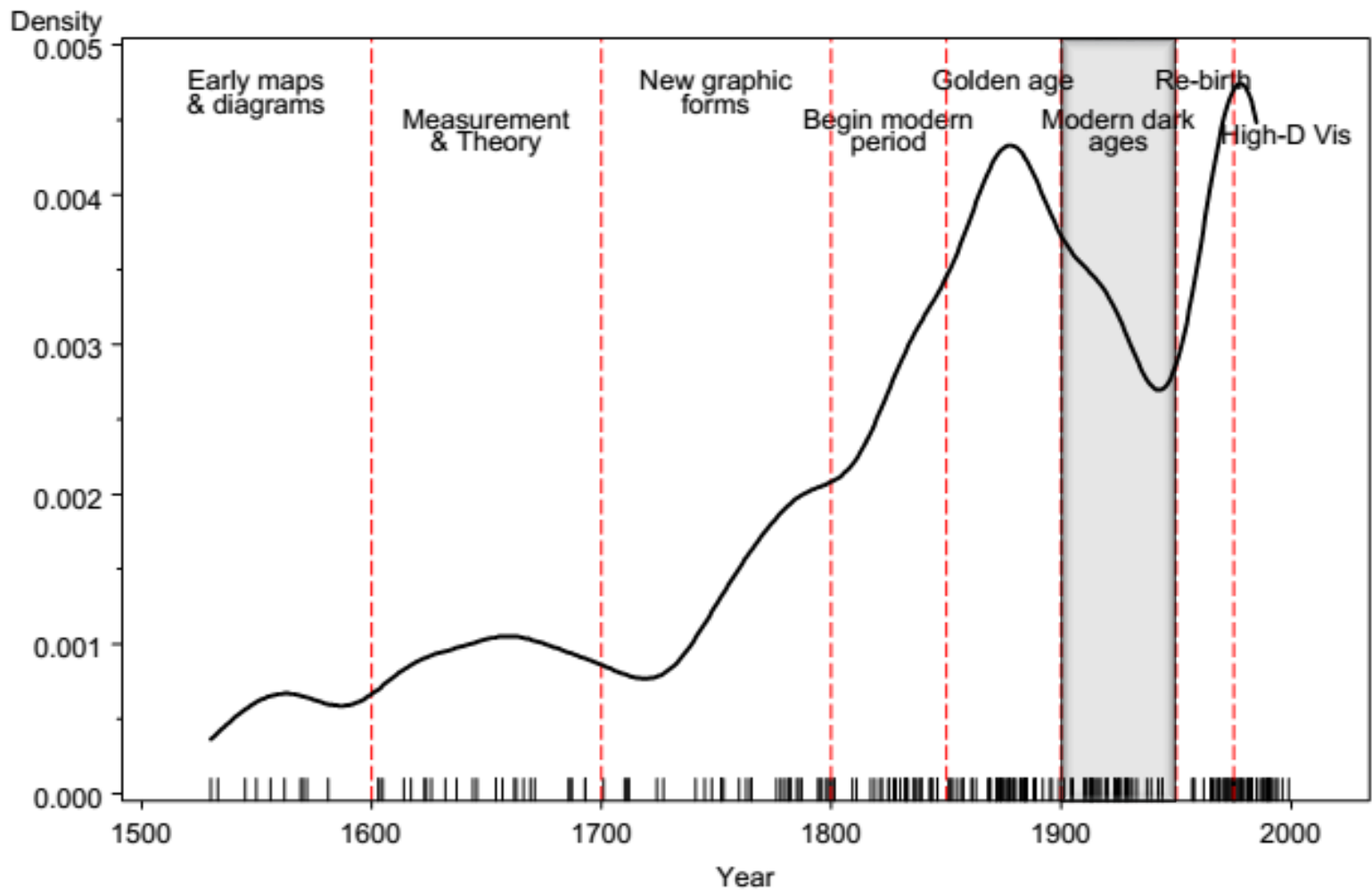
The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

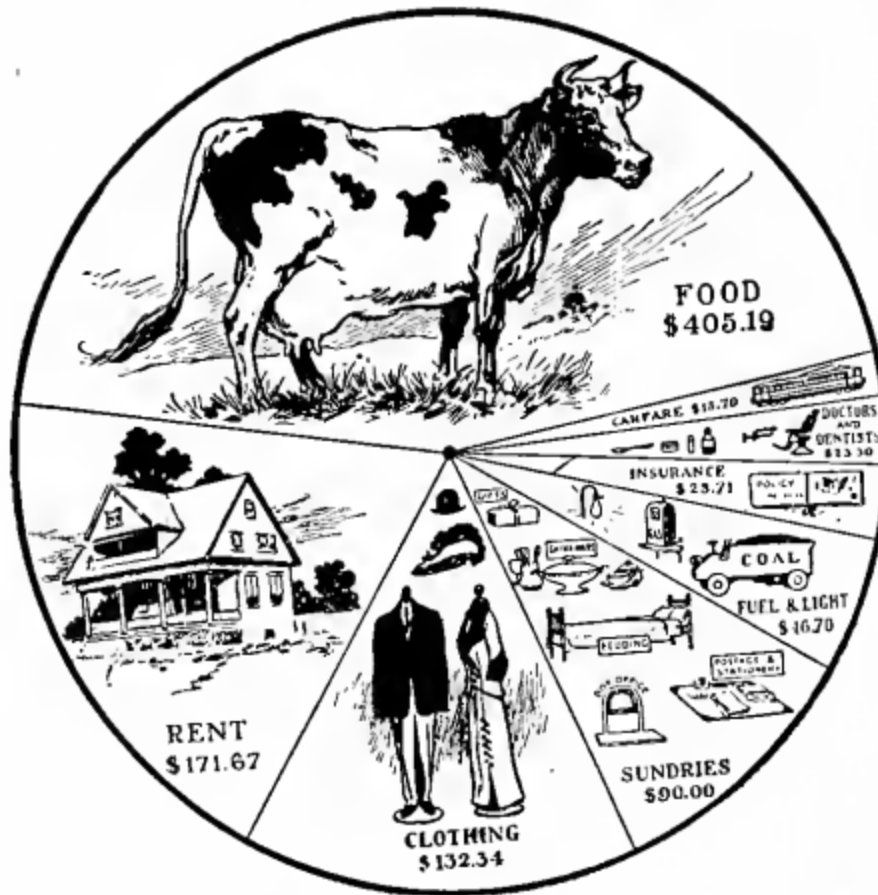
The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.

The black line across the red triangle in Nov. 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855, the black area coincides with the red; in January & February 1856, the blue coincides with the black.

The entire areas may be compared by following the blue, the red & the black lines enclosing them.

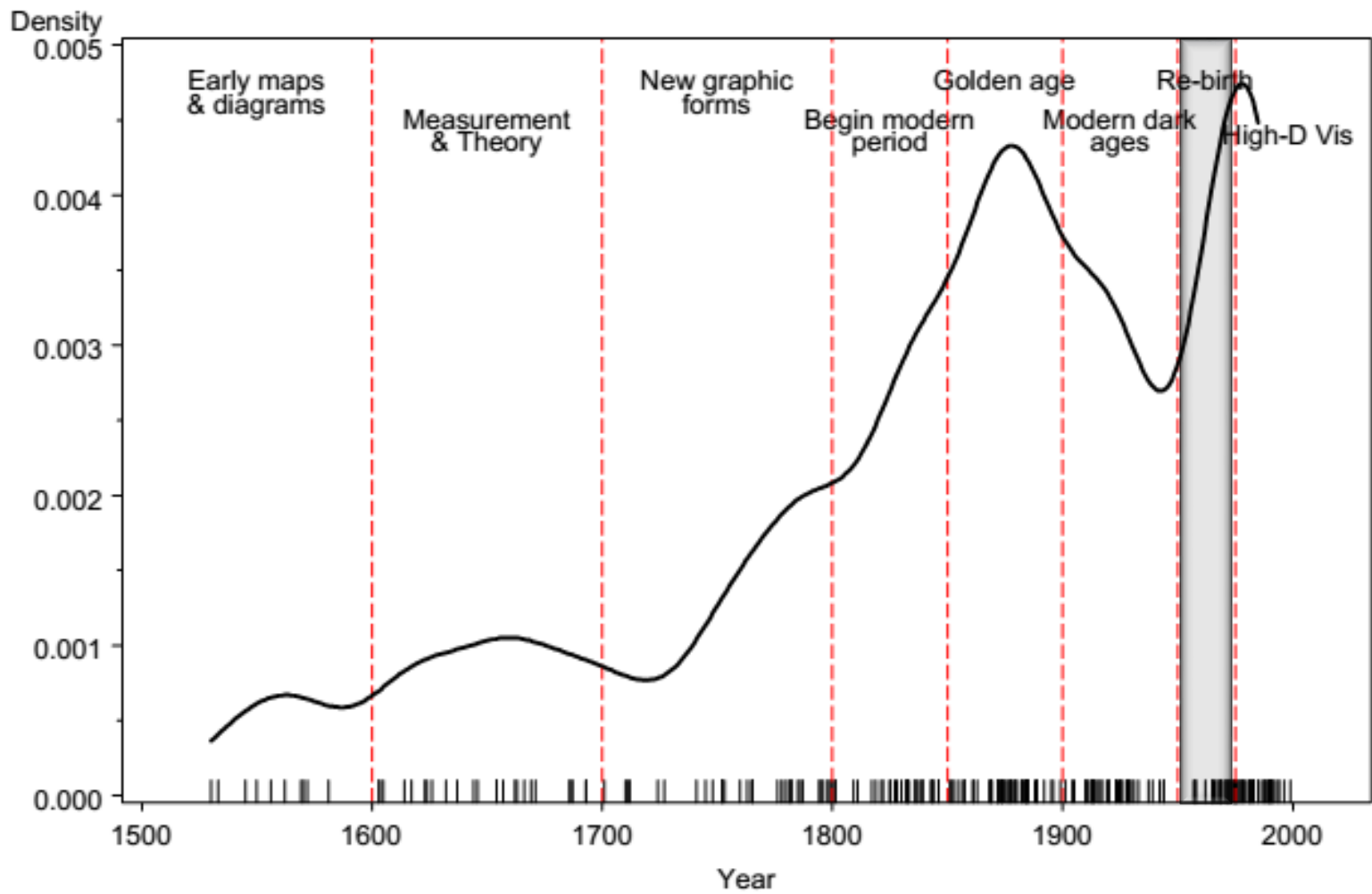




The Survey

Fig. 3. Disposition of a Family Income of from \$900 to \$1000

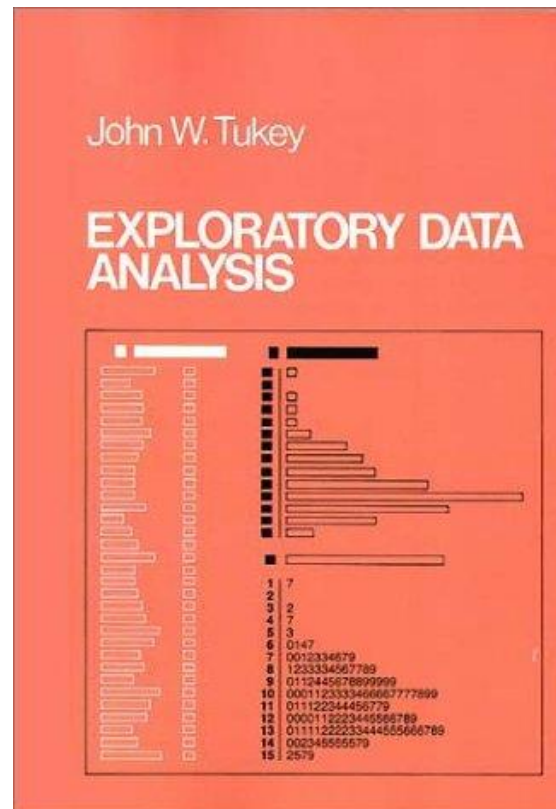
This cut shows an attempt to put figures in popular form. The eye is likely to judge by the size of the pictures rather than by the angles of the sectors

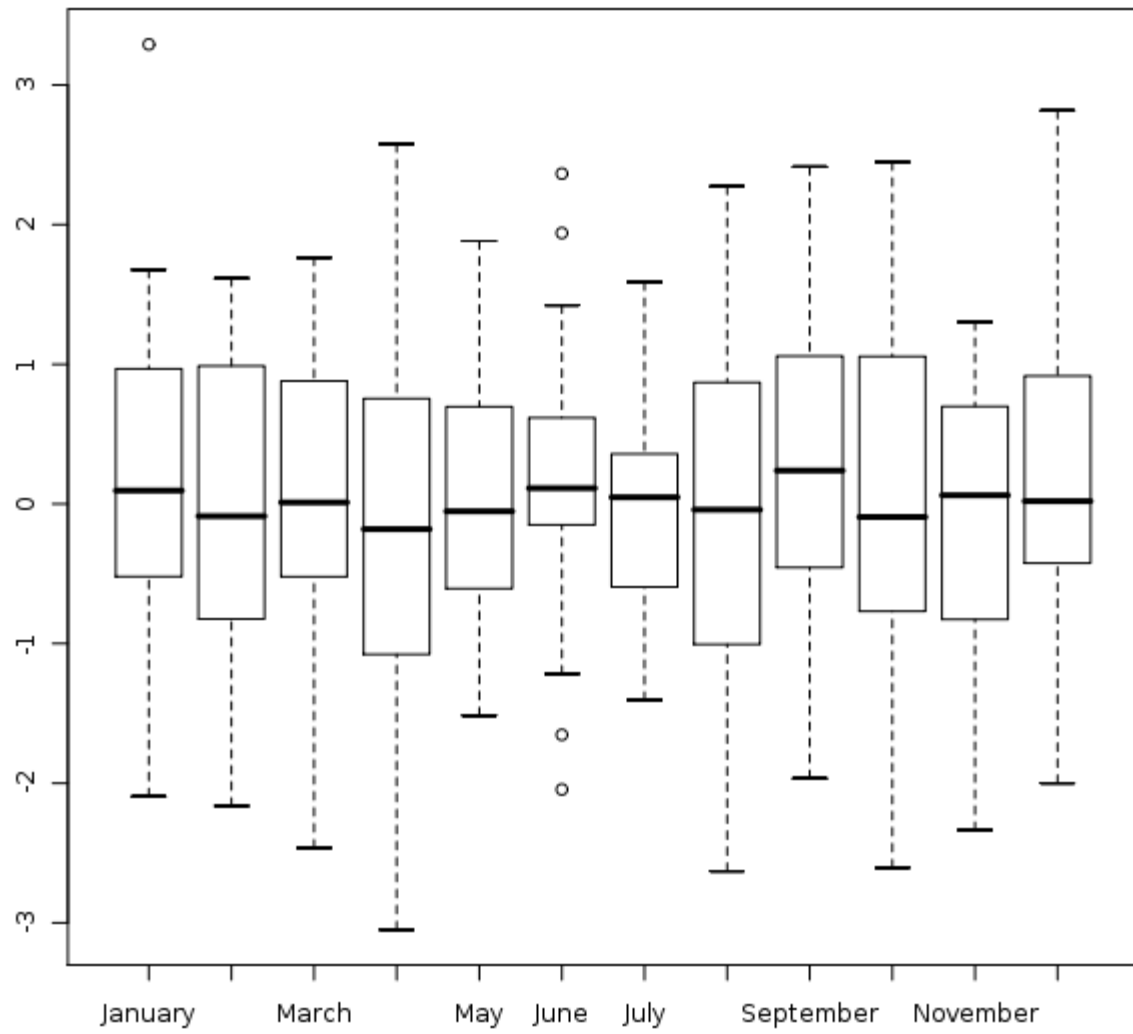


1962

John Tukey

Exploratory Data Analysis

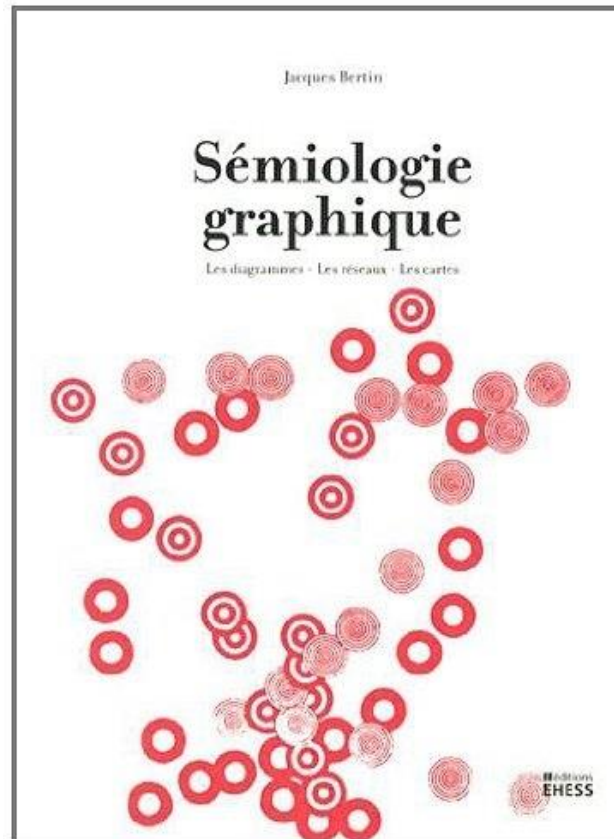




1967

Jacques Bertin

Sémiologie Graphique



1950+

Počítače



2000+

Současný stav

otevírání pole širokému spektru lidí (ve smyslu tvorby)

stabilní oblast studia v akademické sféře

vznikají samostatné studijní obory

otevřené vzdělávání v oblasti - MOOC

zmatení pojmů a představ (*umění*)

1. Data
2. Nástroje
3. Spolupráce
4. Vzdělávání

2000+

Objem a dostupnost dat

2011 - 1.8 ZB dat

data smog - přehlčení daty

big data - krása, ale co s tím

nefunguje bez “information taming” technologií

široká dostupnost všem, open data hnutí

2000+

Dostupnost nástrojů

Demokratizace, laicizace

Naklikávačky

Tableau; D3.js,...

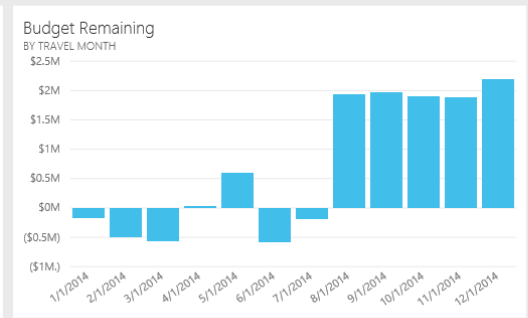
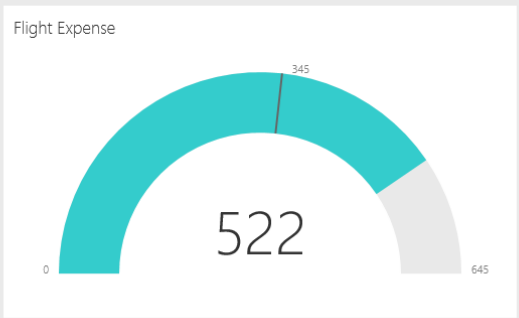
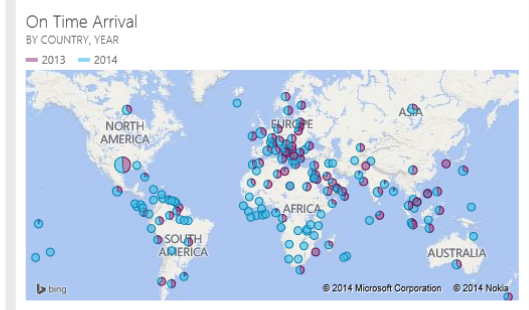
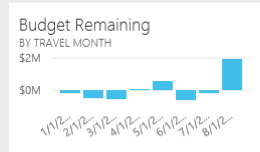
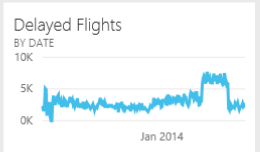
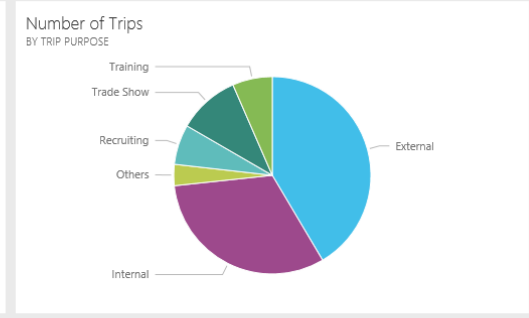
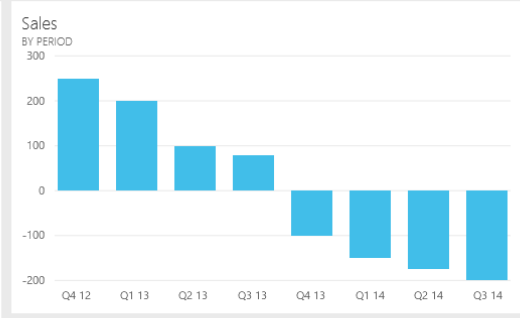
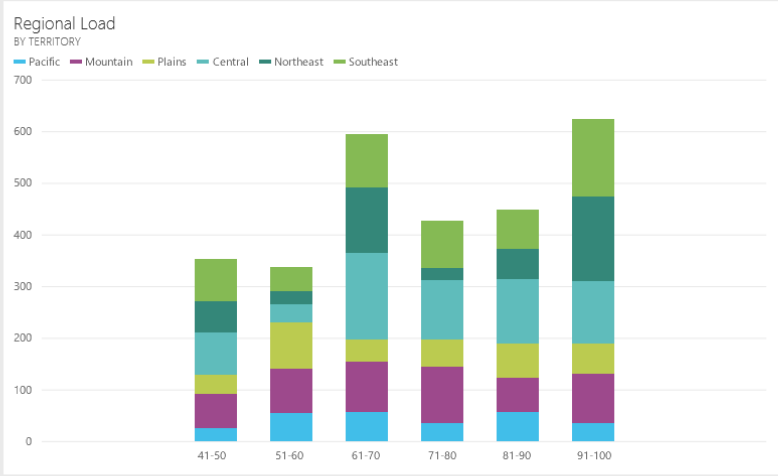
Gephi, NodeXL - sítě

ImagePlot - digital humanities

Quadrigram R, Processing

Travel Analysis

Ask a question about your data



Variance to Budget

(\$1.39M)

Average Cost Per Trip

\$723.16

<http://idl.cs.washington.edu/projects/lyra/>

2000+

Web 2.0 a spolupráce

Sdílení

Inspirace

Spolupráce

<http://www.visualizing.org/>

<http://helpmeviz.com/>

2000+

Otevřené vzdělávání

Knihy zacílené na “nevědce”.

Nathan Yau - Data Points

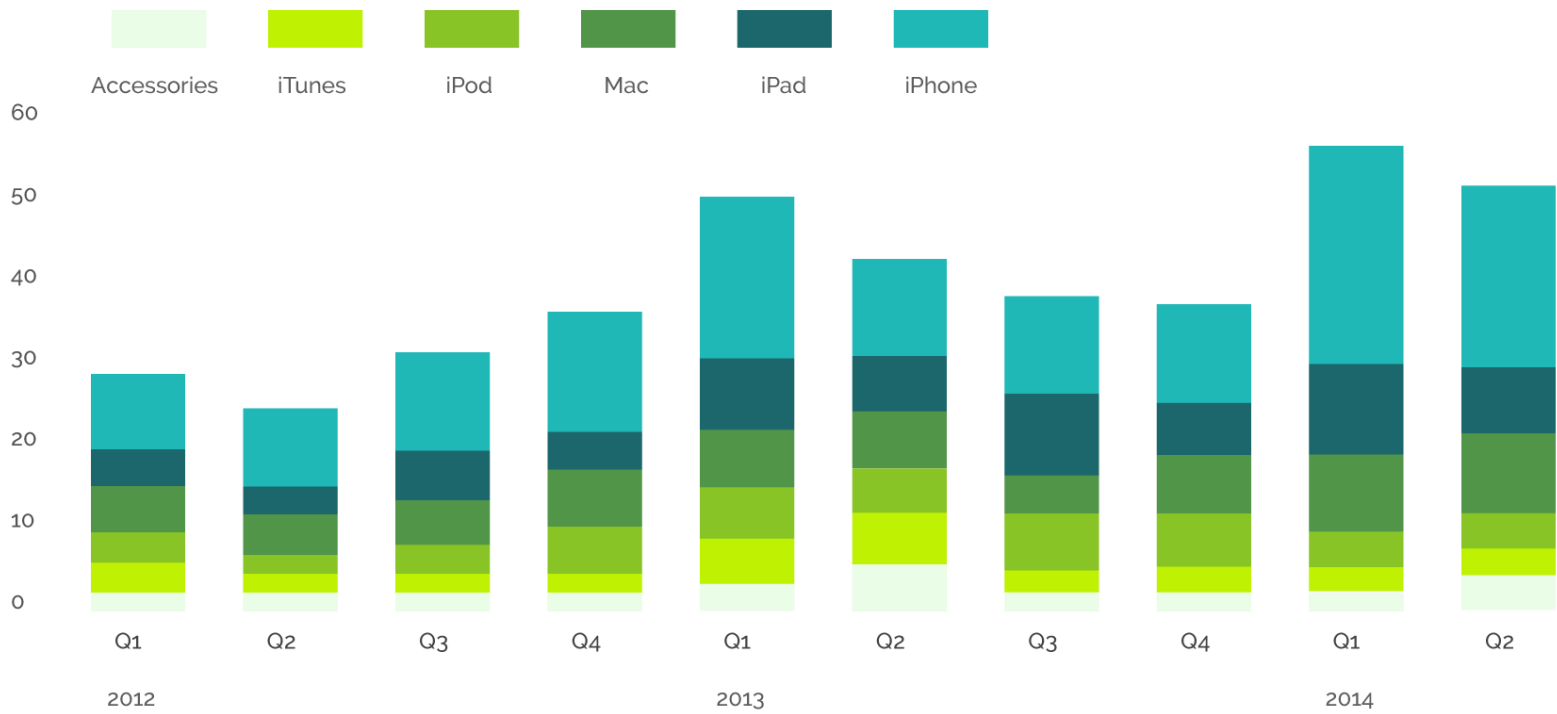
Nathan Yau - Visualize This!

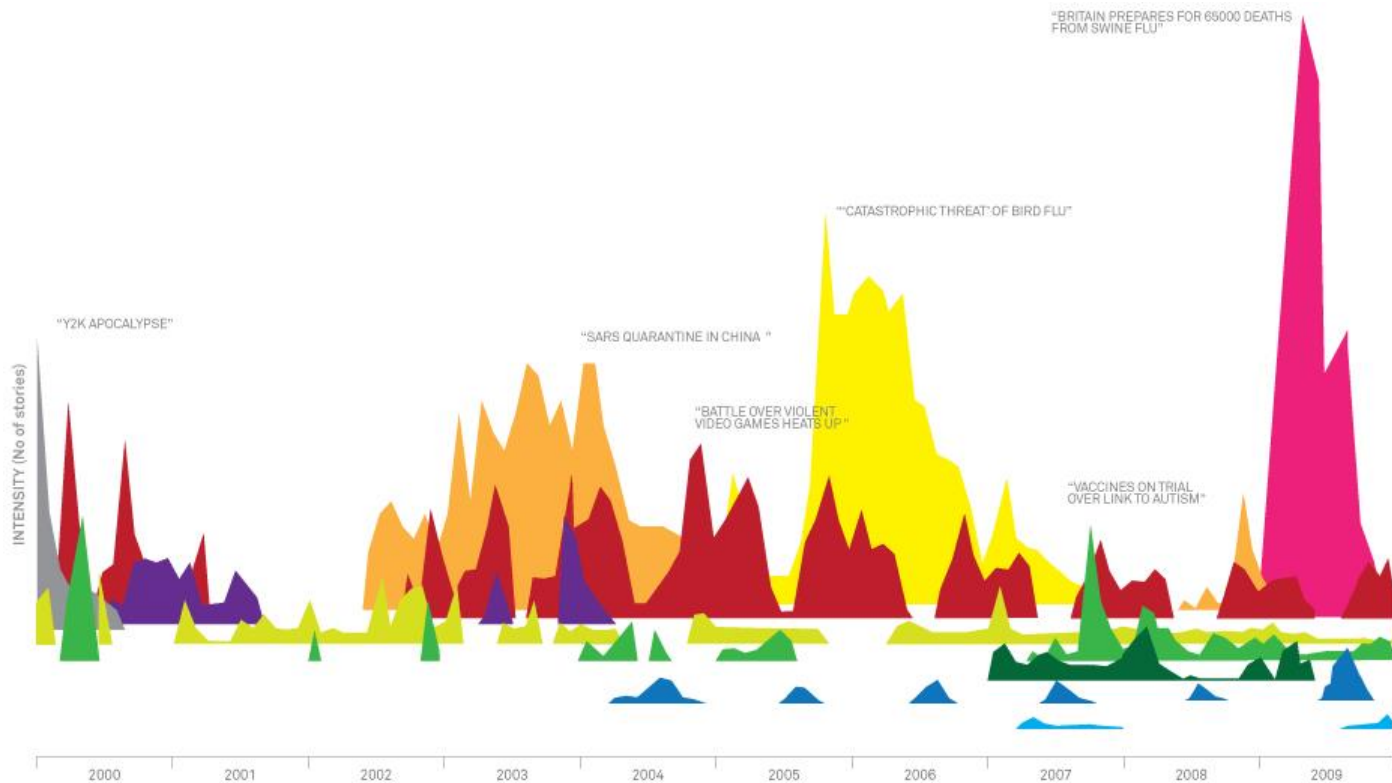
MOOC a kurzy



Jak vizualizace vypadá dnes?

HOW APPLE'S SALES STACK UP

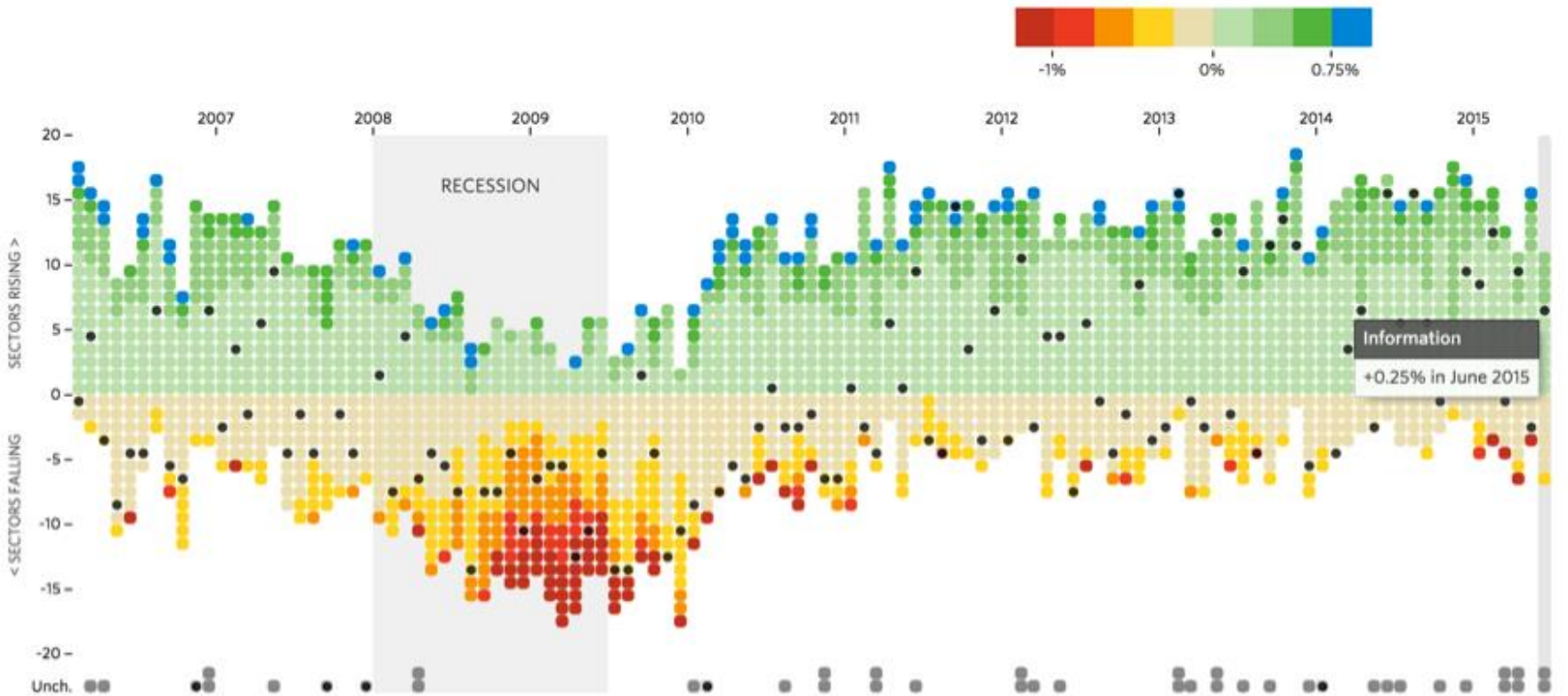


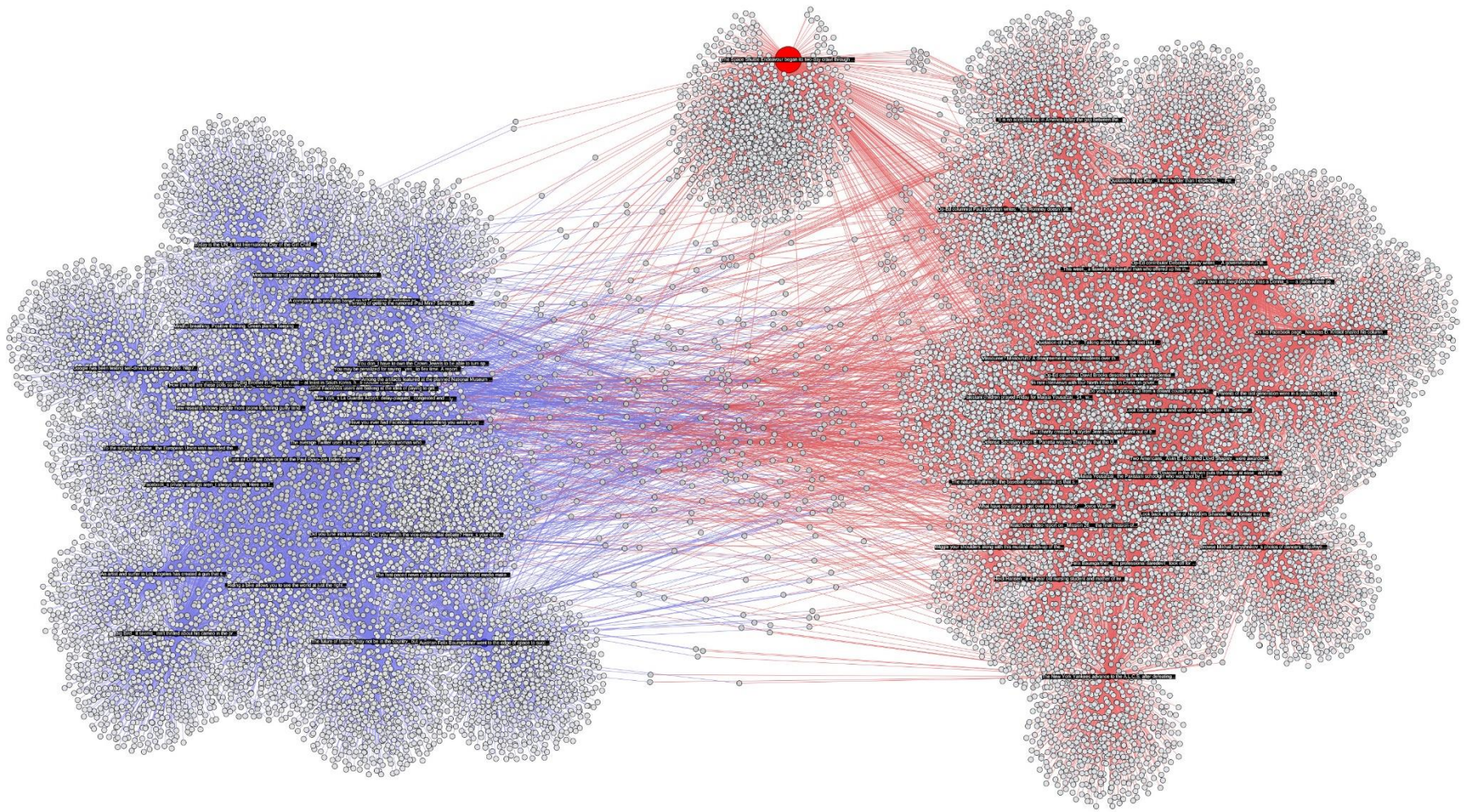


Story (worldwide deaths)

- | | | | |
|-------------------------------|---------------------------|---------------------------------|-------------------|
| ▲ Killer Wasps (1000) | ▲ Autism Vaccinations (0) | ▲ Mad Cow Disease (204) | ▲ Bird Flu (262) |
| ▲ Killer Wifi (0) | ▲ Asteroid Collision (0) | ▲ Violent Video Games (Unknown) | ▲ Swine Flu (702) |
| ▲ Mobile Phones & Tumours (0) | ▲ Millenium Bug (0) | ▲ SARS (774) | |

Mountains Out of Molehills
A timeline of global media scare stories.





PLASTICS BREAKDOWN

WE USE TONS OF PLASTIC. IT'S IN EVERYTHING FROM PACKAGING TO TOYS, TO THE DASHBOARD IN YOUR CAR. MASSIVE AMOUNTS OF IT END UP IN THE OCEAN. IT CONTAINS TOXINS, AND ABSORBS MORE TOXINS. IT ENTANGLES AND KILLS SEA LIFE. IT CERTAINLY DOESN'T BIODEGRADE, BUT THERE ARE WAYS WE CAN HELP.

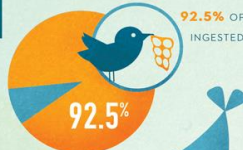


BAD FOR THE OCEAN, BAD FOR US



54%

OF THE 120 MARINE MAMMAL SPECIES ON THE THREATENED LIST HAVE BEEN OBSERVED ENTANGLED IN OR INGESTING PLASTIC.



92.5% OF DEAD SEABIRDS (NORTHERN FULMARS) IN A STUDY HAD INGESTED PLASTIC IN AMOUNTS EQUAL TO 5% OF THEIR BODY WEIGHT.

AMERICANS USE ROUGHLY 100 BILLION PLASTIC BAGS PER YEAR. PLASTIC BAGS CAN TAKE 400 TO 1,000 YEARS TO DECOMPOSE, BUT THEIR

CHEMICAL RESIDUES REMAIN FOR YEARS AFTER.

CHEMICALS USED IN PLASTICS LIKE PHTHALATES AND FLAME RETARDANTS HAVE BEEN FOUND IN FISH, MOLLUSKS, SEA MAMMALS, AND OTHER SEA LIFE

HOW BIG IS THE PROBLEM?

73.9 MILLION POUNDS OF PLASTIC ARE SPREAD THROUGHOUT THE WORLD'S GYRES.

IT'S EXPENSIVE TOO...

AS OF 2009, SOUTHERN CALIFORNIA CITIES HAD SPENT OVER \$1.7 BILLION TO KEEP WATERWAYS FROM BEING OVER LEGAL TRASH LIMITS.

HOW MUCH PLASTIC ENDS UP IN THE OCEAN?



CIRCULAR CURRENTS (GYRES) THOUSANDS OF MILES ACROSS COLLECT IMMENSE AMOUNTS OF PLASTIC IN ALL OF THE WORLD'S OCEANS.

MICROPLASTIC CONCENTRATIONS IN THE NORTH PACIFIC GYRE INCREASED 100X IN THE PAST 40 YEARS.

CURRENTS CARRY THE PLASTIC EVERYWHERE.

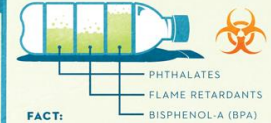
RUBBER DUCKS LOST FROM A SHIPPING CONTAINER IN THE NORTH PACIFIC WERE FOUND NEAR SCOTLAND, IN THE NORTH ATLANTIC. TSUNAMI DEBRIS FROM JAPAN ARRIVED IN NORTH AMERICA, AFTER CROSSING THE LARGEST OCEAN ON EARTH IN JUST 10 MONTHS

PLASTIC IS MADE OF TOXINS

331 MILLION BARRELS OF PETROLEUM & NATURAL GAS LIQUIDS

WERE USED TO MAKE U.S. PLASTIC PRODUCTS. EQUAL TO ABOUT 5% OF THE NATIONAL PETROLEUM CONSUMPTION.

PLASTICS CONTAIN TOXIC CHEMICALS



FACT:



MORE TOXINS ADHERE AS PLASTIC BREAKS DOWN

IN PLASTIC FROM THE NORTH PACIFIC GYRE.



40% CONTAINED PESTICIDES LIKE DDT. 50% CONTAINED PCBs (BANNED BY U.S. CONGRESS IN 1979, FOR HAVING VARIOUS NEUROTOXIC EFFECTS). 80% CONTAINED PAHs (MAY BE HIGHLY CARCINOGENIC).

FLOATING TOXIC MICROPLASTICS ARE OFTEN INGESTED BY MARINE LIFE, WHICH IN TURN IS CONSUMED BY US.

RESEARCH PROVIDED BY OCEAN CONSERVANCY, 5 GYRES, AND OTHERS. INFOGRAPHIC BY WWW.ABRAHAMTHINKIN.COM FOR ONE WORLD ONE OCEAN | 2012

WHAT CAN WE DO TO HELP?

USE LESS PLASTIC

8 OF THE TOP 10 ITEMS FOUND ON BEACHES DURING LAST YEAR'S INTERNATIONAL COASTAL CLEAN-UP DAY WERE PLASTICS RELATED TO EATING & DRINKING.



TO GO CUPS > REUSABLE MUGS & CUPS

PLASTIC BAGS > REUSABLE BAGS, NO BAG

STRAWS > NO NEED

UTENSILS > USE NON-PLASTIC

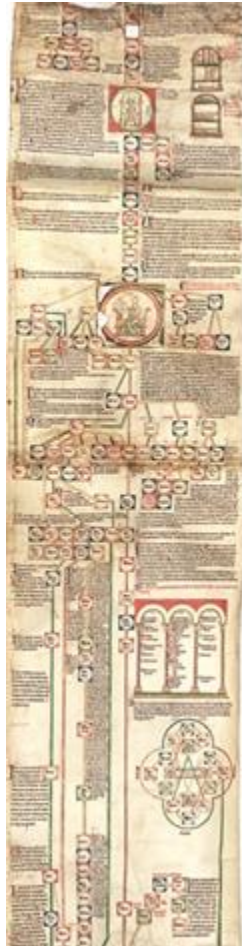
ELECTRONICS > REPAIR OR UPGRADE. RECYCLE THE OLD ITEM WHEN YOU NEED SOMETHING NEW.

BOTTLED WATER > REUSABLE WATER BOTTLE

PACKAGING > BUY ITEMS WITH MINIMAL PACKAGING

CLOTHING > BUY NATURAL MATERIALS. SYNTHETIC FIBERS END UP IN THE OCEAN





BABYLON.

MEDIA AND PERSIA.

PAGAN ROME.

THE TEN KINGDOMS.

PAPAL ROME.

PAPAL ROME.

MAHOMETANS.

MAHOMETANS.

GOD'S EVERLASTING KINGDOM

677

2520

7

677

12

1843.

84

30

538

2300

2520.

457

457

1843.

332

A CHRONOLOGICAL CHART

OF THE

VISIONS OF DANIEL & JOHN.

164

158

490

3 1/2

1290

12

45.

508

42

538

PAPAL ROME.

1260.

606

1299

1449

1798

508

45

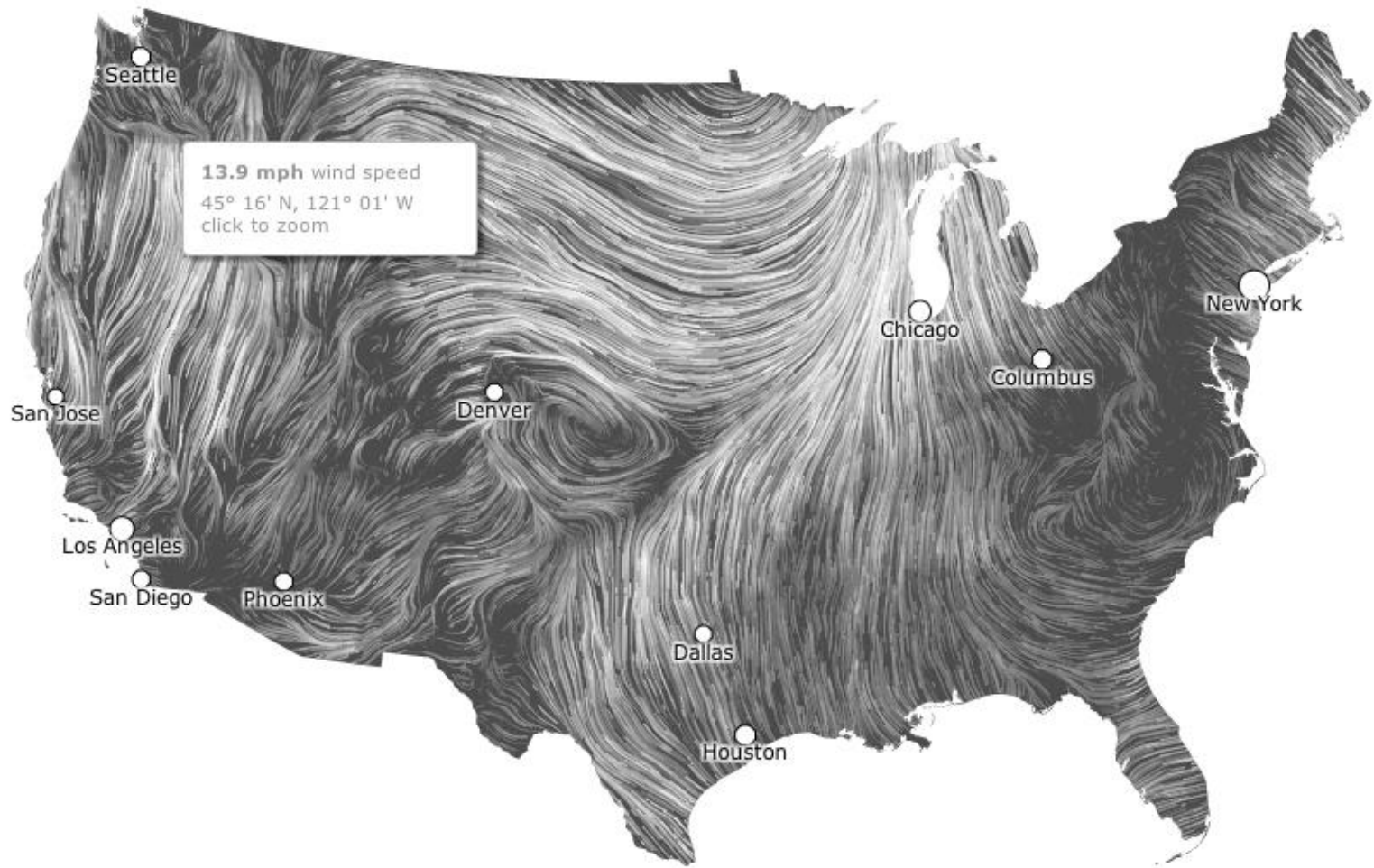
1335

1843.

1843.

1848.





Feeling All

Gender Both

Age All

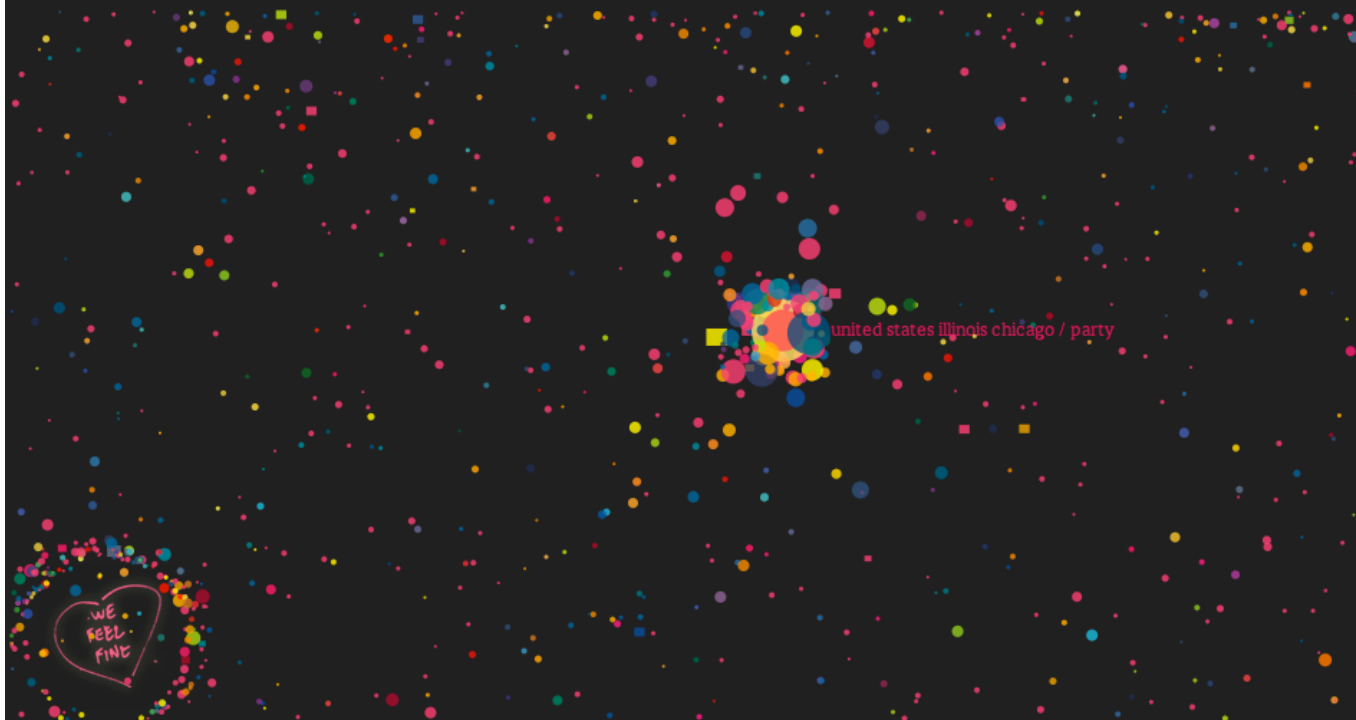
Weather All

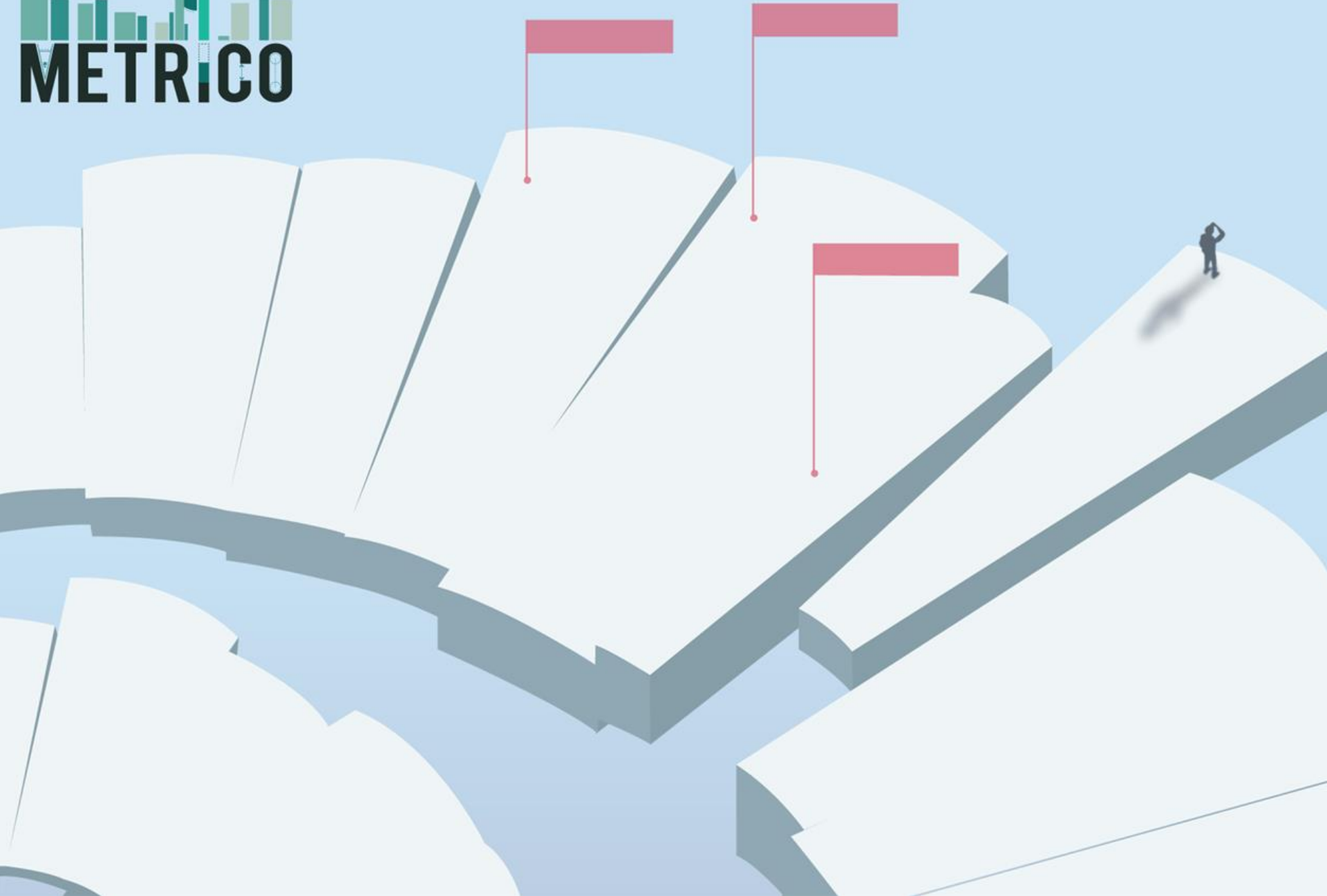
Location All

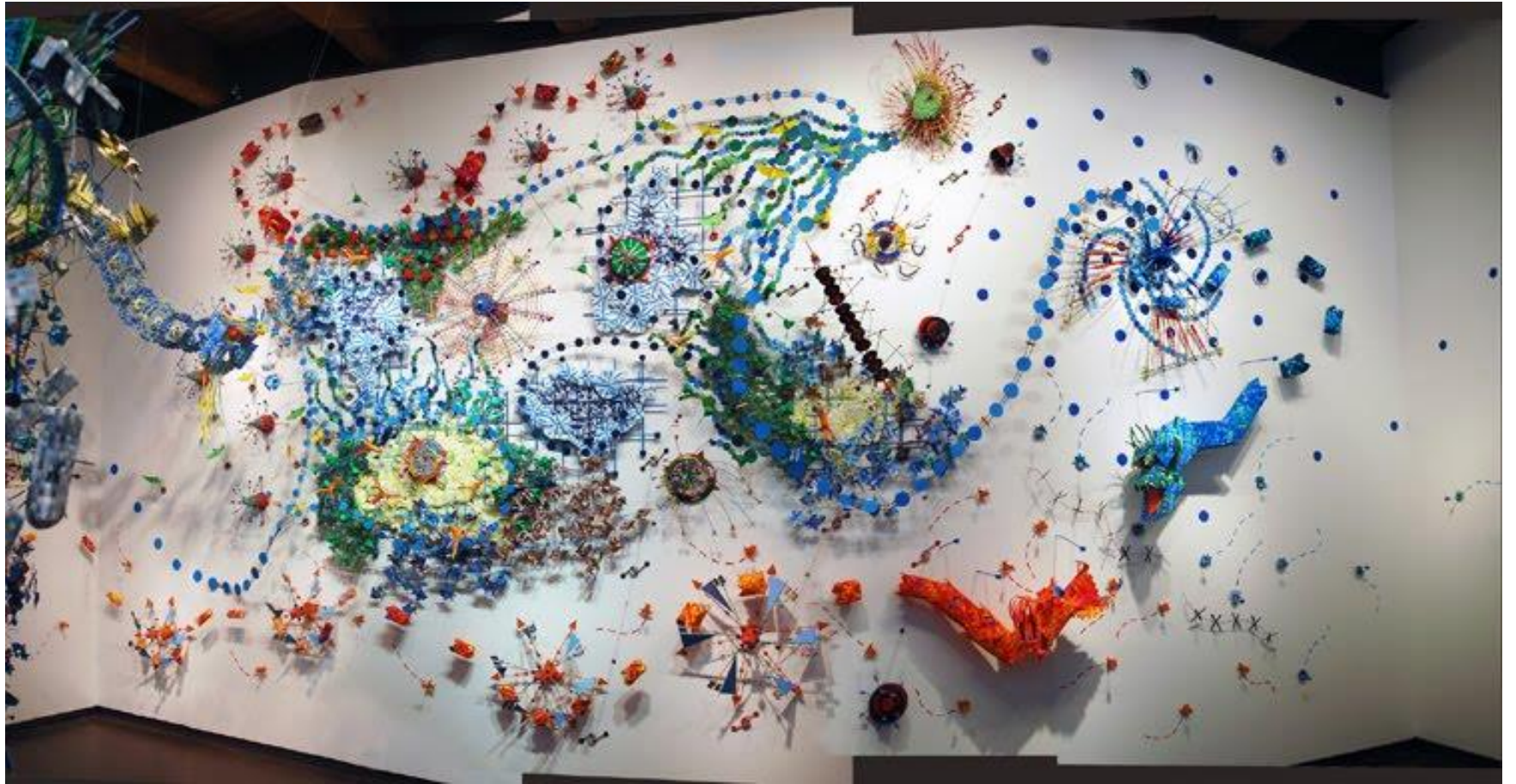
Date All

i seriously hope youre not upset that i passed on drinks at her club gig that night i desperately wanted to meet you there though i feel like you should have enough insight to realize i cant afford to drive into the city and party whenever i feel like it and put my health at risk

39 mins ago / from a 106 year old in chicago illinois united states when it was cloudy









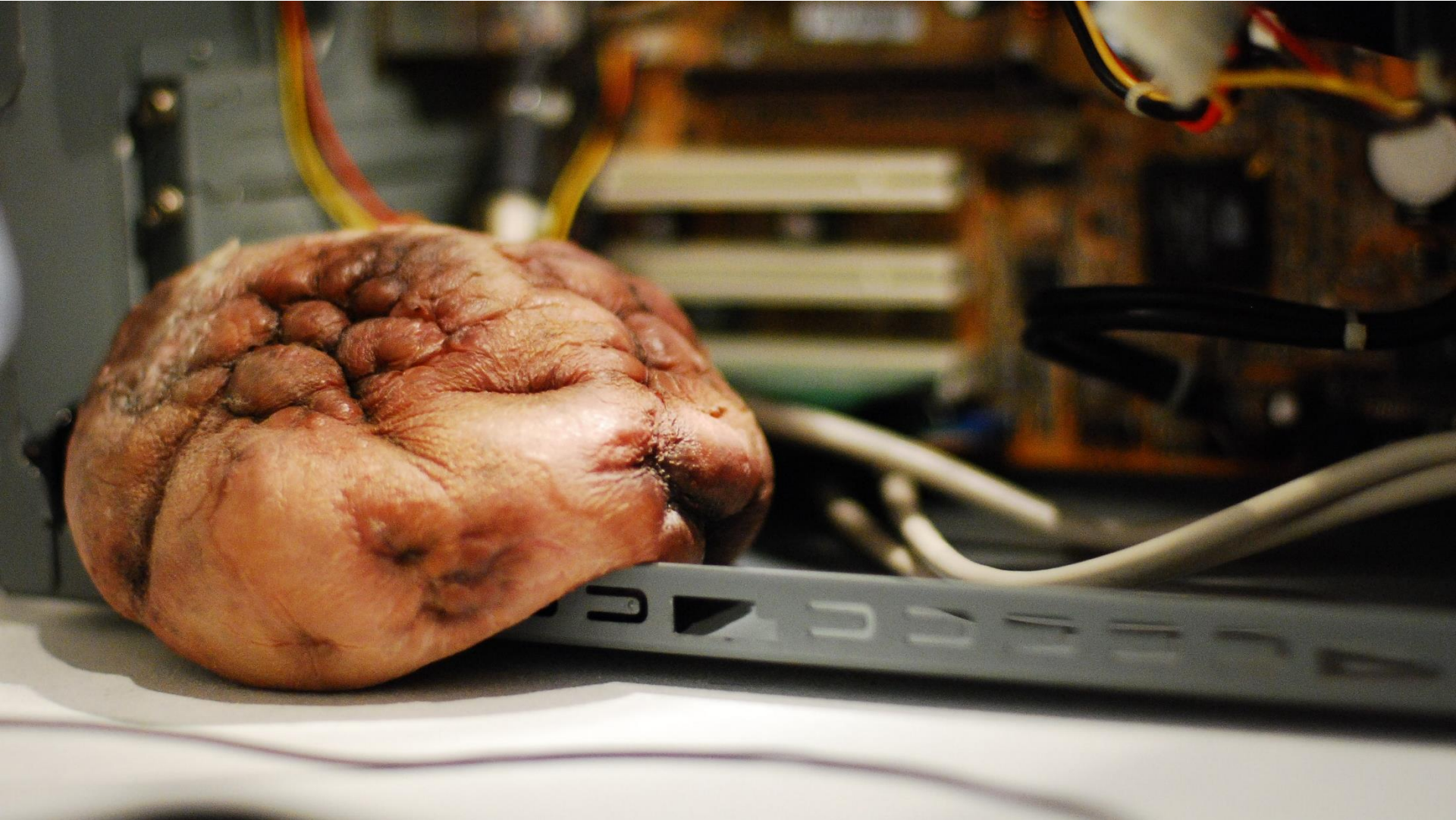










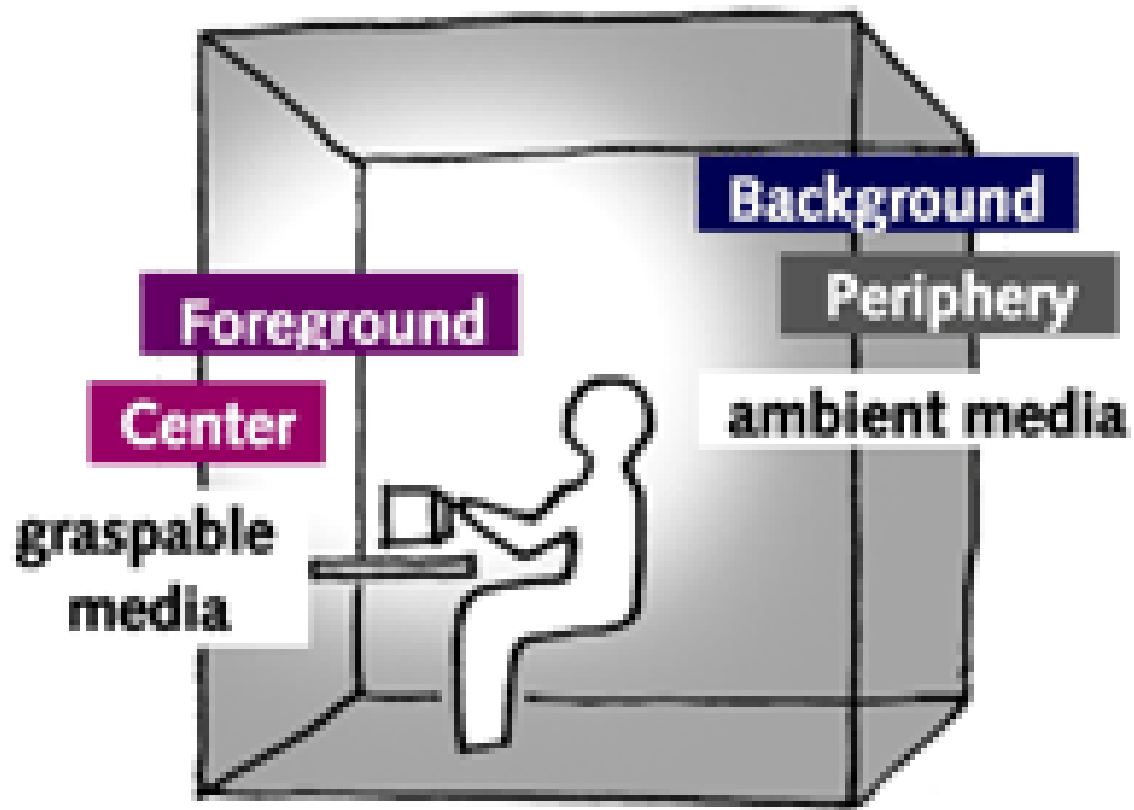








Mimo vizuálno







S.S. SHIPIT

Tradiční definice vizualizace

“...the use of computer-supported, interactive, visual representations of data to amplify cognition.”

(Card et al., 1999)

K čemu běžně slouží vizualizace?

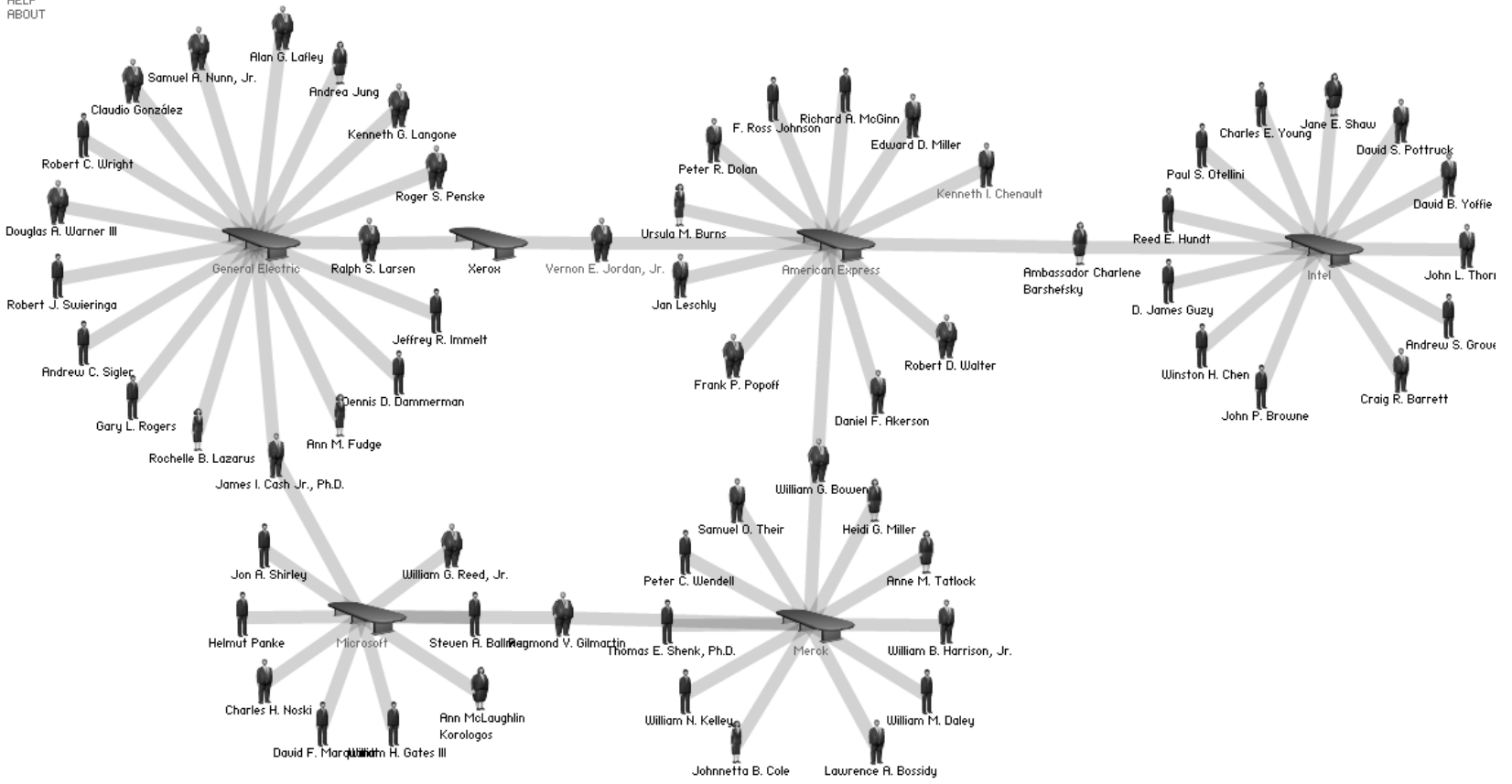
Vizualizace jako pragmatický nástroj, **pragmatický** vhled do dat,
cílem je informace, znalost.

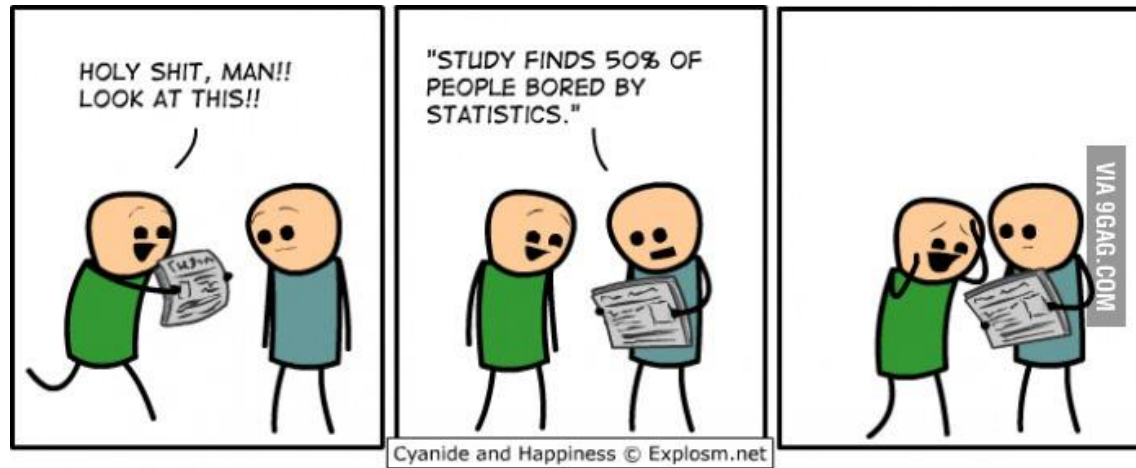
“Umělecké vizualizace jsou vizualizace dat
vytvářené umělci s účelem tvořit umění,”

Viégasová a Wattenberg

THEY RULE 2004 -

- COMPANIES
- DIRECTORS
- INSTITUTIONS
- LOAD MAP
- SAVE MAP
- CLEAR MAP
- FIND CONNECTION
- ADD NOTE
- LOG-IN | SIGN-UP
- PRINT MAP
- HELP
- ABOUT





„Data visualization is the fastest way to make a whole bunch of numbers look a **lot more interesting.**“

Vizualizace je **nástroj**
s širokým spektrem použití.

Přesvědčování

Argumentace

Motivace

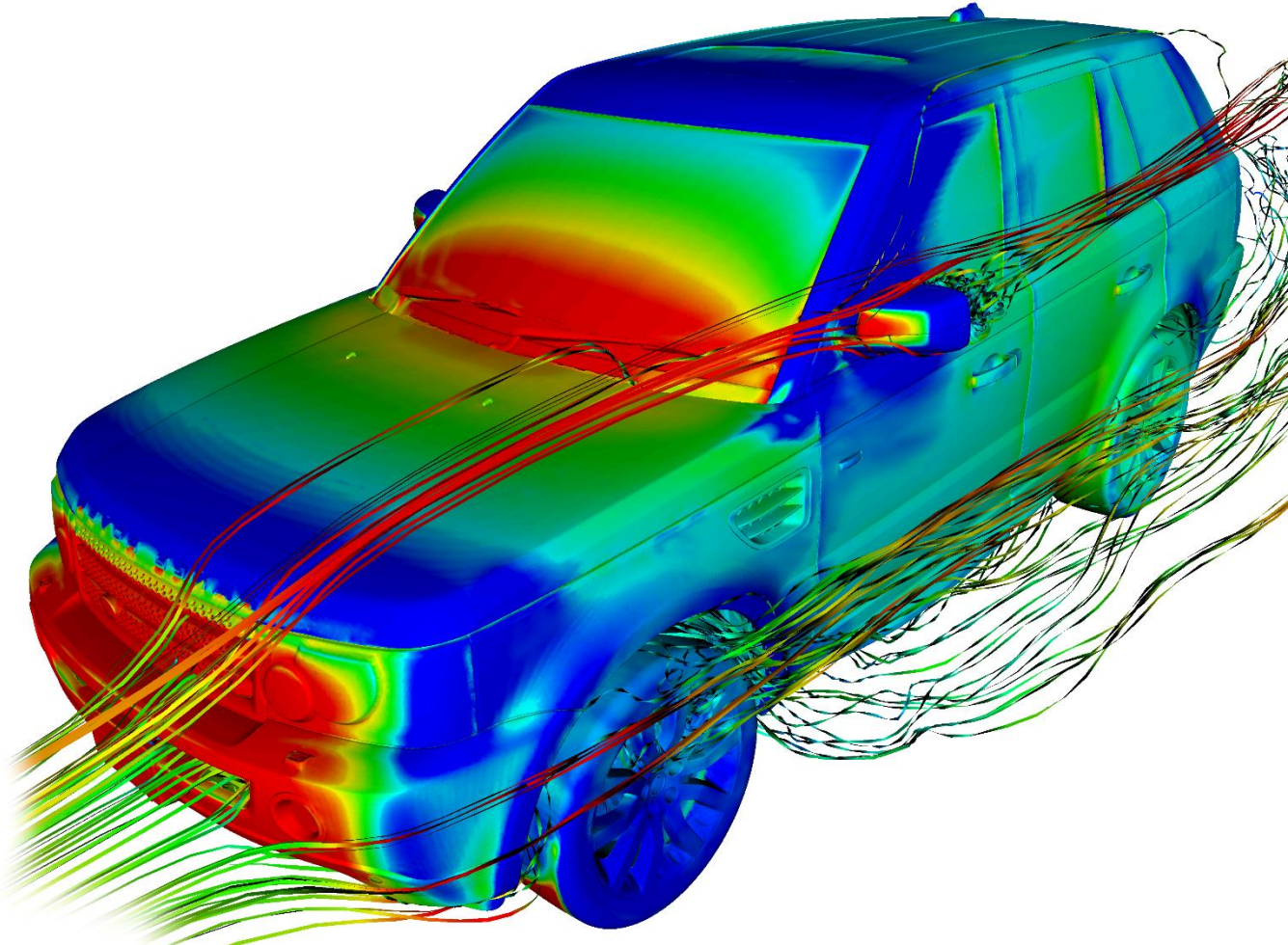
Ilustrace

Vhled

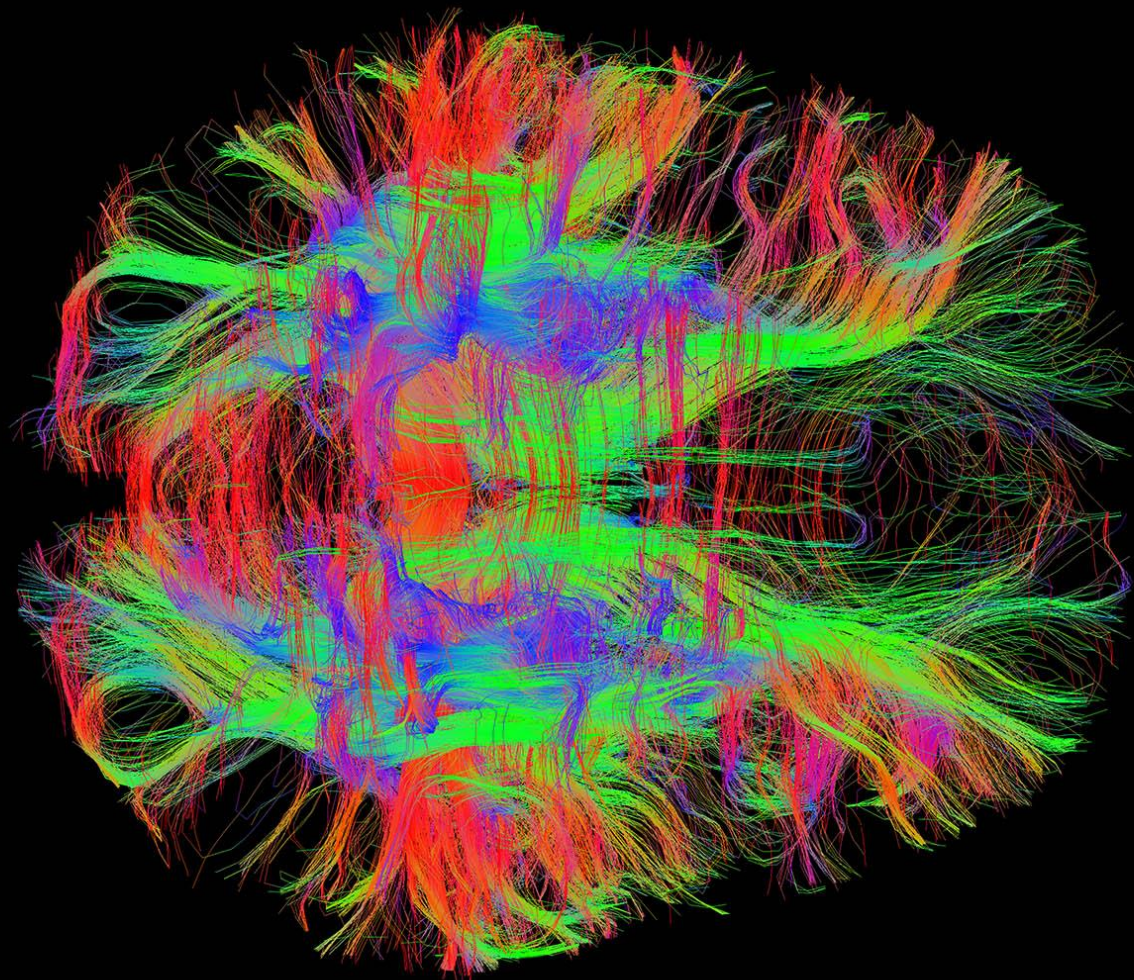
Emoce

Terminologické okénko

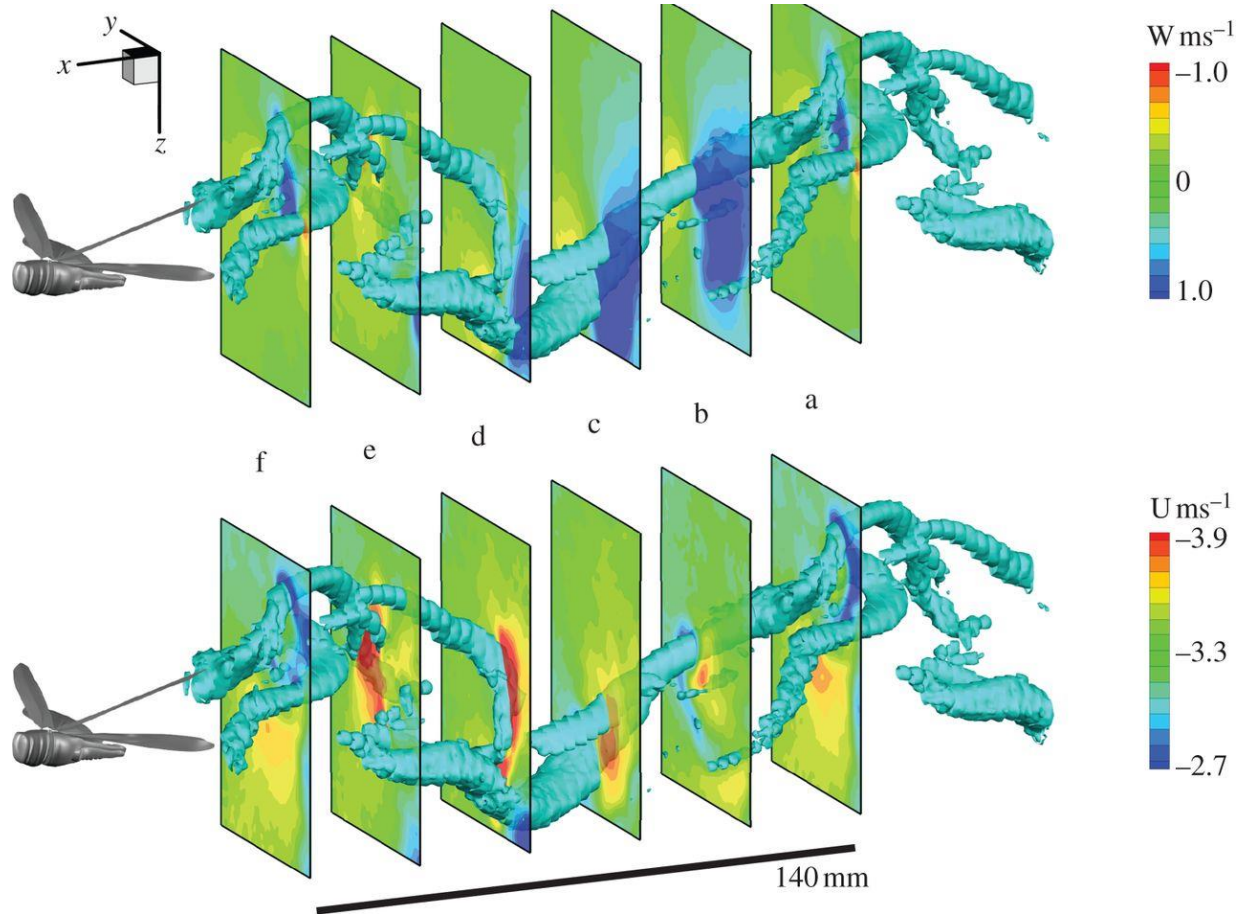
#sciviz



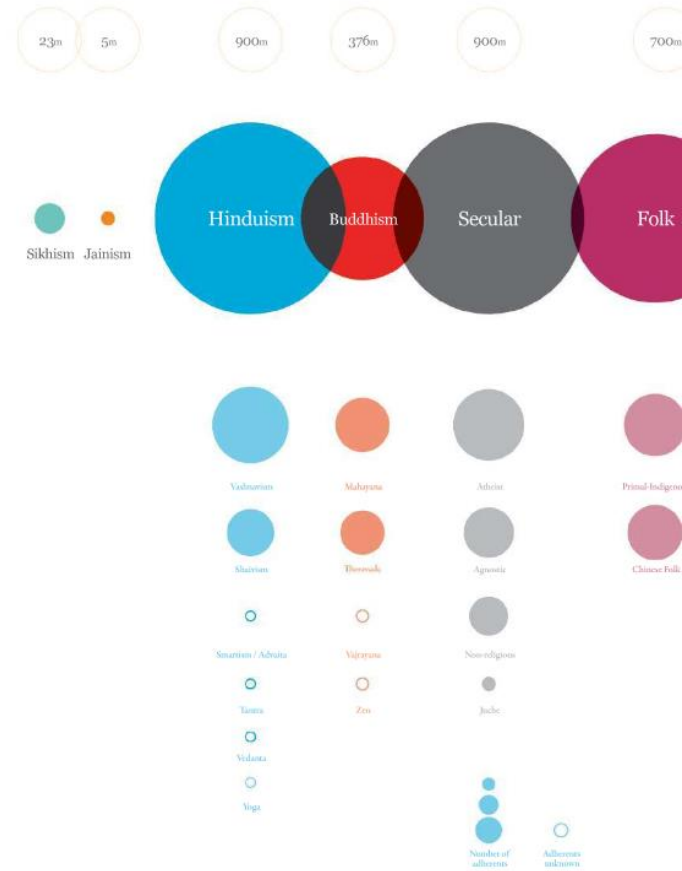
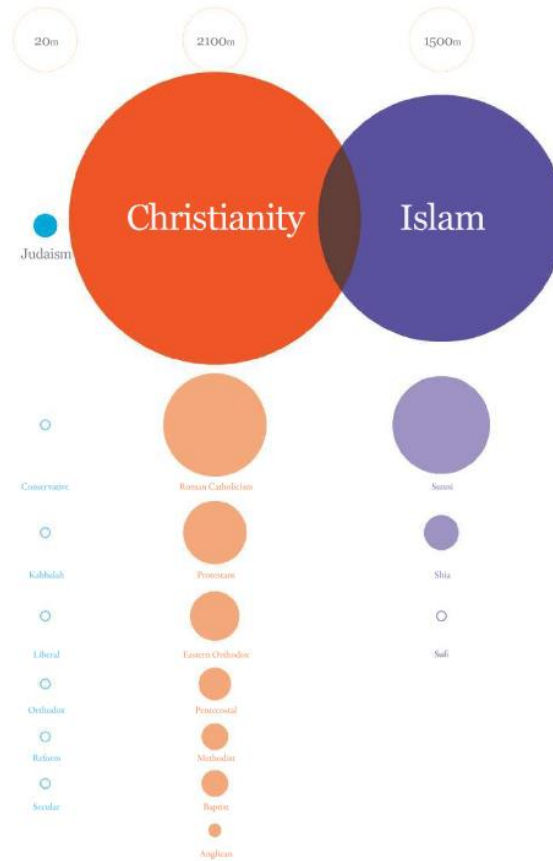
#sciviz



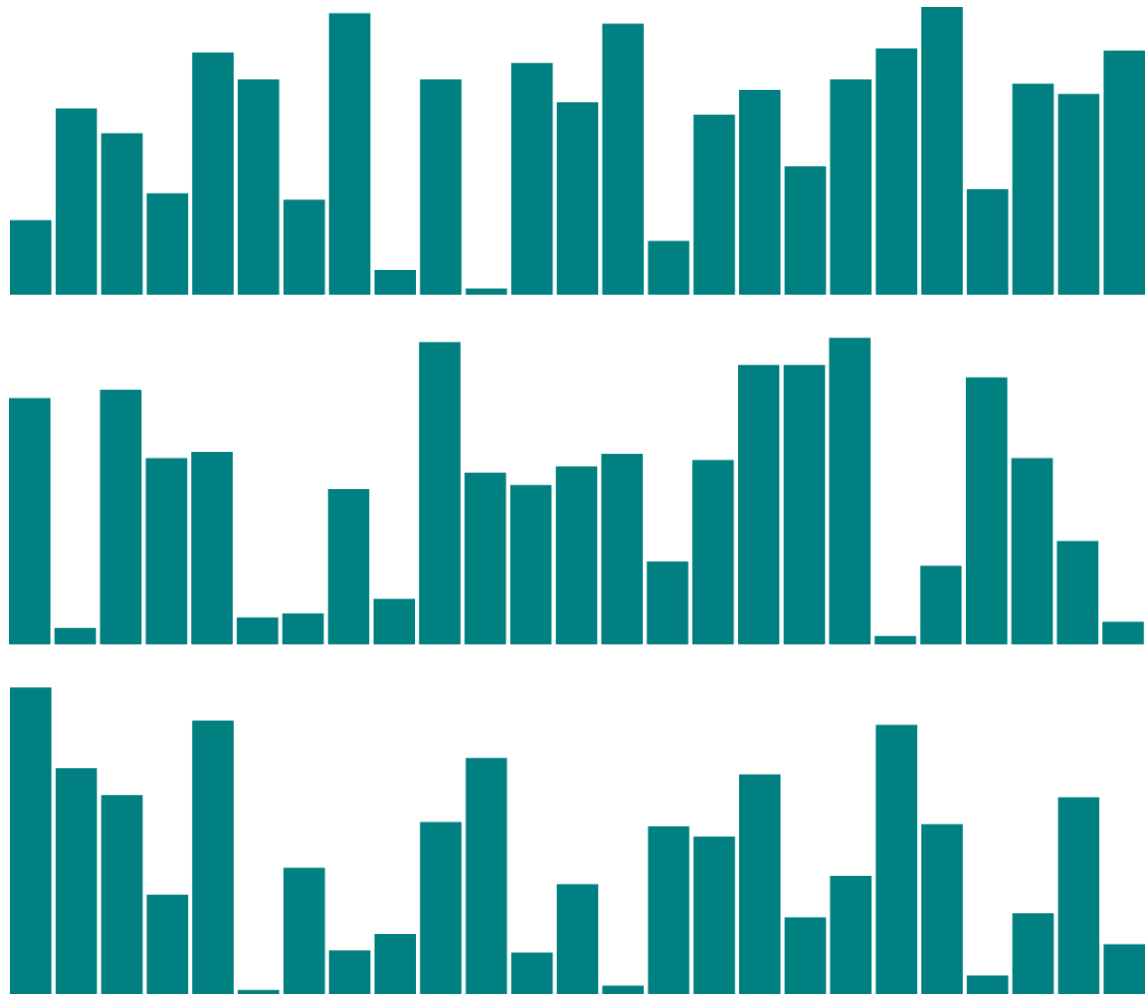
#sciviz



#infoviz



#infoviz



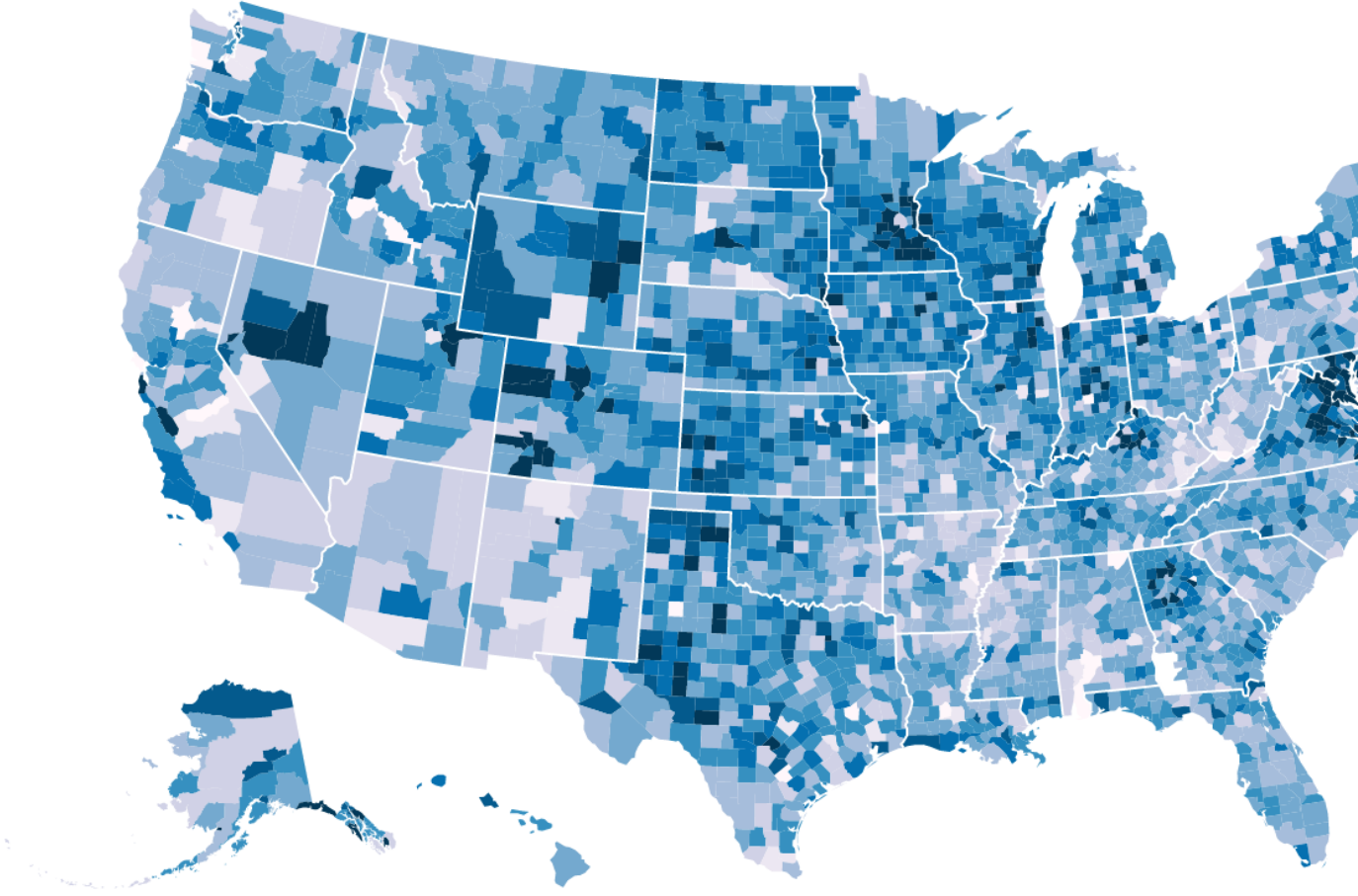
#infoviz

The image displays three overlapping 'Vložit graf' (Insert Chart) dialog boxes from a software application. Each dialog box contains a sidebar with various chart types and a main area showing a preview of the selected chart type.

- Top-left dialog:** The 'Výšečový' (3D pie chart) option is selected in the sidebar. The preview shows a 3D pie chart with a single orange slice.
- Middle dialog:** The 'Spojnicový' (line chart) option is selected. The preview shows a line chart with three data series (blue, orange, and grey) plotted over four categories.
- Right dialog:** The '100% skládaný sloupcový' (100% stacked bar chart) option is selected. The preview shows a 100% stacked bar chart with three data series (blue, orange, and grey) across six categories.

Each dialog box also features a 'Doporučené grafy' (Recommended charts) and 'Všechny grafy' (All charts) tab at the top. The bottom-right dialog box includes 'OK' and 'Zrušit' (Cancel) buttons.

#geoviz



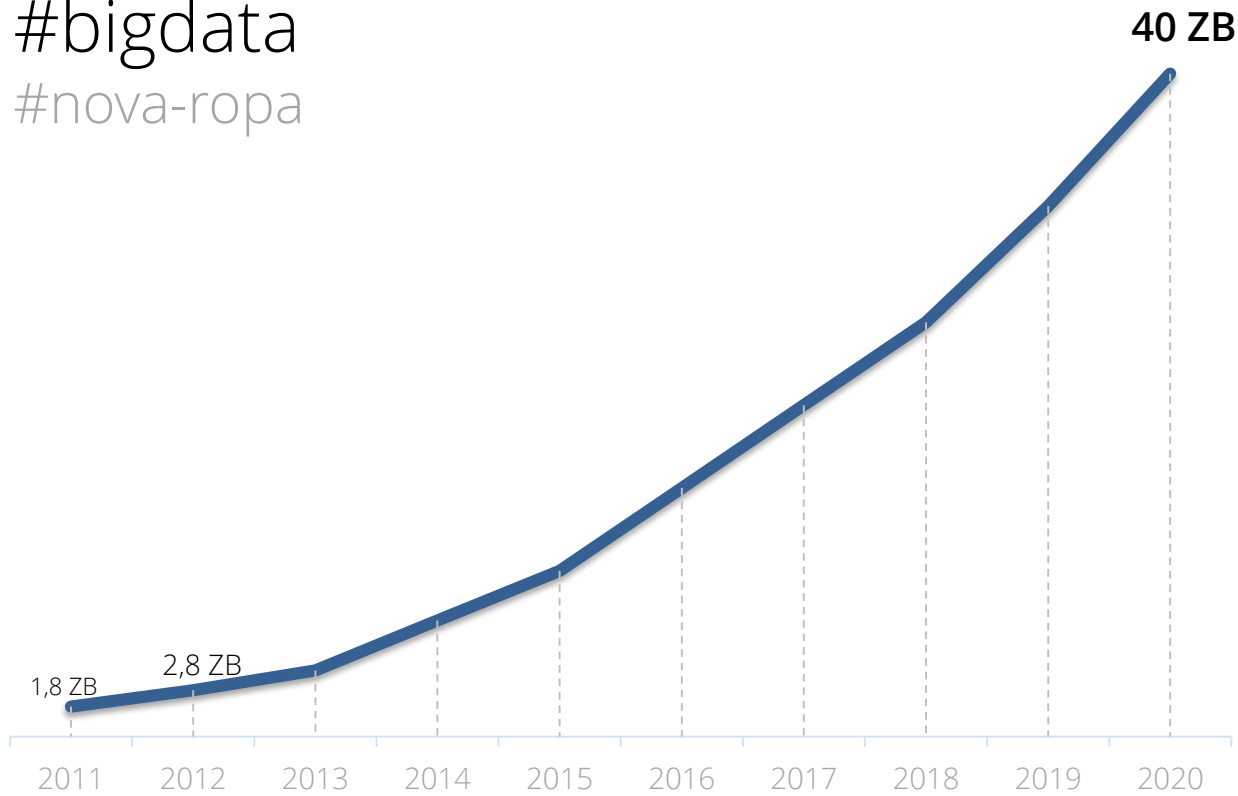
Poučení z dosavadního vývoje

Aktuálně máme **hodně dat.**



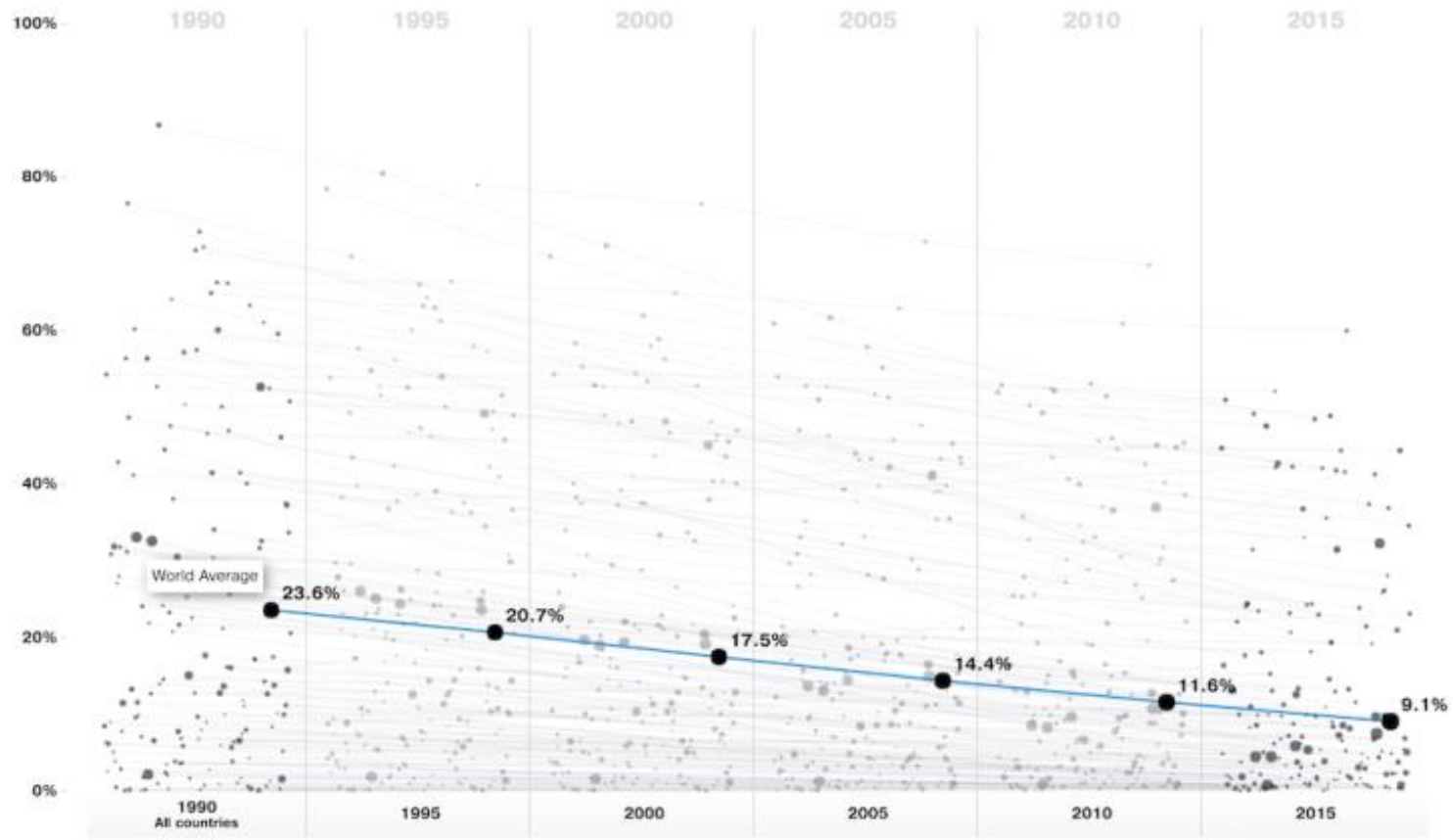
"According to all the big data we've gathered, our discussions about big data are up 72% this year alone."

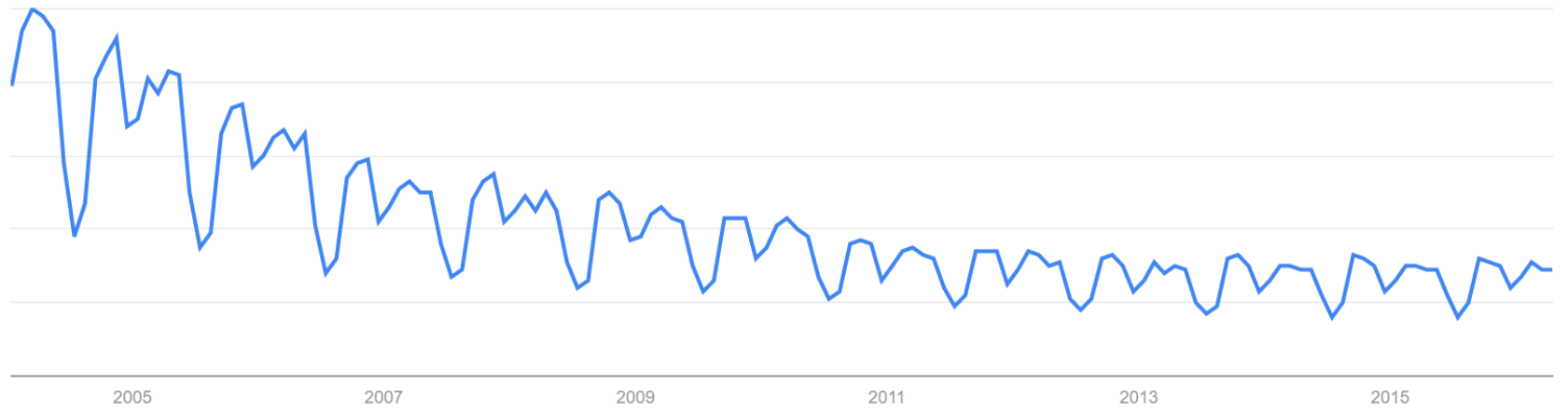
#bigdata
#nova-ropa



Chceme v těch datech **najít**
vzory, trendy, změny a korelace.

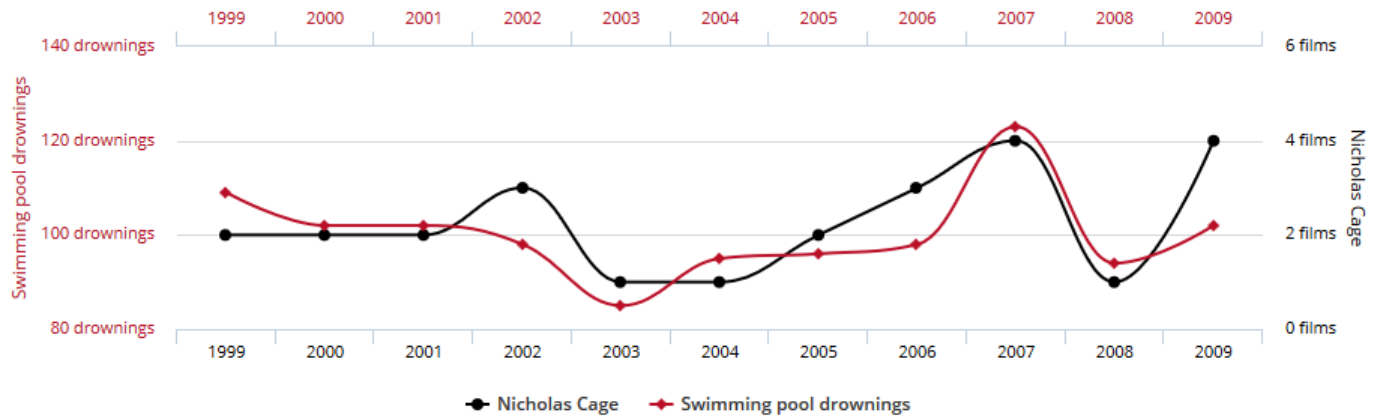
102.27	10.96	238.41	27.81	21.12	27.81	21.12	27.81	21.12
40.51	115.38	261.34	25.77	24.79	33.24	17.90	14.01	14.01
97.70	261.34	25.77	29.88	30.83	17.90	2.37	8.05	8.05
102.27	25.77	29.88	39.30	18.91	4.64	97.20	120.50	120.50
34.38	39.30	23.36	4.22	4.22	136.63	77.27	181.40	120.87
18.85	4.67	4.67	4.95	123.47	77.27	8.86	15.75	15.75
2.96	5.40	5.40	123.47	143.55	8.86	160.18	206.01	206.01
6.05	104.30	104.30	143.55	89.00	160.18	514.40	697.32	697.32
96.08	129.93	129.93	89.00	9.20	514.40	35.88	45.49	45.49
112.71	62.55	62.55	9.20	146.96	35.88	46.63	71.95	71.95
52.57	6.13	6.13	146.96	575.00	46.63	45.54	62.6	62.6
5.39	112.47	112.47	575.00	37.94	45.54	66.64	108	108
	424.62	424.62	37.94	52.88	66.64	9.75		
	1.30	1.30	52.88	53.52	9.75	1.15		
			53.52		1.15			





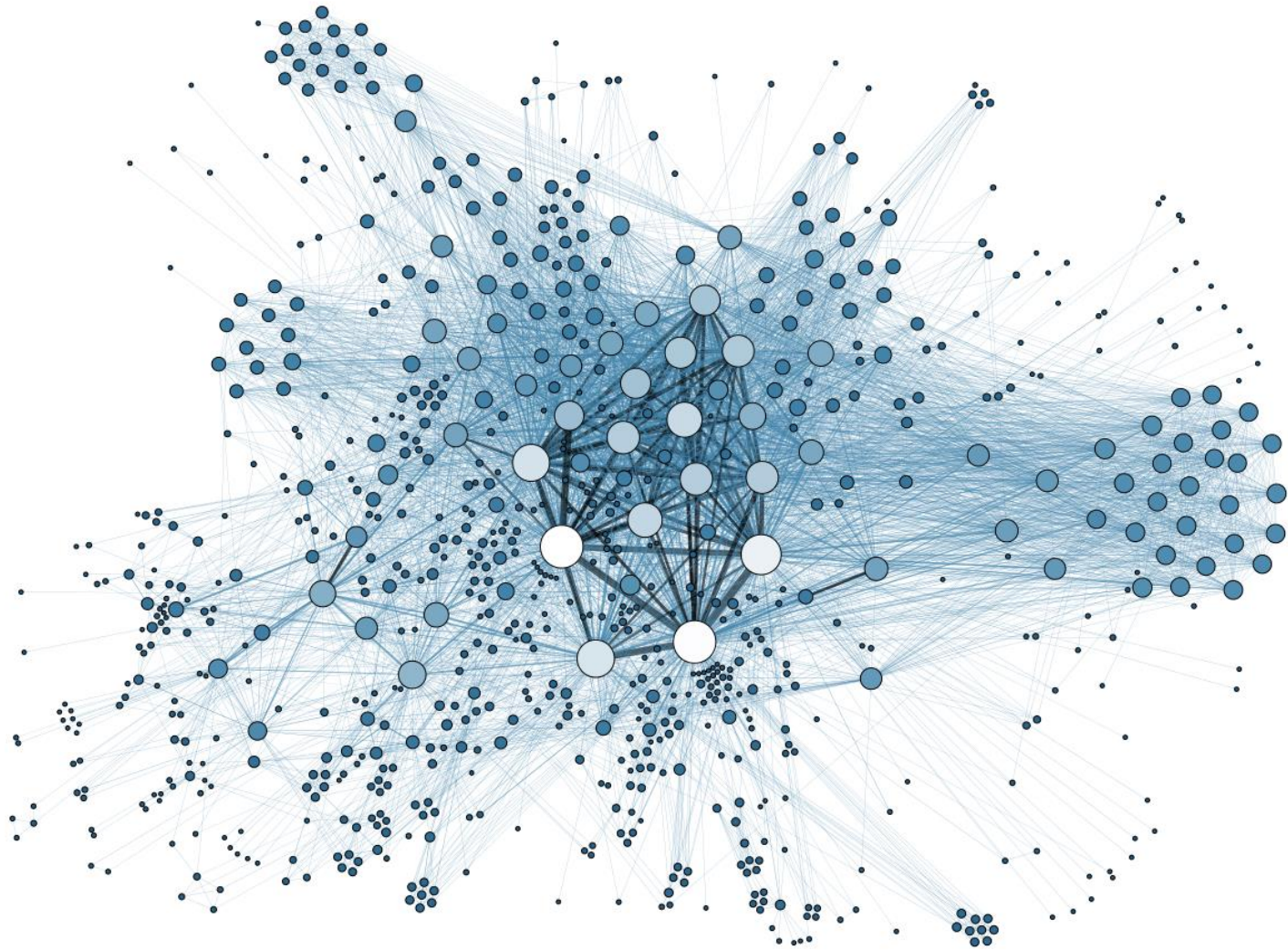
Number of people who drowned by falling into a pool correlates with Films Nicolas Cage appeared in

Correlation: 66.6% (r=0.666004, p>0.05)



Data sources: Centers for Disease Control & Prevention and Internet Movie Database

tylervigen.com



Anscombův kvartet

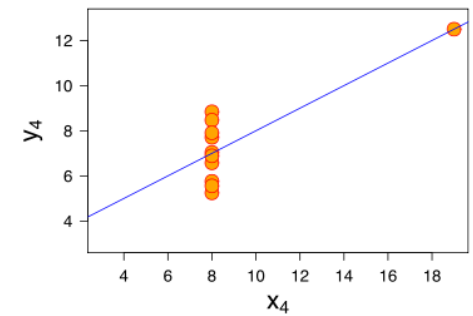
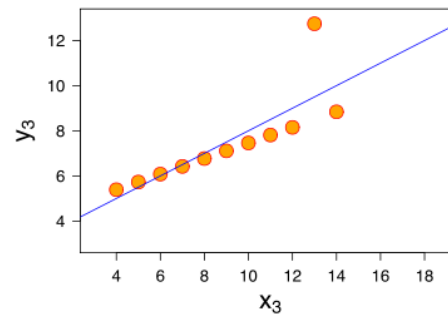
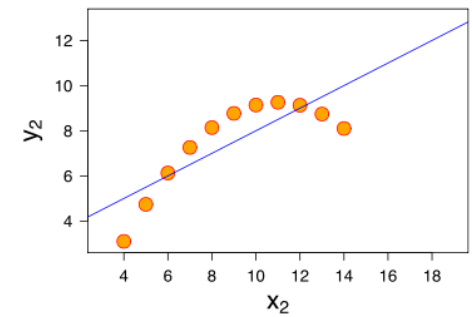
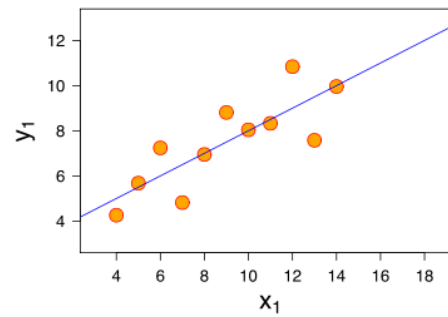
I		II		III		IV	
x	y	x	y	x	y	x	y
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	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

Dataset v popisné statistice

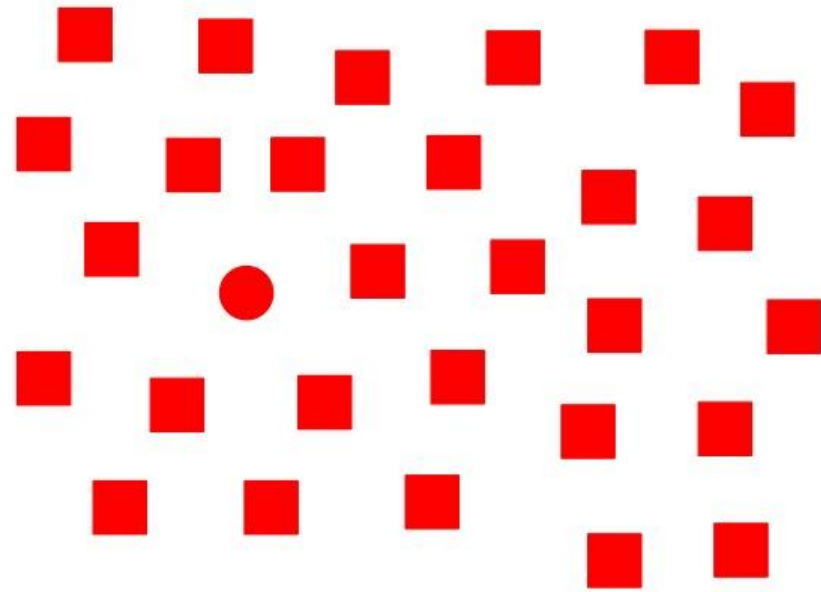
Property	Value	Accuracy
Mean of x	9	exact
Sample variance of x	11	exact
Mean of y	7.50	to 2 decimal places
Sample variance of y	4.125	plus/minus 0.003
Correlation between x and y	0.816	to 3 decimal places
Linear regression line	$y = 3.00 + 0.500x$	to 2 and 3 decimal places, respectively

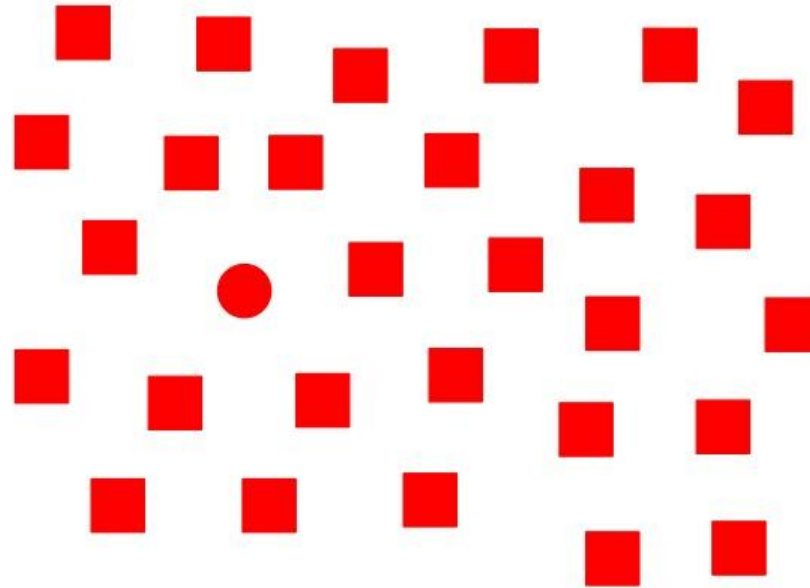
Anscombův kvartet

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



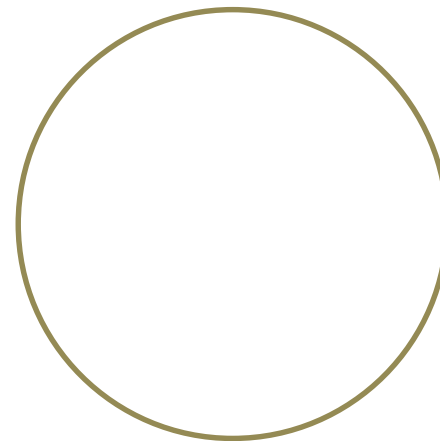
Máme **oči** a náš **mozek**
pracuje s vizuální informací efektivně.





Předpozornostní atributy zaznamenáváme rychleji,
než se naše oči pohybují (200 ms).

Množina všech bodů v rovině,
které leží ve stejné vzdálenosti,
označované jako poloměr, od pevně
daného bodu, zvaného střed.



60.000_x

1 2 3 4 5 6 7 8 9

4	9	2
3	5	7
8	1	6

Můžeme **komunikovat**
komplexní informace vizuální cestou.

Carte Figurative des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

Dressée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite Paris, le 20 Novembre 1869.

Les nombres d'hommes présents sont représentés par les largeurs des zones colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zones. Le rouge désigne les hommes qui entrent en Russie, le noir ceux qui en sortent. — Les renseignements qui ont servi à dresser la carte ont été puisés dans les ouvrages de M. M. Chiers, de Legur, de Fezensac, de Chambray et le journal inédit de Jacob, pharmacien de l'Armée depuis le 28 Octobre. — Pour mieux faire juger à l'œil la diminution de l'armée, j'ai supposé que les corps du Prince Nètome et du Maréchal Davout qui avoient été détachés sur Minsk et Mohilow et qui rejoignent vers Orscha et Witebsk, avoient toujours marché avec l'armée.

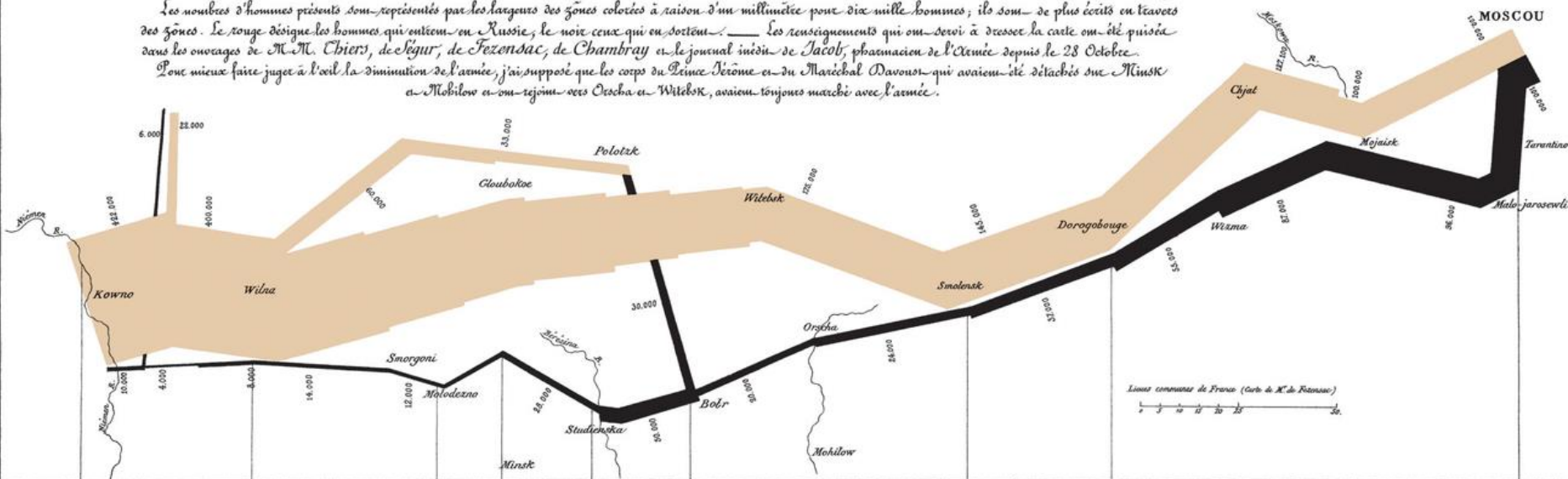
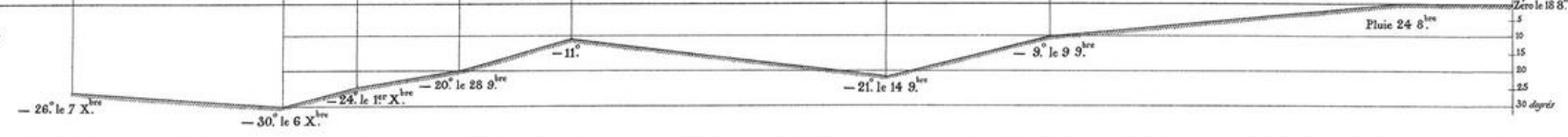
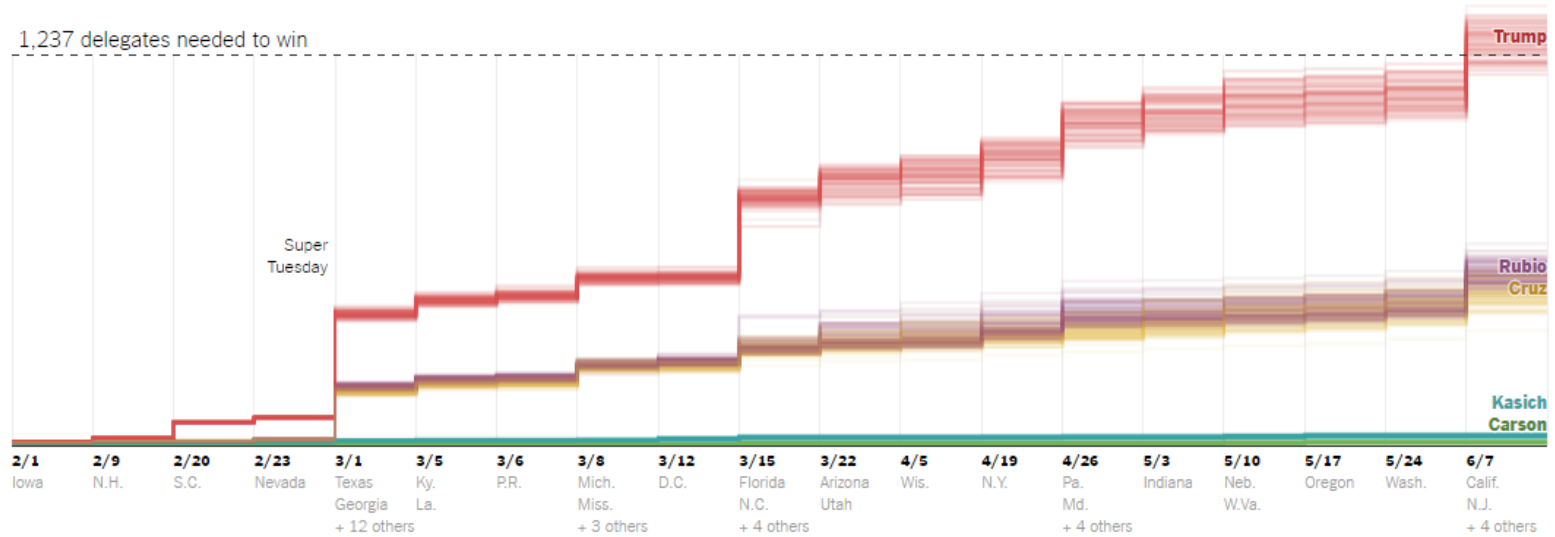


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

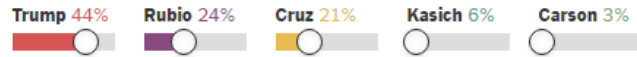


Les Cosaques passent au galop le Niémen gelé.

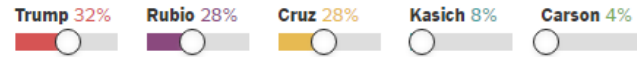
1,237 delegates needed to win



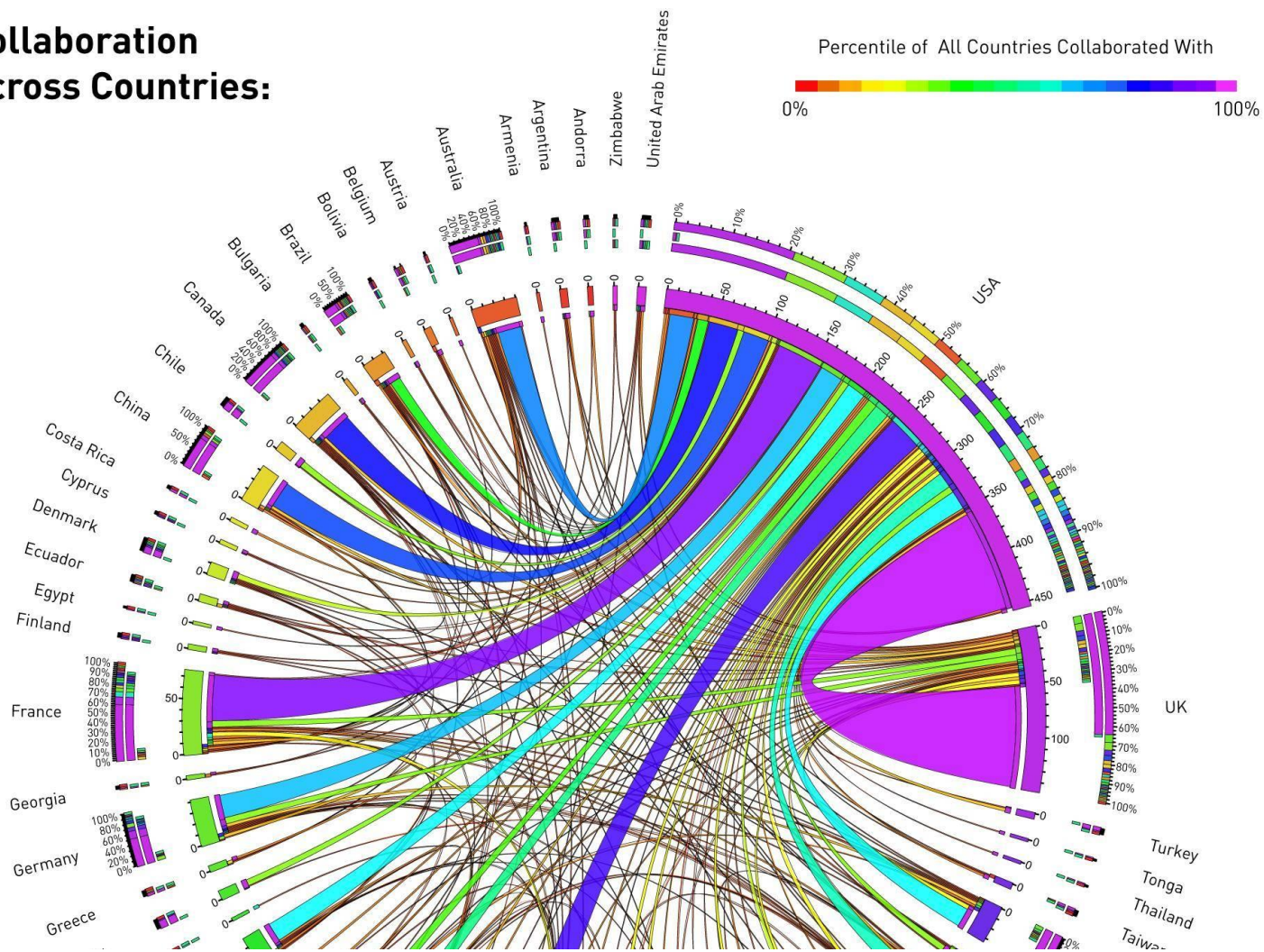
Average results through March 7



Average results after March 7



Collaboration Across Countries:



K tomu máme boží **technologie**,
které nám umožňují vytvářet
boží vizualizace.

<https://www.youtube.com/watch?v=jbkSRLYSojo>

[https://www.nytimes.com/interactive/2014/06/05/upshot
/how-the-recession-reshaped-the-economy-in-255-
charts.html? r=0](https://www.nytimes.com/interactive/2014/06/05/upshot/how-the-recession-reshaped-the-economy-in-255-charts.html? r=0)

Vizualizace nám umožňují
lépe a rychleji **dosahovat našich cílů.**

TOLEDO.

GRADOS DE LA LONGITUD.



G. Janssonius.

G. Mercator.

I. Schonerus.

P. Lantsbergius.

T. Brahe.

I. Regiomontanus.

Orontius.

C. Clavius.

C. Ptolomeus.

A. Argelius.

A. Maginus.

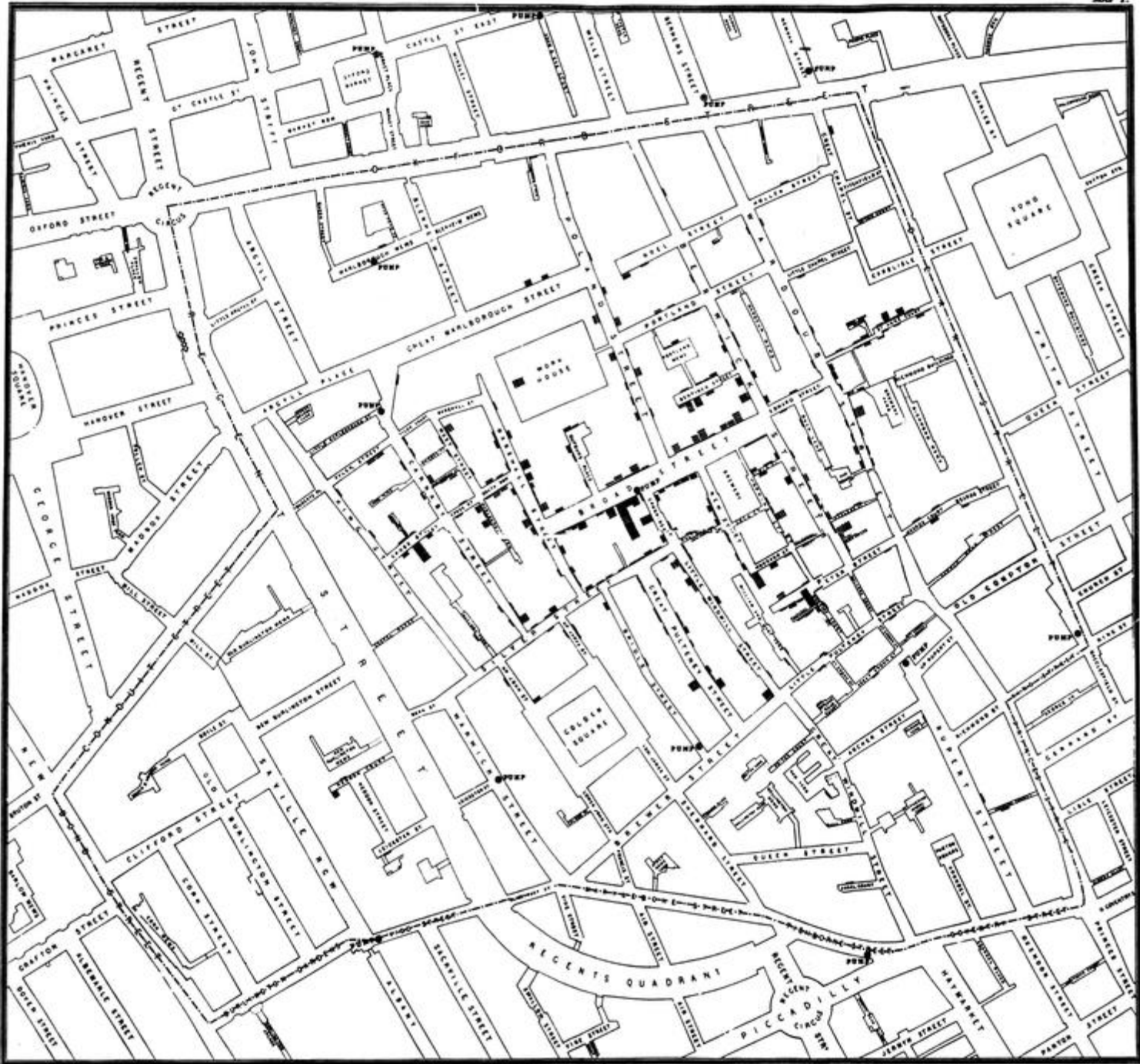
D. Origanus.

Na jejich základě se dokážeme
lépe **rozhodovat**.

<http://www.nytimes.com/interactive/2014/upshot/buy-rent-calculator.html? r=0>

Můžeme vizuálně (tj. lépe)
podpořit svůj **argument**.

43 %

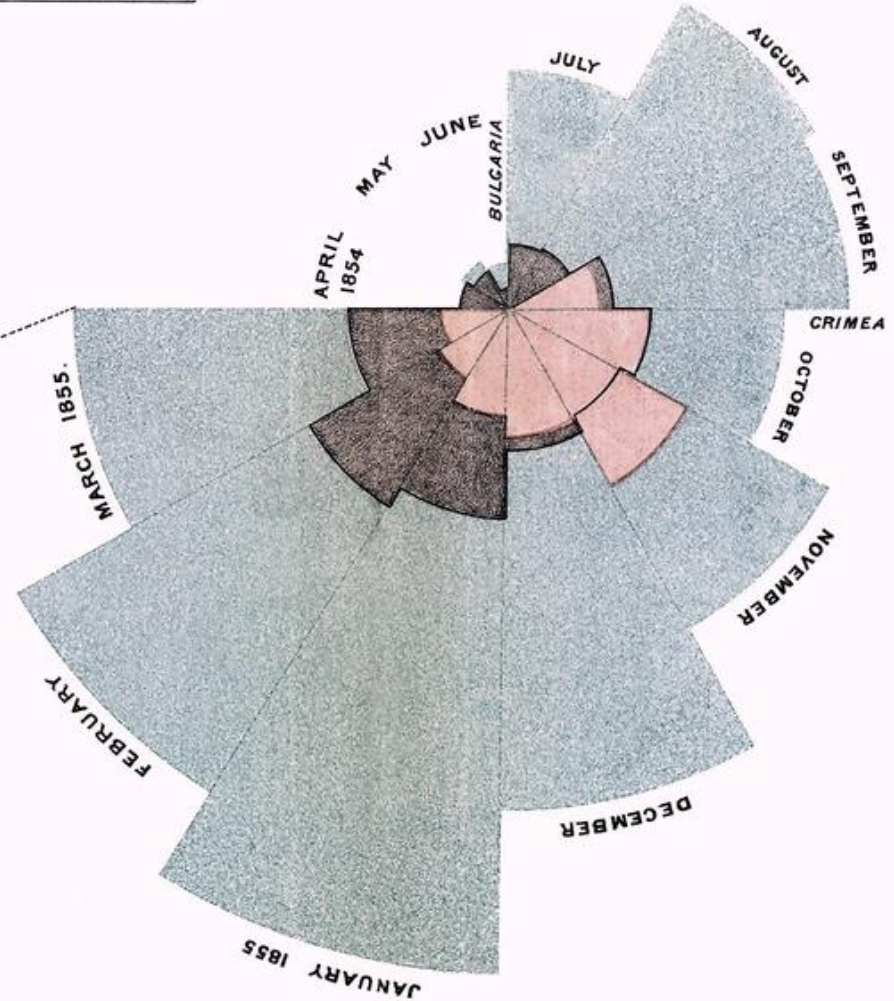


Dokážeme skrze ně
působit na **emoce**.

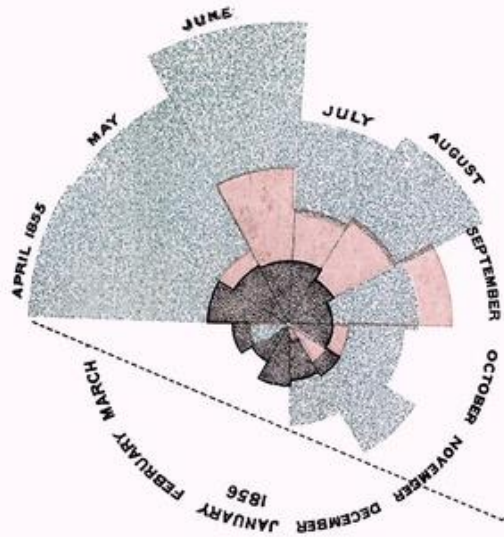


DIAGRAM OF THE CAUSES OF MORTALITY IN THE ARMY IN THE EAST.

1.
APRIL 1854 TO MARCH 1855.



2.
APRIL 1855 TO MARCH 1856.



The Areas of the blue, red, & black wedges are each measured from the centre as the common vertex.

The blue wedges measured from the centre of the circle represent area for area the deaths from Preventible or Mitigable Zymotic diseases, the red wedges measured from the centre the deaths from wounds, & the black wedges measured from the centre the deaths from all other causes.

The black line across the red triangle in Nov. 1854 marks the boundary of the deaths from all other causes during the month.

In October 1854, & April 1855, the black area coincides with the red; in January & February 1856, the blue coincides with the black.

The entire areas may be compared by following the blue, the red & the black lines enclosing them.

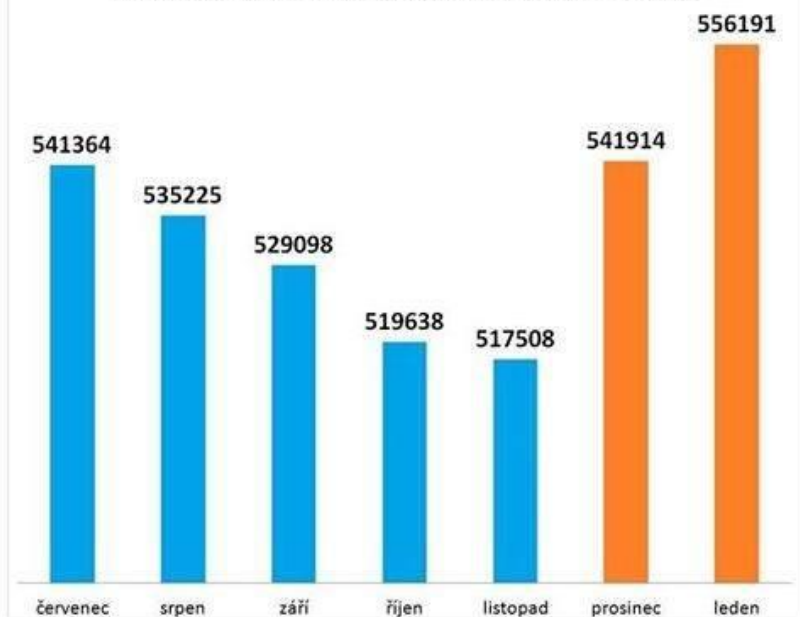


Občanská demokratická strana

February 17 at 10:59am · 🌐

Nejsou to radostná čísla: v době hospodářského růstu roste i nezaměstnanost. Přesto levicová vláda zvýšila minimální mzdu, ve zvyšování hodlá dál pokračovat. Může tak ohrozit další pracovní místa.

Počet nezaměstnaných je po půl roce na svém maximu



Like · Comment · Share · 👍 109 💬 80 ➦ 67

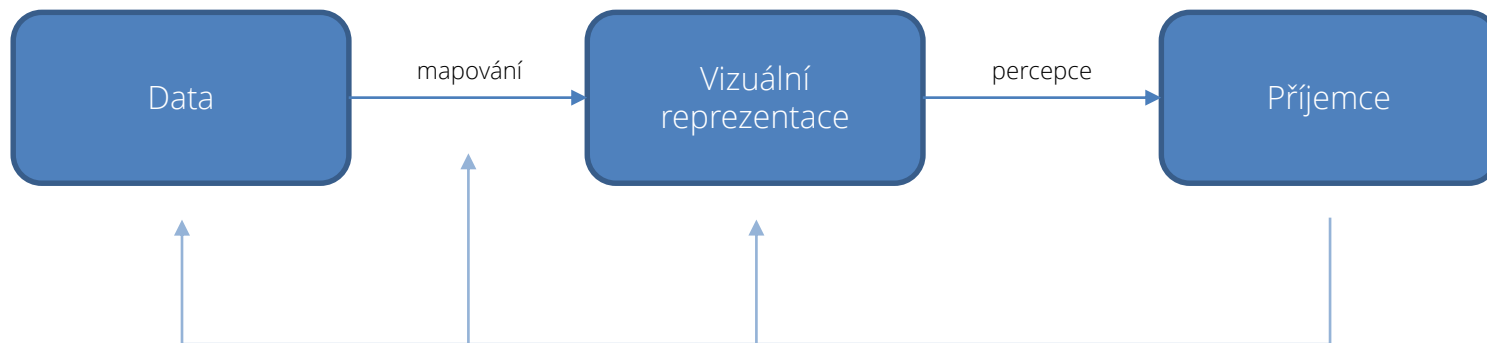
Co bude **dál?**

Data, jejich zpracování,
čištění, analýza,...

Jaké vizuální prvky zvolit pro
jaká data? Jakou vybrat
formu vizualizace, jaký typ
grafu?

Vizuální proměnné, design
vizualizace, kontext grafu,...

Jak vnímáme vizuální
informaci, jak na jejím
základě rozhodujeme?



Interaktivita, UI, informační
architektura. Jak s vizualizacemi
můžeme interagovat?