Welcome to Transforming Data!

FALL 2012/New School

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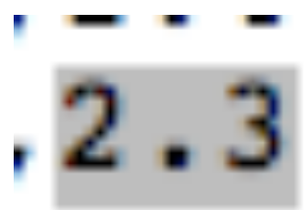
What we'll do this semester...

- Learn to identify, "read", and critically evaluate data visualizations and infographics
- Try making our own data visualizations and infographics, both as analog and digital representations
- Learn some **basic** programming techniques and concepts in order to make digital, interactive data displays

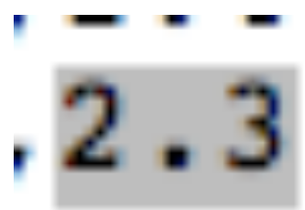
Data

- what is it?
- where does it come from?
- how do we use it?


2.3

“...a mark or trace that represents a portion of the real world...”

-sharon daniel, the database: an aesthetics of dignity


2.3

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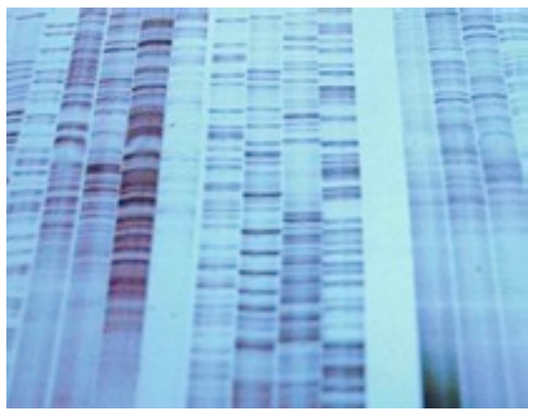
Where does data come from?



How much data?

Data inflation 2

Unit	Size	What it means
Bit (b)	1 or 0	Short for "binary digit", after the binary code (1 or 0) computers use to store and process data
Byte (B)	8 bits	Enough information to create an English letter or number in computer code. It is the basic unit of computing
Kilobyte (KB)	1,000, or 2^{10}, bytes	From "thousand" in Greek. One page of typed text is 2KB
Megabyte (MB)	1,000KB; 2^{20} bytes	From "large" in Greek. The complete works of Shakespeare total 5MB. A typical pop song is about 4MB
Gigabyte (GB)	1,000MB; 2^{30} bytes	From "giant" in Greek. A two-hour film can be compressed into 1-2GB
Terabyte (TB)	1,000GB; 2^{40} bytes	From "monster" in Greek. All the catalogued books in America's Library of Congress total 15TB
Petabyte (PB)	1,000TB; 2^{50} bytes	All letters delivered by America's postal service this year will amount to around 5PB. Google processes around 1PB every hour
Exabyte (EB)	1,000PB; 2^{60} bytes	Equivalent to 10 billion copies of *The Economist*
Zettabyte (ZB)	1,000EB; 2^{70} bytes	The total amount of information in existence this year is forecast to be around 1.2ZB
Yottabyte (YB)	1,000ZB; 2^{80} bytes	Currently too big to imagine

Source: *The Economist*

The prefixes are set by an intergovernmental group, the International Bureau of Weights and Measures. Yotta and Zetta were added in 1991; terms for larger amounts have yet to be established.

UCSD researchers report that in 2008 the average American household was exposed to 3.6 zettabytes of information (or 34 gigabytes per person per day).

source: The Economist Special Report "The Data Deluge" (2010)

- data must retain a **connection** to its source to be meaningful

- data is only useful if you have **more than one** value

- data must be **interpreted** to be meaningful

- the act of measuring something **fixes its state**
- data's true origins are often **invisible**
- data has **authority**

Visualization

- what is it?
- why create one?
- how can we make good ones?
- why now, more than ever?

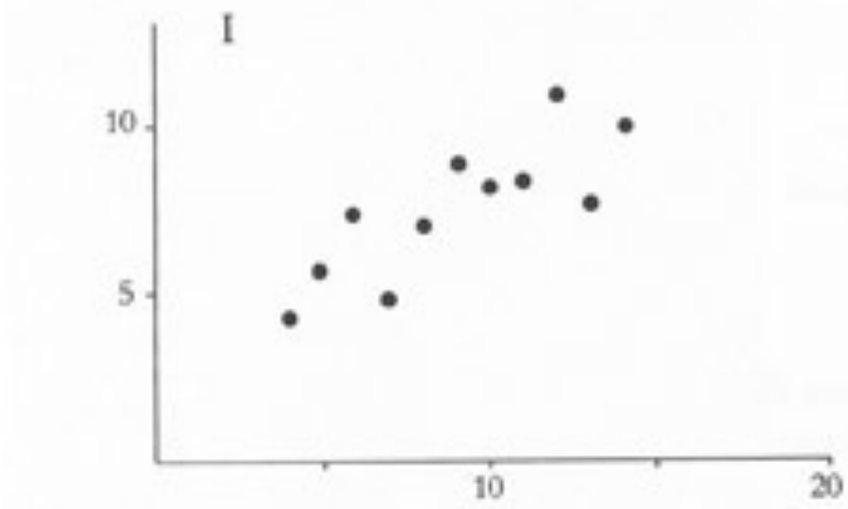
Definitions of Visualization

- the process of constructing a visual image in the mind
- **a graphical representation of data or concept**

Uses of Visualizations

- **record**- store information
- **analyze**- detect patterns
- **confirm**- verify hypotheses
- **communicate**- convey info, convince
- ***enable a task***

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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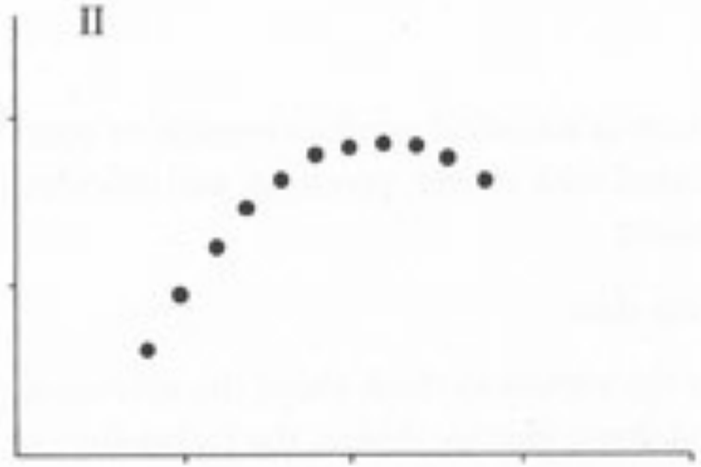
10
5
10
20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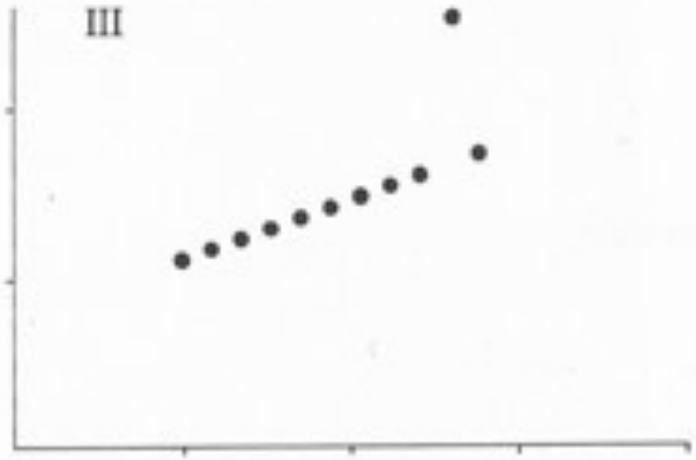
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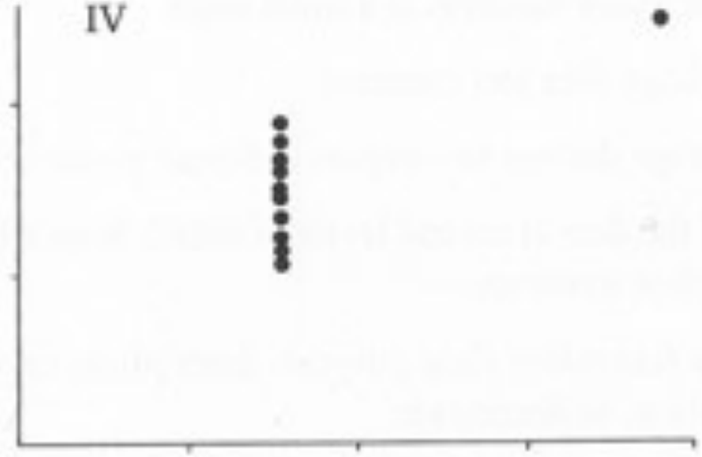
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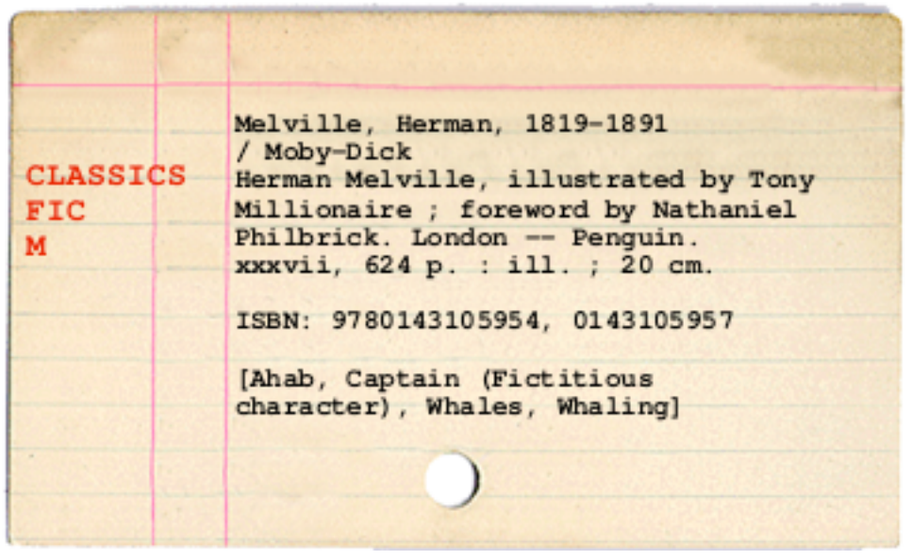
Visualization as Cognitive Tool

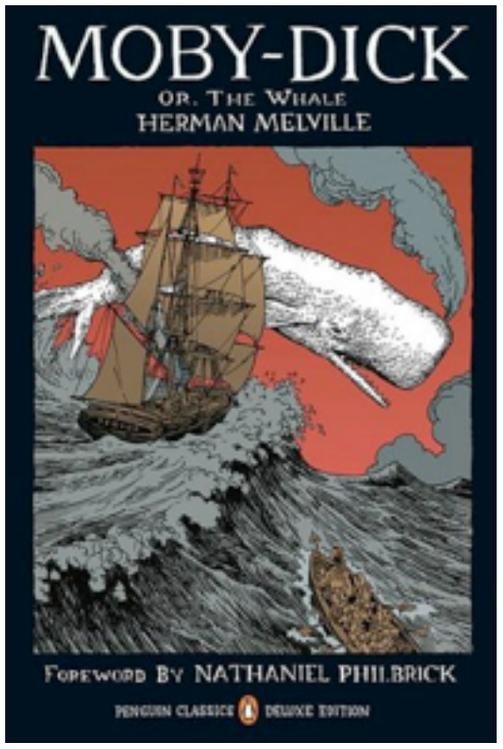
user's visual system & decision-making mechanism

information resources, processing & computing power

information visualization

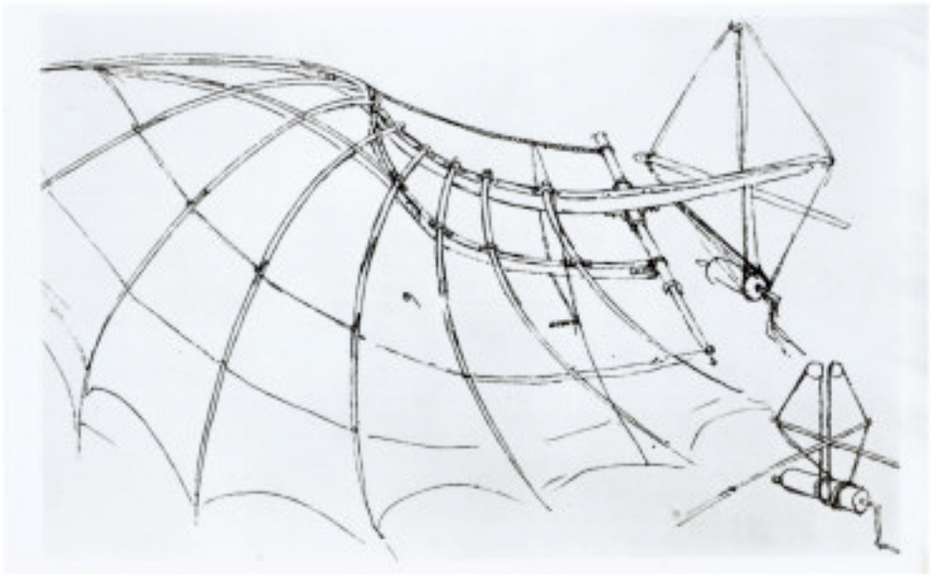
Data vs. Metadata

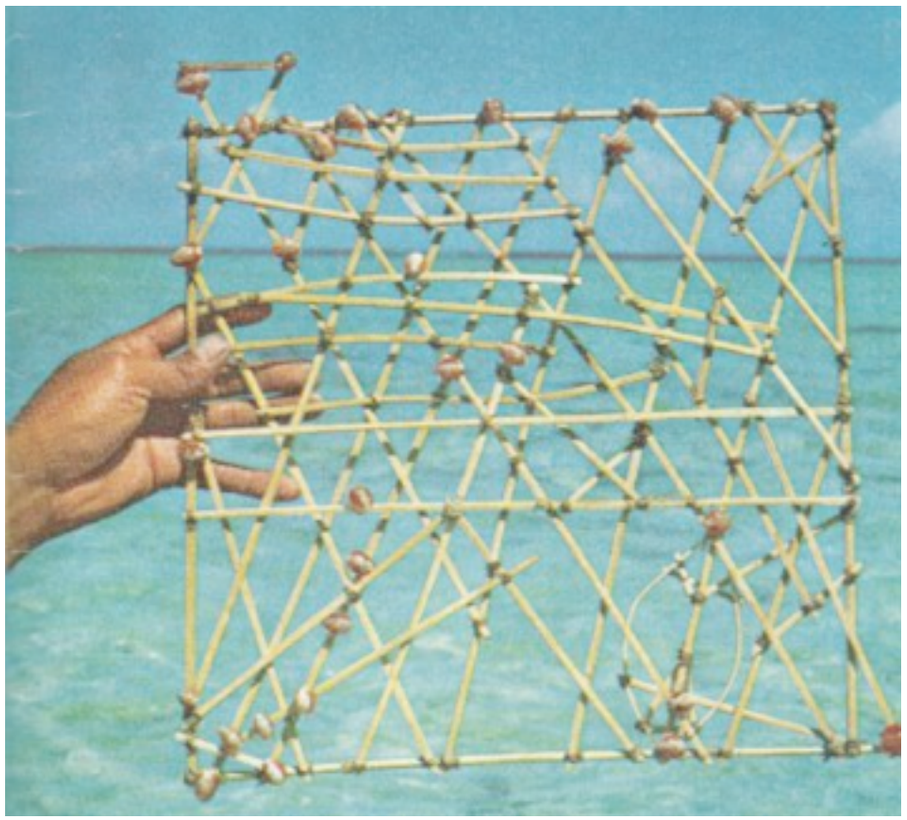


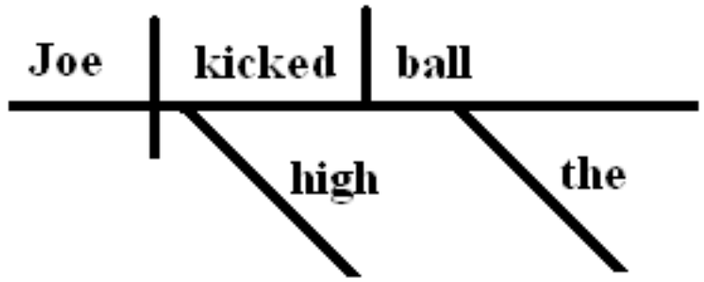


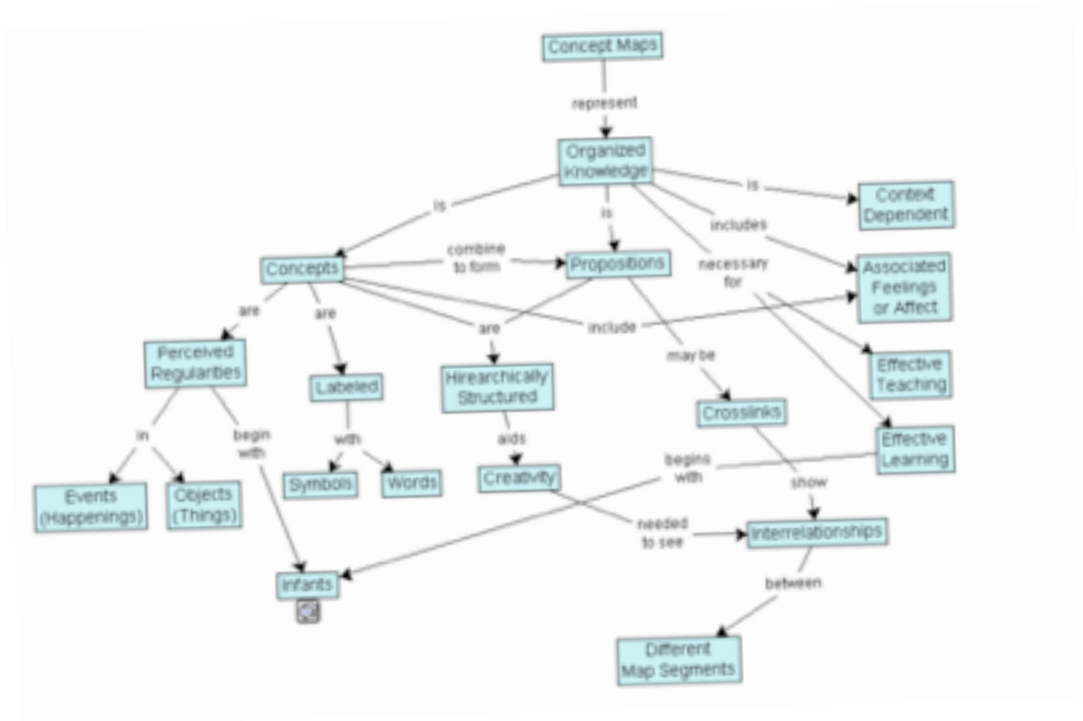
http://www.blyberg.net/card-generator/

“It is things that make us smart”
-Donald Norman









DATA-VIZ flow chart

the WORLD is your data-source...

collect via observation or technology

methods? processes? omissions? errors? ownership? agenda?

"RAW" data

data-entry

data-errors? omissions?

organized DATABASE DATASET search/retrieve

structure? relationships? hierarchy? maintenance? decay?

form vs. content?

process (B. Fry)

- parse/"clean"
- mine
- represent/TRANSLATE
- refine/DESIGN
- interact...

yay!

visual system

interact

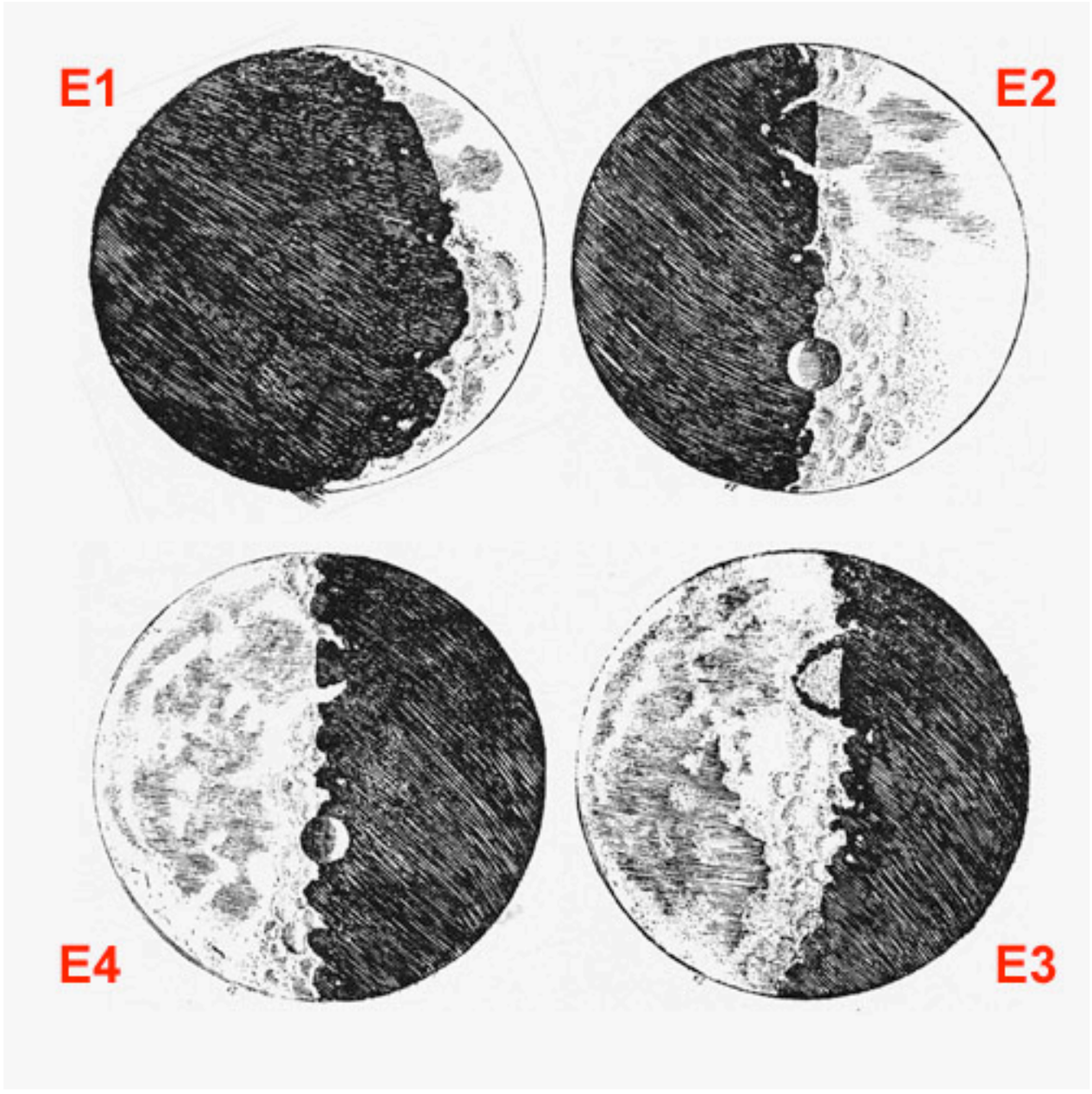
VISUALIZATION graphical display of info

many formats many platforms

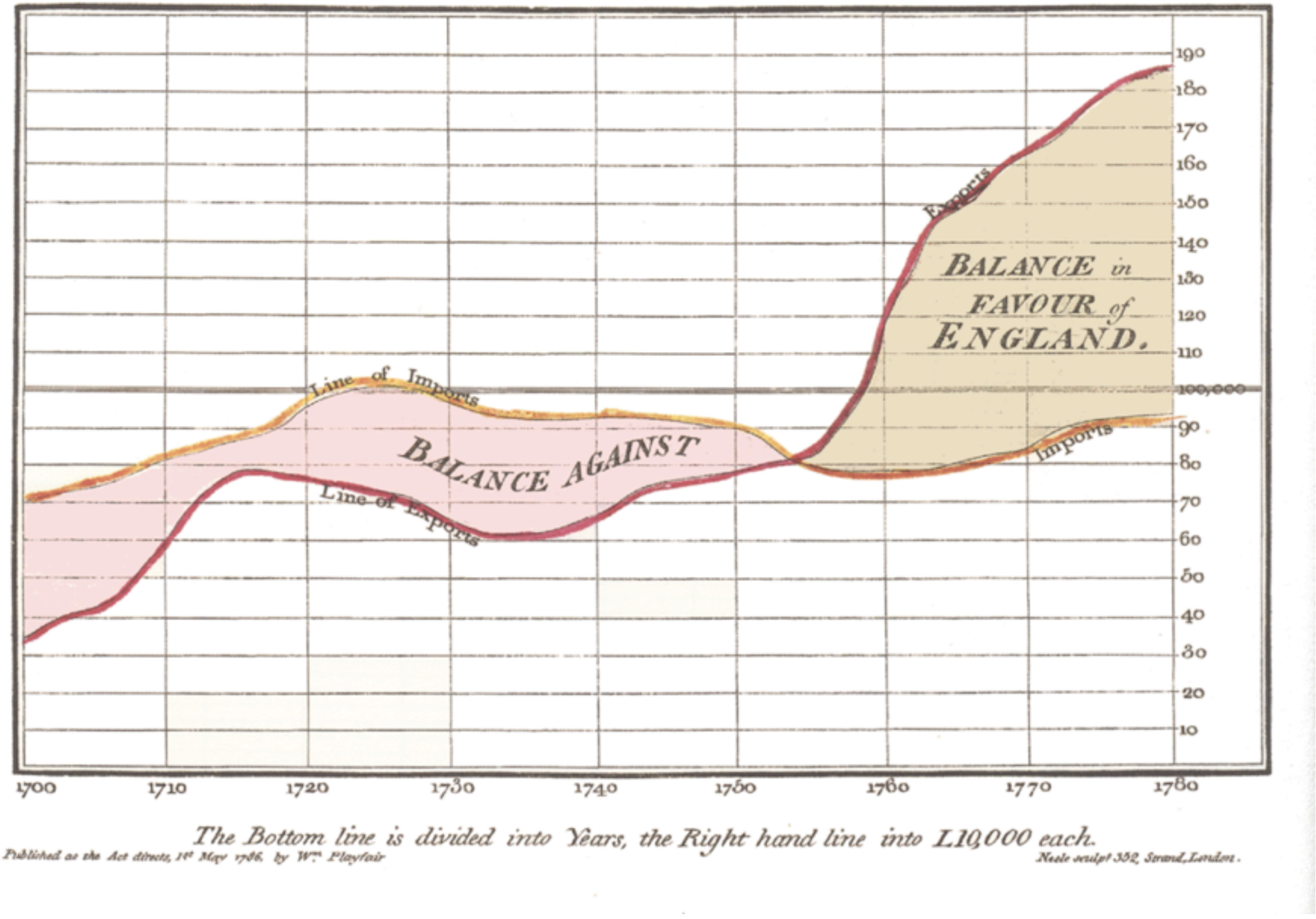
USER

semantic/cultural context

Early Visualizations



left, cave painting at Lascaux
right, Galileo's moon phase drawings



William Playfair, Exports and Imports Chart, 1786

John Snow, Cholera Map (1854)

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 des largeurs des zônes colorées à raison d'un millimètre pour dix mille hommes; ils sont de plus écrits en travers des zônes. 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 MM. Thiers, de Ségur, 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 Jérôme et du Maréchal Davoust qui avaient été détachés sur Minsk et Mobilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

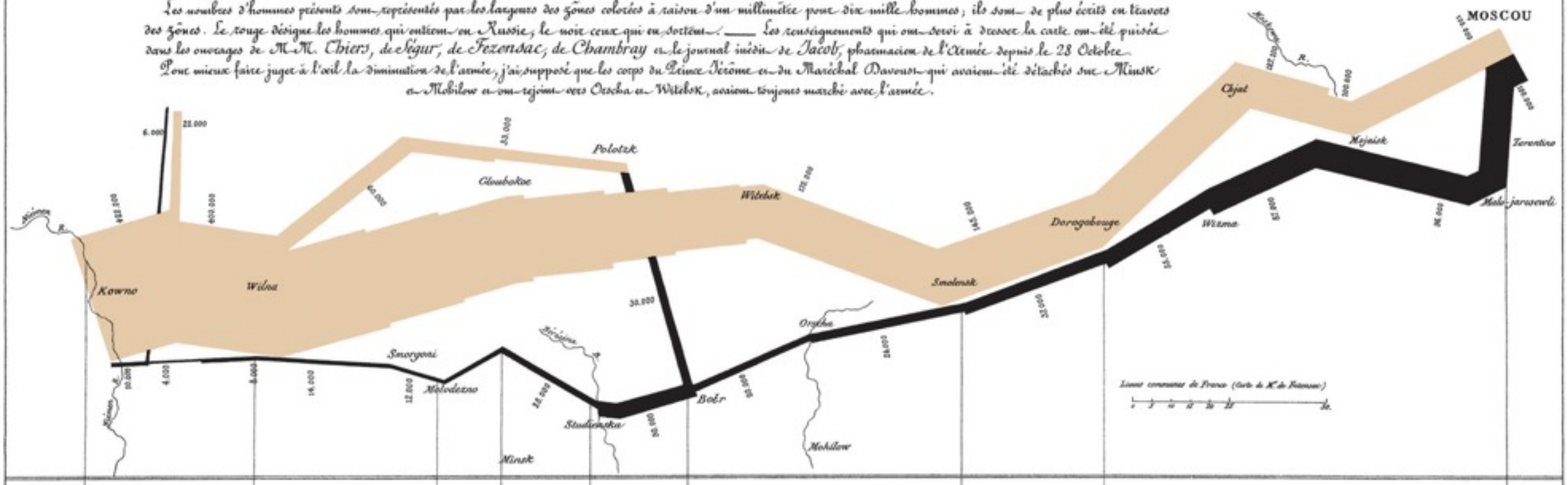
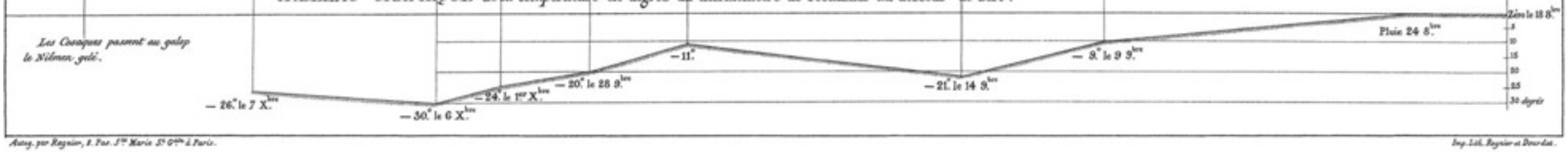


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



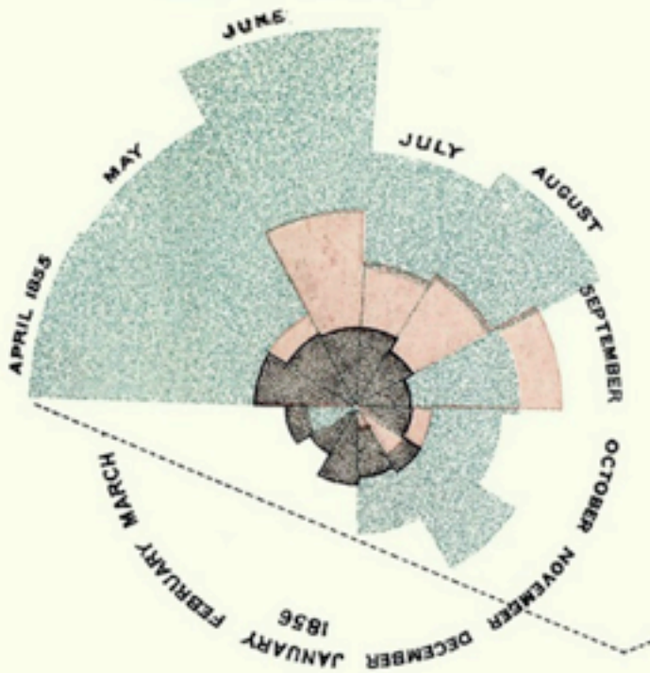
Autog. par Regnier, 8. Pas. St.e Marie St Gen.ve à Paris.

Imp. Lith. Regnier et Bourdet.

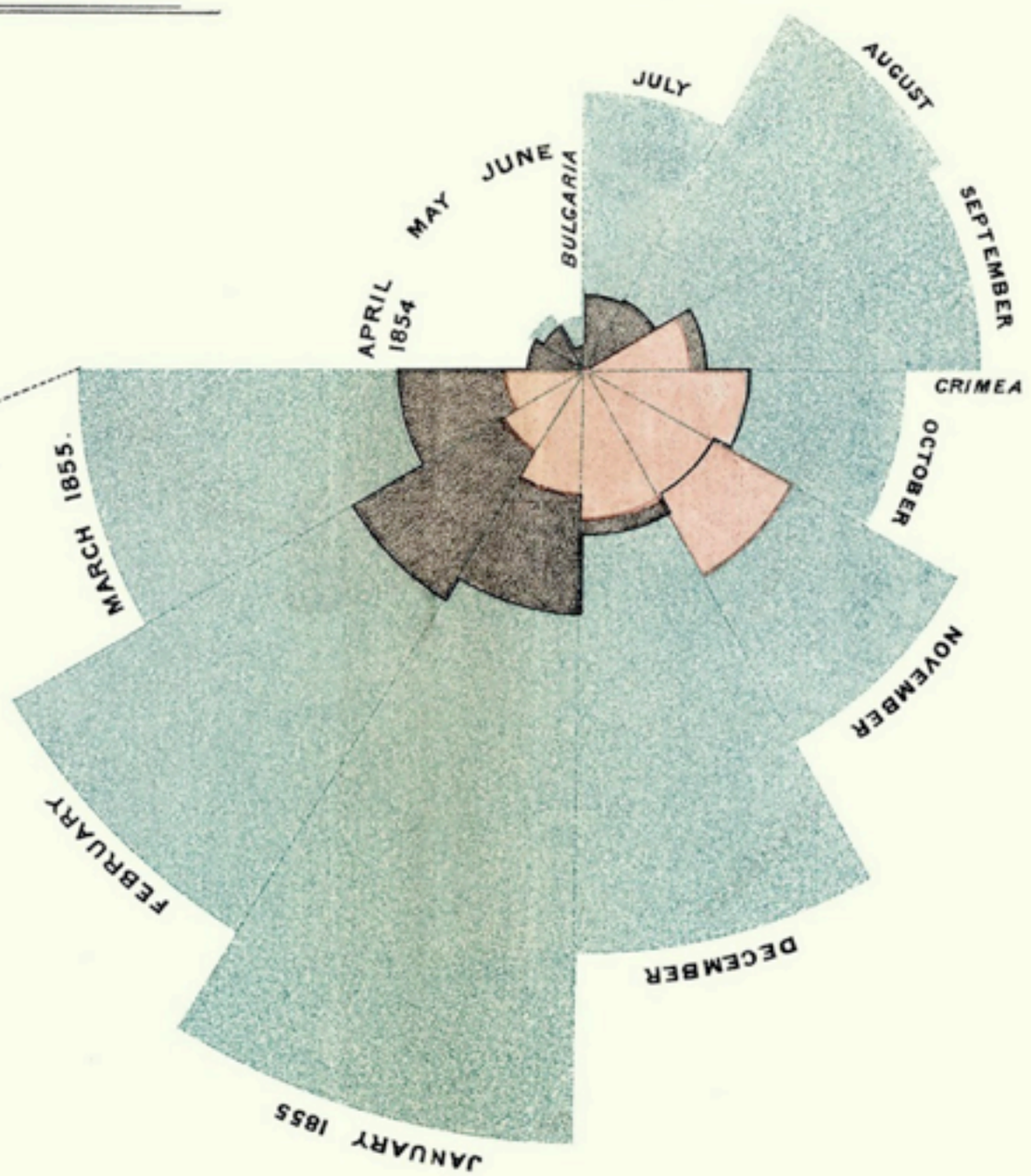
Joseph Minard
Map of Napoleon's Russian 1812 Campaign (1869)

DIAGRAM of the CAUSES of MORTALITY
IN THE ARMY IN THE EAST.

2.
APRIL 1855 to MARCH 1856.

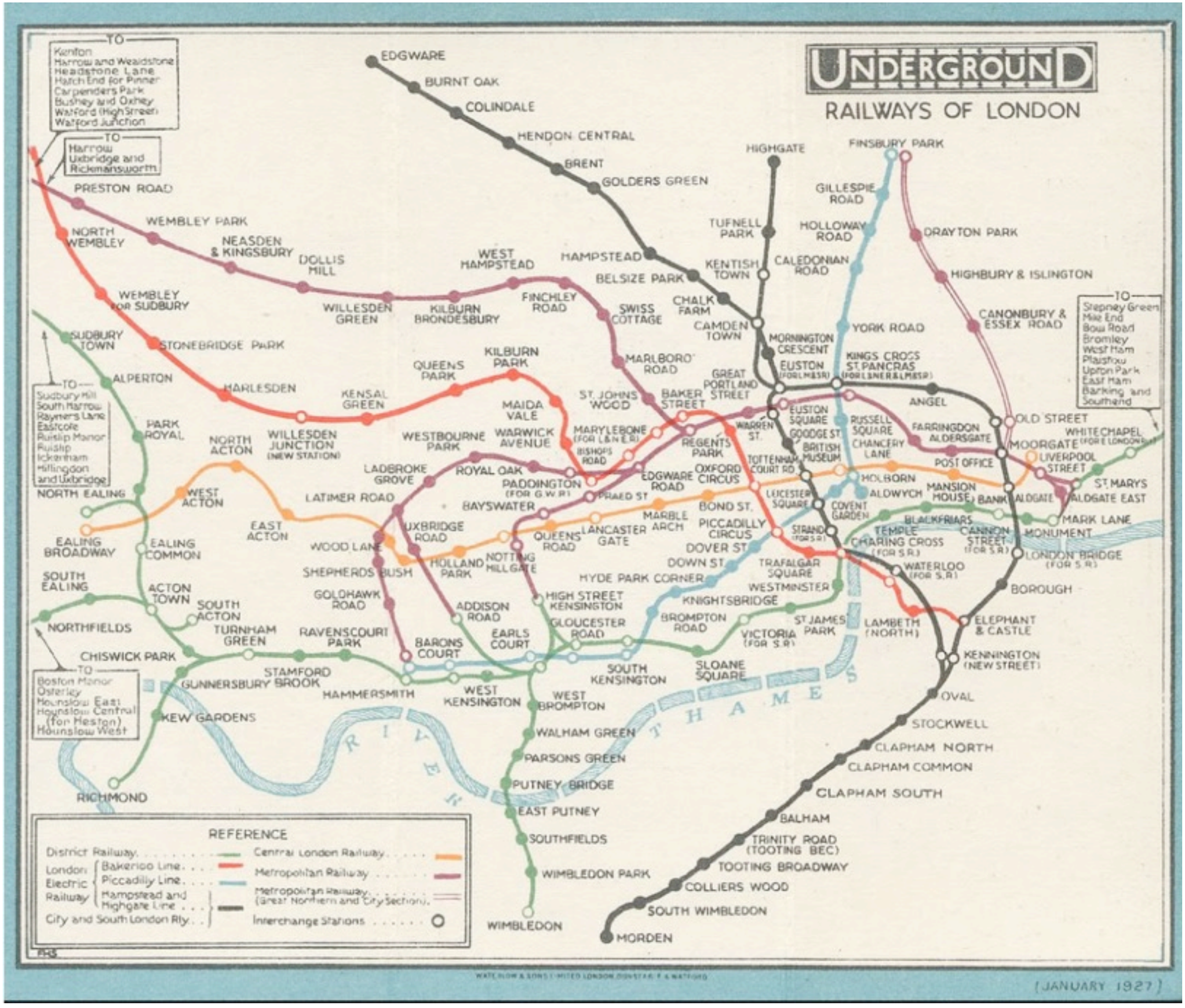


1.
APRIL 1854 to MARCH 1855.



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.r 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.

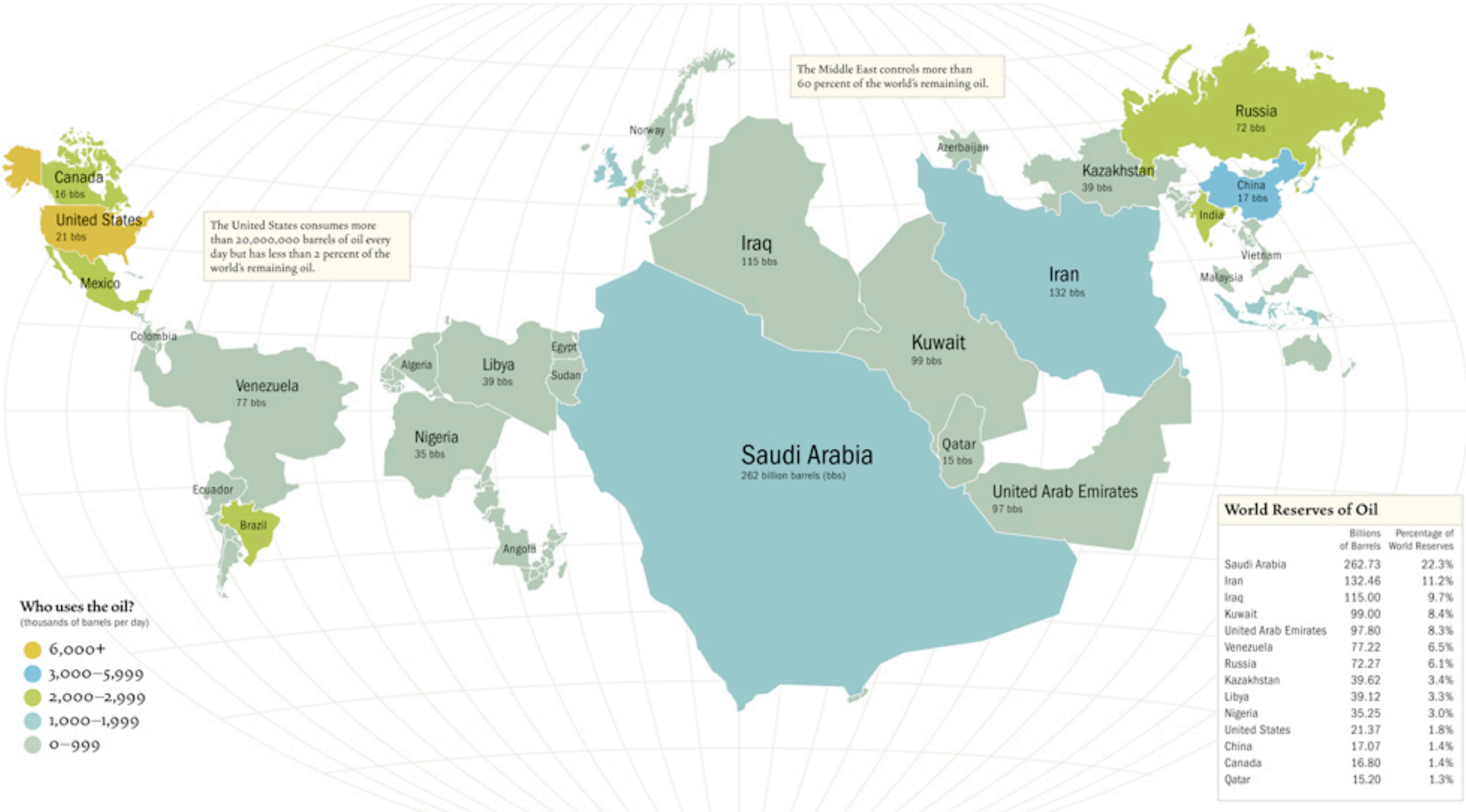
Florence Nightingale, Diagram of Causes of Mortality (1858)



Tube Map, 1927

Chesham
Chalfont & Latimer
Amersham
Watford
Croxley
Chorleywood
Rickmansworth
Moor Park
Northwood
Northwood Hills
Pinner
North Harrow
West Ruislip
Harrow & Wealdstone
Hillingdon
Ruislip
Ruislip Manor
Eastcote
Uxbridge
Ickenham
Kenton
Northwick Park
Preston Road
Ruislip Gardens
Rayners Lane
West Harrow
Harrow-on-the-Hill
South Ruislip
South Kenton
North Wembley
Wembley Central
Stonebridge Park
Harlesden
Willesden Junction
Wembley Park
Stanmore
Canons Park
Queensbury
Kingsbury
Neasden
Dollis Hill
Willesden Green
Kilburn
Edgware
Burnt Oak
Colindale
Hendon Central
Brent Cross
Golders Green
Hampstead
Finchley Road & Frognal
West Hampstead
Finchley Road
Swiss Cottage
St. John's Wood
Kensal Rise
Brondesbury Park
Brondesbury
Kensal Green
Queen's Park
Kilburn Park
Maida Vale
Warwick Avenue
Edgware Road
Marylebone
Baker Street
Great Portland Street
Euston
Warren Street
Euston Square
Northolt
Greenford
Perivale
South Harrow
Sudbury Hill
Sudbury Town
Alperton
Hanger Lane
Park Royal
North Ealing
Ealing Broadway
North Acton
West Acton
East Acton
Acton Central
White City
Shepherd's Bush
Holland Park
Queensway
Notting Hill Gate
Lancaster Gate
Marble Arch
Bond Street
Oxford Circus
Tottenham Court Road
Chancery Lane
Holborn
Westbourne Park
Ladbroke Grove
Latimer Road
Paddington
Edgware Road
Bayswater
Regent's Park
Goodge Street
Russell Square
Ealing Common
Shepherd's Bush
Goldhawk Road
South Acton
Kensington (Olympia)
High Street Kensington
Green Park
Hyde Park Corner
Knightsbridge
Piccadilly Circus
Leicester Square
Covent Garden
City Thameslink
Acton Town
Hammersmith
Barons Court
Gloucester Road
Sloane Square
Charing Cross
Blackfriars
Temple
Embankment
Westminster
Victoria
St. James's Park
Mansion House
Monument
Tower Hill
Tower Gateway
Aldgate
Aldgate East
Shoreditch
Liverpool Street
Bethnal Green
Mile End
Stepney Green
Whitechapel
Bow Road
Bow Church
Devons Road
All Saints
Poplar
East India
Limehouse
Blackwall
Canning Town
Royal Victoria
Custom House
Prince Regent
Royal Albert
Beckton Park
Cyprus
Gallions Reach
Beckton
Silvertown & London City Airport
North Woolwich
Shadwell
Wapping
Westferry
West India Quay
Canary Wharf
Heron Quays
South Quay
Crossharbour
Mudchute
Island Gardens
North Greenwich
Rotherhithe
Canada Water
Bermondsey
Surrey Quays
New Cross Gate
New Cross
South Ealing
Northfields
Boston Manor
Osterley
Hounslow East
Hounslow Central
Hounslow West
Hatton Cross
Heathrow Terminals 1, 2, 3
Heathrow Terminal 4
Chiswick Park
Turnham Green
Stamford Brook
Ravenscourt Park
West Kensington
Earl's Court
South Kensington
Gunnersbury
Kew Gardens
Richmond
West Brompton
Fulham Broadway
Parsons Green
Putney Bridge
East Putney
Southfields
Wimbledon Park
Wimbledon
Pimlico
Vauxhall
Waterloo
Southwark
London Bridge
Lambeth North
Borough
Elephant & Castle
Kennington Oval
Stockwell
Brixton
Clapham High Street
Clapham North
Clapham Common
Clapham South
Balham
Tooting Bec
Tooting Broadway
Colliers Wood
South Wimbledon
Morden
High Barnet
Totteridge & Whetstone
Woodside Park
West Finchley
Finchley Central
East Finchley
Highgate
Archway
Tufnell Park
Mill Hill East
Kentish Town West
Kentish Town
Camden Road
Chalk Farm
Camden Town
Mornington Crescent
King's Cross St. Pancras
Belsize Park
Gospel Oak
Hampstead Heath
Cockfosters
Oakwood
Southgate
Arnos Grove
Bounds Green
Wood Green
Turnpike Lane
Manor House
Arsenal
Holloway Road
Caledonian Road
Drayton Park
Caledonian Road & Barnsbury
Finsbury Park
Highbury & Islington
Canonbury
Essex Road
Dalston Kingsland
Hackney Central
Hackney Wick
Homerton
Angel
Farringdon
Barbican
Old Street
Moorgate
Tottenham Hale
Seven Sisters
Blackhorse Road
Walthamstow Central
Epping
Theydon Bois
Debden
Loughton
Roding Valley
Chigwell
Buckhurst Hill
Woodford
South Woodford
Snaresbrook
Leytonstone
Leyton
Redbridge
Wanstead
Gants Hill
Grange Hill
Hainault
Fairlop
Barkingside
Newbury Park
Upminster
Upminster Bridge
Hornchurch
Elm Park
Dagenham East
Dagenham Heathway
Becontree
Upney
Barking
East Ham
Upton Park
Plaistow
West Ham
Stratford
Key to Lines
Bakerloo
Central
Circle
District
East London
Hammersmith & City
Jubilee
Metropolitan
Northern
Piccadilly
Victoria
Waterloo & City
Docklands Light Railway
British Rail
Key to symbols
Interchange stations
Connections with British Rail
Connections with British Rail within walking distance
Airport interchange
Closed Sundays
Closed Saturdays and Sundays
Morningtion Crescent closed for rebuilding
Certain stations are closed on public holidays.
These stations are open at the following times
Barbican All day Mondays to Fridays 0715 to 2345 Saturdays 0900 to 2345 Sundays
Cannon Street Until 2045 Mondays to Fridays Closed Saturdays and Sundays
Chigwell Until 2080 daily
City Thameslink 0680 to 2045 Mondays to Fridays Closed Saturdays and Sundays
Docklands Light Railway Poplar – Beckton until 2150 Mondays to Fridays only All stations between Tower Gateway, Bank, Stratford and Island Gardens. buses replace trains all day Saturdays and Sundays.
Drayton Park Until 2030 Mondays to Fridays. Closed Saturdays and Sundays
Essex Road Until 2030 Mondays to Fridays Closed Saturdays and Sundays
Grange Hill Until 2000 daily
Heathrow Terminal 4 Until 2345 Mondays to Saturdays and 2215 Sundays.
Kensington (Olympia) 0700 to 2045 Mondays to Fridays. Saturdays and Sundays during exhibitions
Roding Valley Until 2140 daily
Shoreditch Monday to Friday peak hours Closed Saturdays 0800 to 1415 Sundays
Turnham Green Served by Piccadilly Line trains early morning and late evening Mondays to Saturdays and all day Sundays
Waterloo & City line 0630 to 2130 Mondays to Fridays 0800 to 1745 Saturdays. Closed Sundays
UNDERGROUND
© London Regional Transport
Folder 11.94

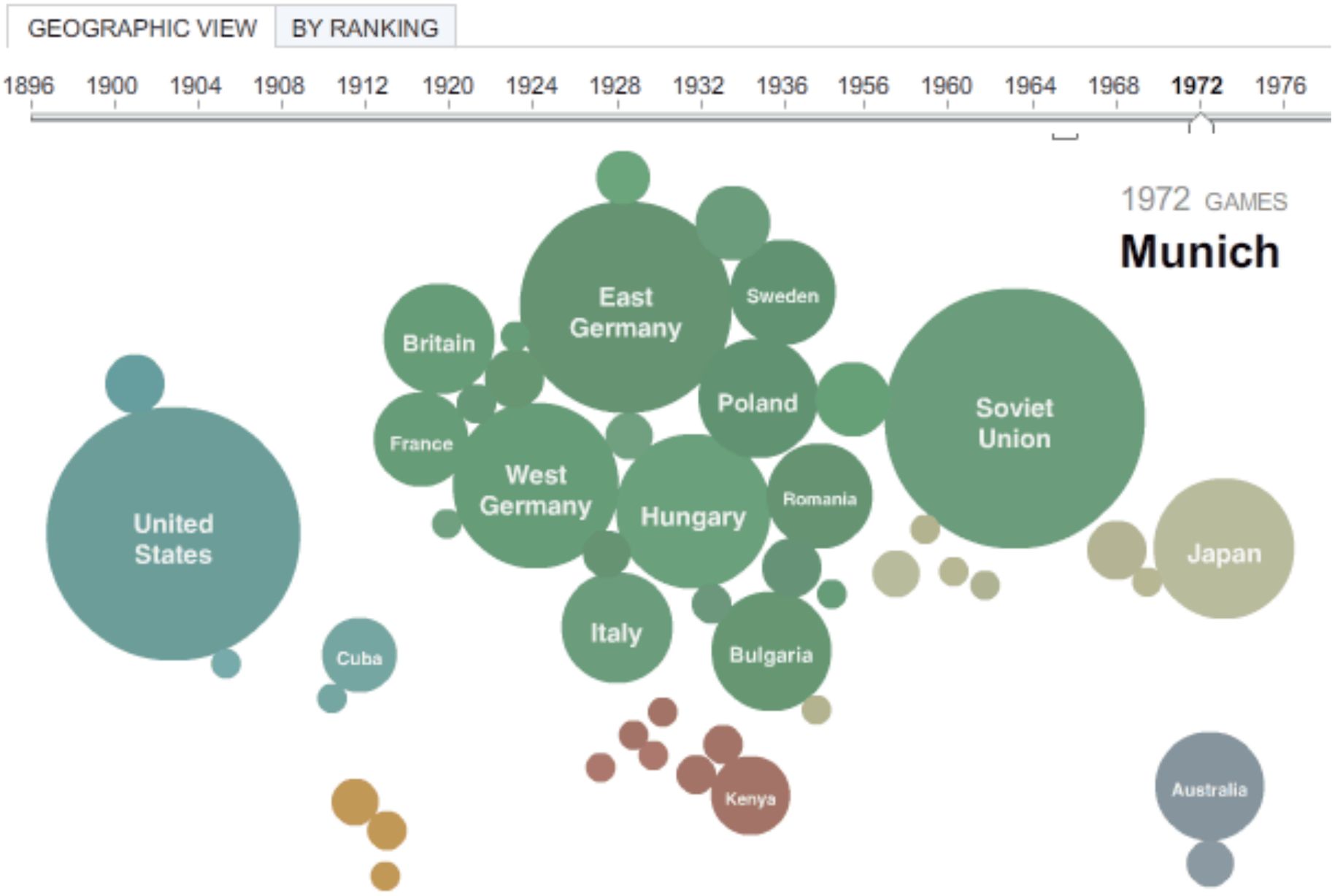
Who has the oil?



World Reserves of Oil

	Billions of Barrels	Percentage of World Reserves
Saudi Arabia	262.73	22.3%
Iran	132.46	11.2%
Iraq	115.00	9.7%
Kuwait	99.00	8.4%
United Arab Emirates	97.80	8.3%
Venezuela	77.22	6.5%
Russia	72.27	6.1%
Kazakhstan	39.62	3.4%
Libya	39.12	3.3%
Nigeria	35.25	3.0%
United States	21.37	1.8%
China	17.07	1.4%
Canada	16.80	1.4%
Qatar	15.20	1.3%

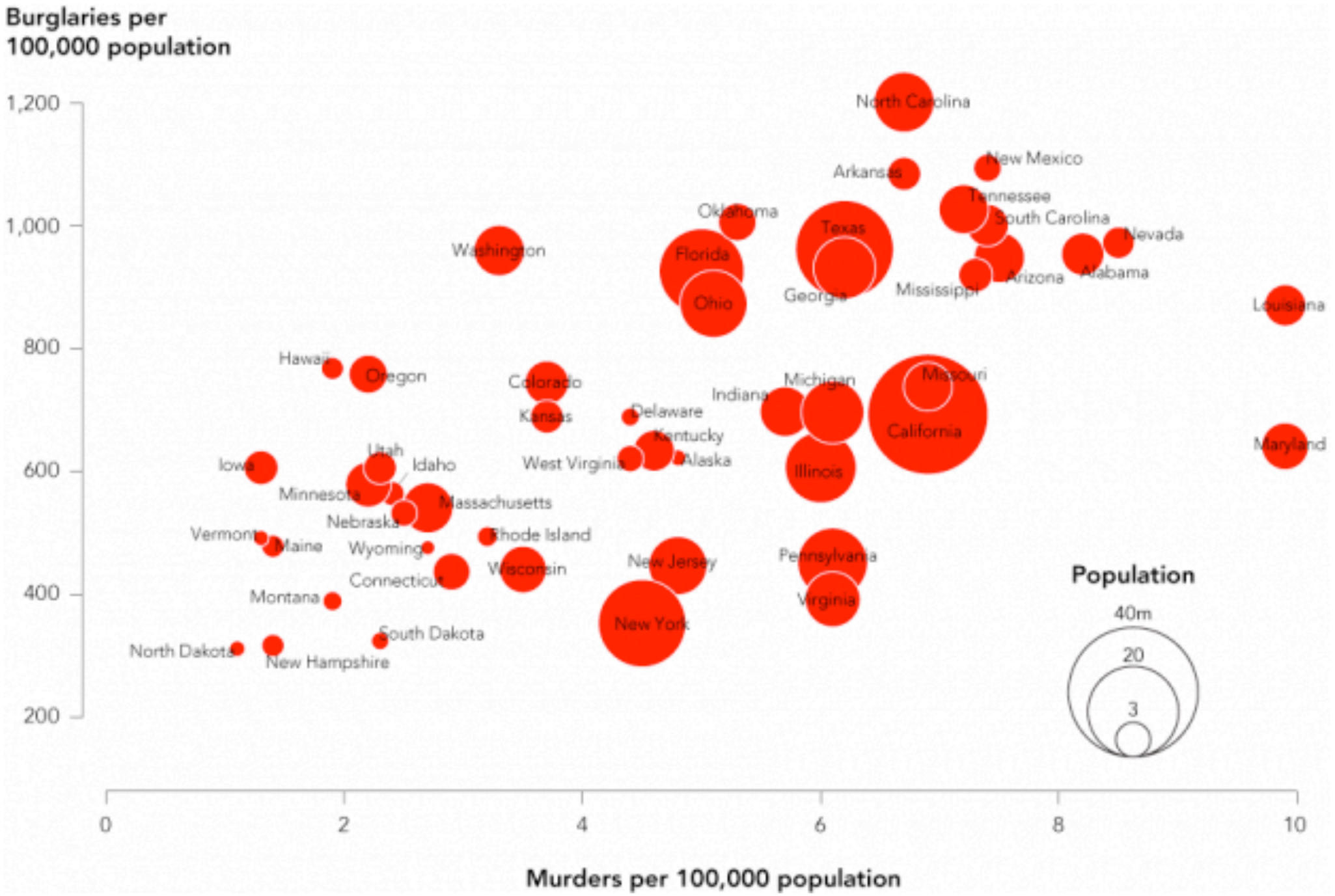
Each country's size is proportional to the amount of oil it contains (oil reserves); Source: BP *Statistical Review* Year-End 2004 & Energy Information Administration

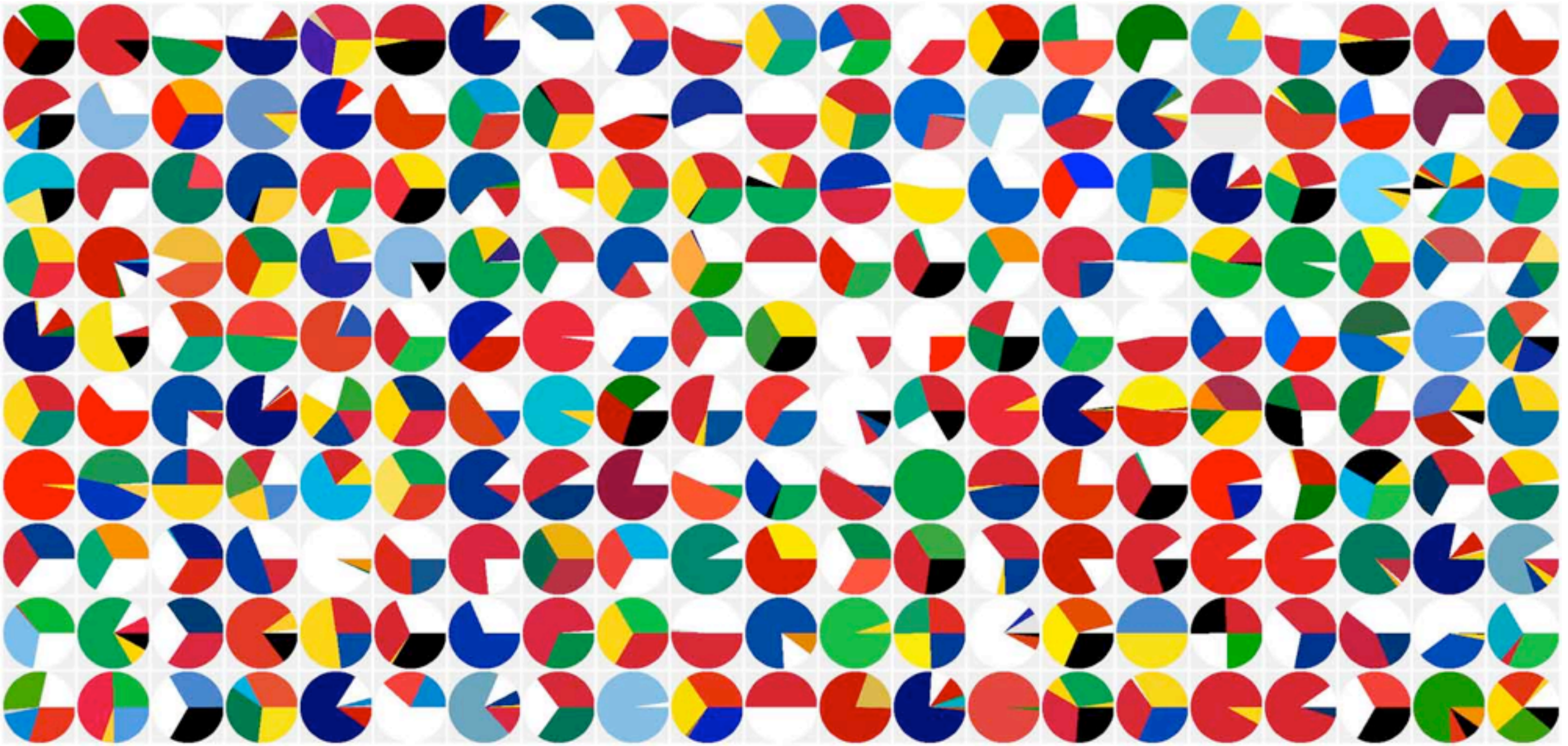


Source: International Olympic Committee

Lee Byron, Amanda Cox and Matthew Ericson/The New York Times

http://www.nytimes.com/interactive/2008/08/04/sports/olympics/20080804_MEDALCOUNT_MAP.html


Burglaries per
100,000 population
1,200
1,000
800
600
400
200
North Carolina
New Mexico
Arkansas
Tennessee
South Carolina
Oklahoma
Texas
Nevada
Washington
Florida
Arizona
Alabama
Ohio
Georgia
Mississippi
Louisiana
Hawaii
Oregon
Colorado
Michigan
Missouri
Indiana
Delaware
Kansas
California
Kentucky
Maryland
Utah
Idaho
Iowa
West Virginia
Alaska
Illinois
Minnesota
Massachusetts
Nebraska
Vermont
Rhode Island
Maine
Wyoming
New Jersey
Pennsylvania
Wisconsin
Connecticut
Virginia
Montana
New York
South Dakota
North Dakota
New Hampshire
Population
40m
20
3
0
2
4
6
8
10
Murders per 100,000 population



Shahee Ilyas (http://shaheeilyas.com)

Truck Sales Slip, Tripping Up Chrysler

Over the past few years, Chrysler executives said they were following the lead of Toyota and Honda, focusing on vehicles that met the needs of their customers. But as American consumers turned away from large trucks and S.U.V.'s in 2006, Chrysler continued to churn out big vehicles, which are now sitting unsold at dealerships across the country.

READING THE CHART

Boxes are scaled proportionally according to number of cars sold in 2006

Change in sales from 2005 to 2006

Many of these vehicles were introduced in 2005.

SALES CHANGE '05 TO '06

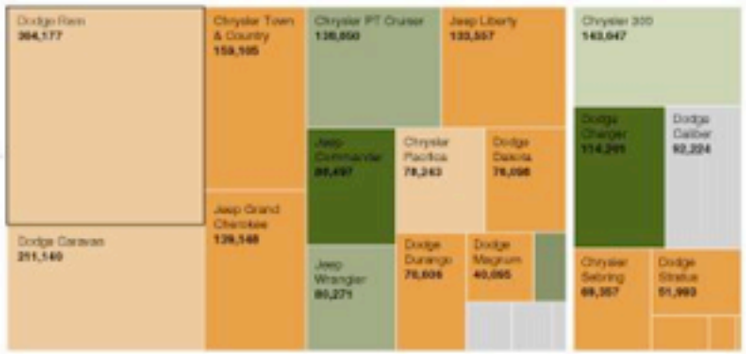
◄TRUCKS, VANS, S.U.V.'S | CARS►

Chrysler Group –7.0%

Trucks/vans/S.U.V.'s 1.6 million

Cars 0.5 million

Pickups, minivans and S.U.V.'s made up 76 percent of Chrysler's sales, which left it vulnerable when consumers shifted to cars.



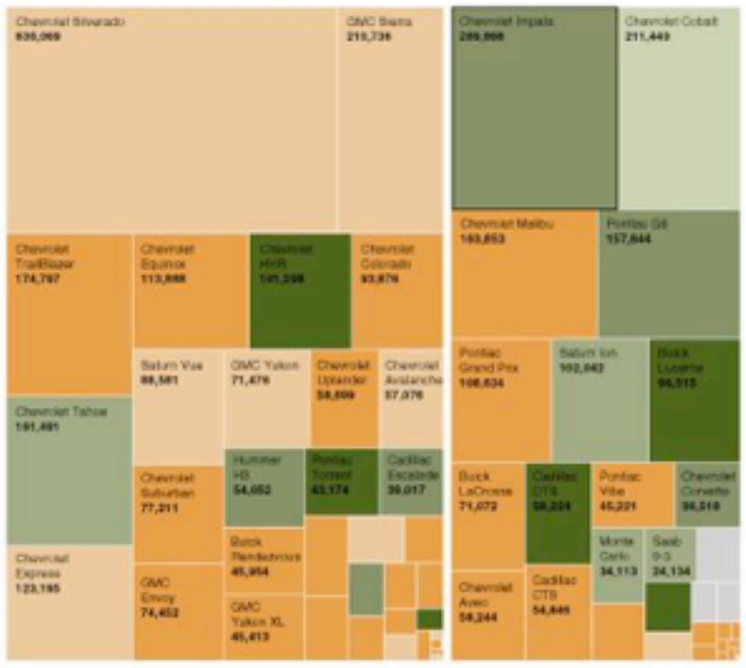
General Motors –8.7%

Trucks/vans/S.U.V.'s 2.5 million

Cars 1.6 million

G.M. introduced new versions of its large S.U.V.'s in late 2005, hoping they would bolster sales. Instead, sales of big vehicles were hurt when gas prices climbed. One of the few standouts was the Chevrolet HHR, now in 2005.

The Chevrolet Impala, with or without flashing lights, did well in 2006, when a redesign came out.



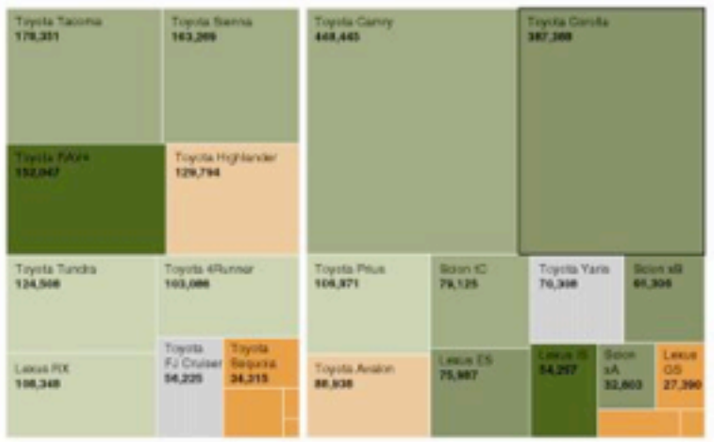
Ford –8.3%

Trucks/vans/S.U.V.'s 1.8 million

Cars 1.1 million

Even the country's best-selling vehicles, the F-Series, slumped in 2006, with sales dropping 13 percent. One of Ford's bright spots was the new Fusion sedan, which made its debut in late 2005 and sold well in its first full year.

◄TRUCKS, VANS, S.U.V.'S | CARS►



Toyota +12.5%

Trucks/vans/S.U.V.'s 1.1 million

Cars 1.5 million

Toyota rolled out a new version of the Camry, and once again it was the country's best-selling car.

Corolla sales also jumped, along with gas prices. Toyota could not escape the decline in sales of supersized S.U.V.'s like its Sequoia.

Honda +3.2%

Trucks/vans/S.U.V.'s 0.7 million

Cars 0.8 million

Like the Corolla, the small Honda Civic did well. But the Accord stalled. Buyers, it seems, are waiting for the new version to be released this year.

Nissan –5.3%

Trucks/vans/S.U.V.'s 0.5 million

Cars 0.6 million

BMW +2.1%

Trucks/vans/S.U.V.'s 0.1 million

Cars 0.3 million

Mercedes-Benz +10.3%

Trucks/vans/S.U.V.'s 0.1 million

Cars 0.2 million

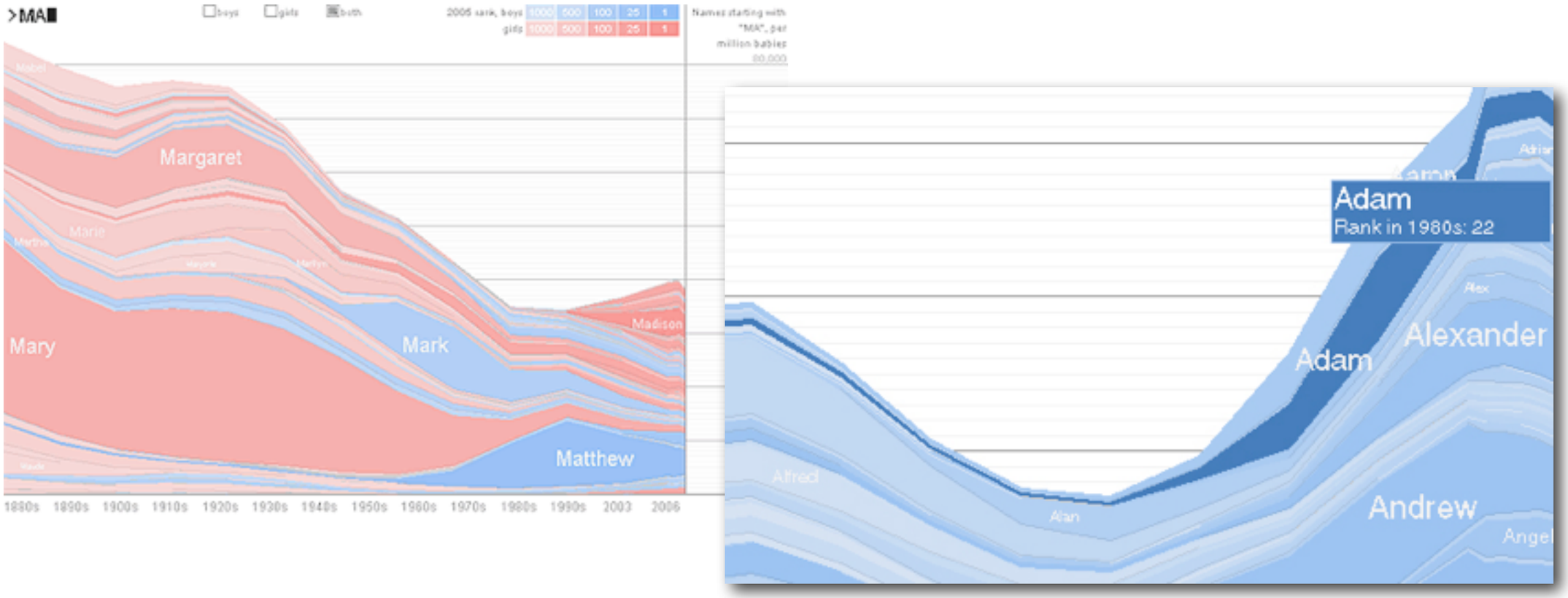
Mercedes-Benz, owned by DaimlerChrysler, had a comeback in 2006, thanks to a new version of its flagship S-Class. BMW sales were helped by a new version of its 3 Series sport sedan.

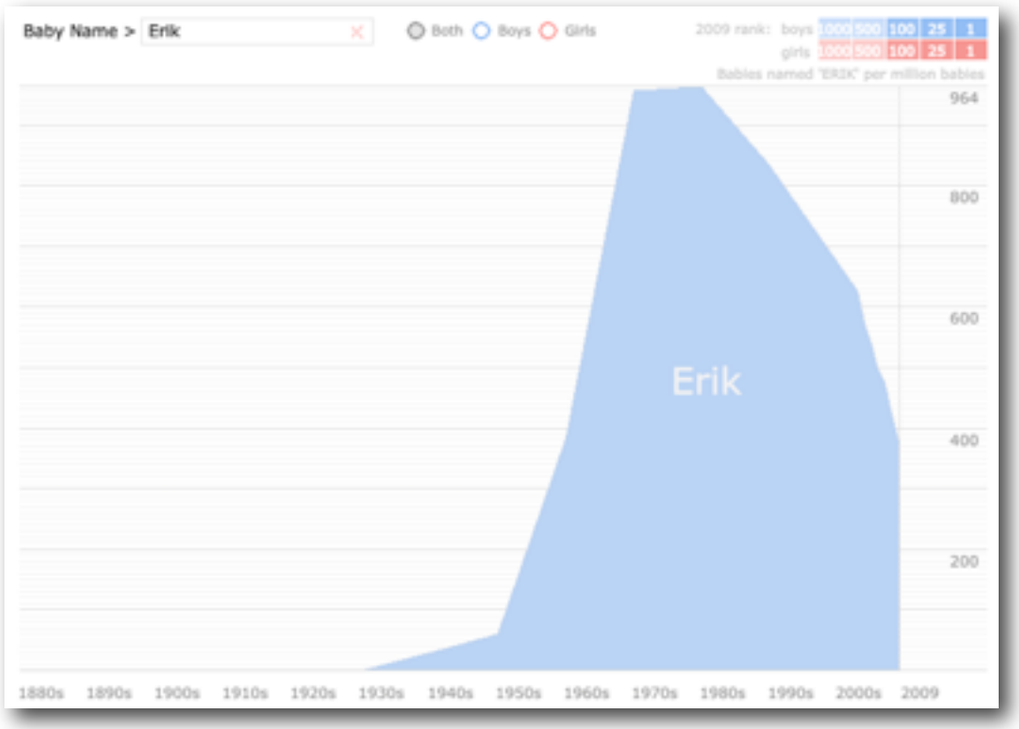
Sources: Ward's AutoInfoBank; Edmunds

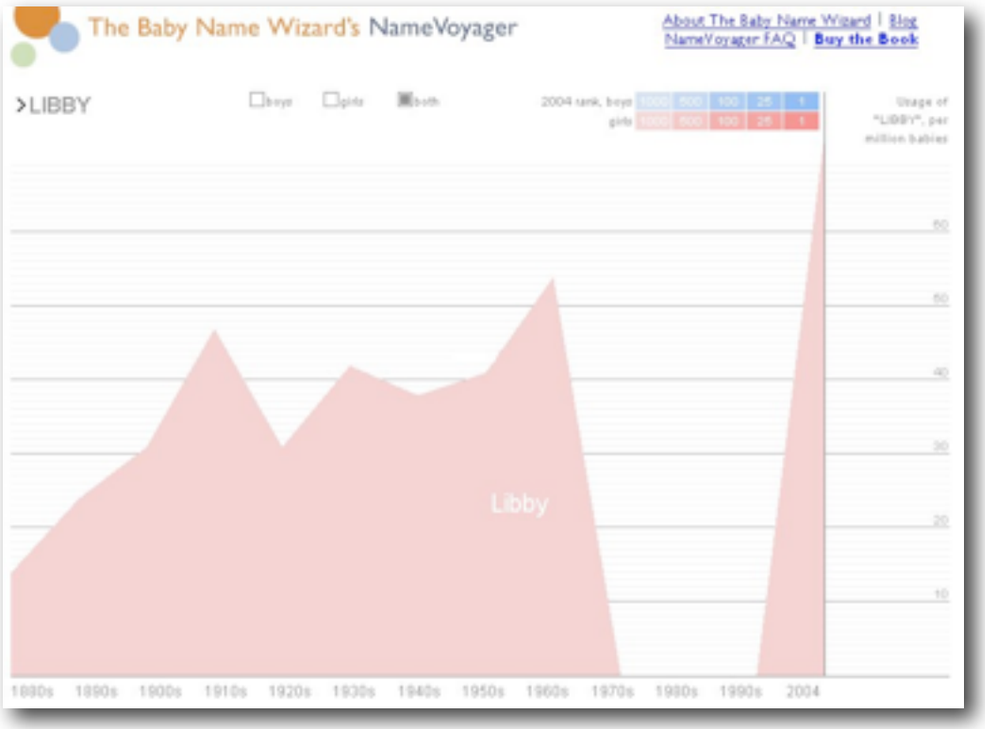
Amanda Cox and Hannah Fairfield/ The New York Times

Amanda Cox and Hannah Fairfield/The New York Times

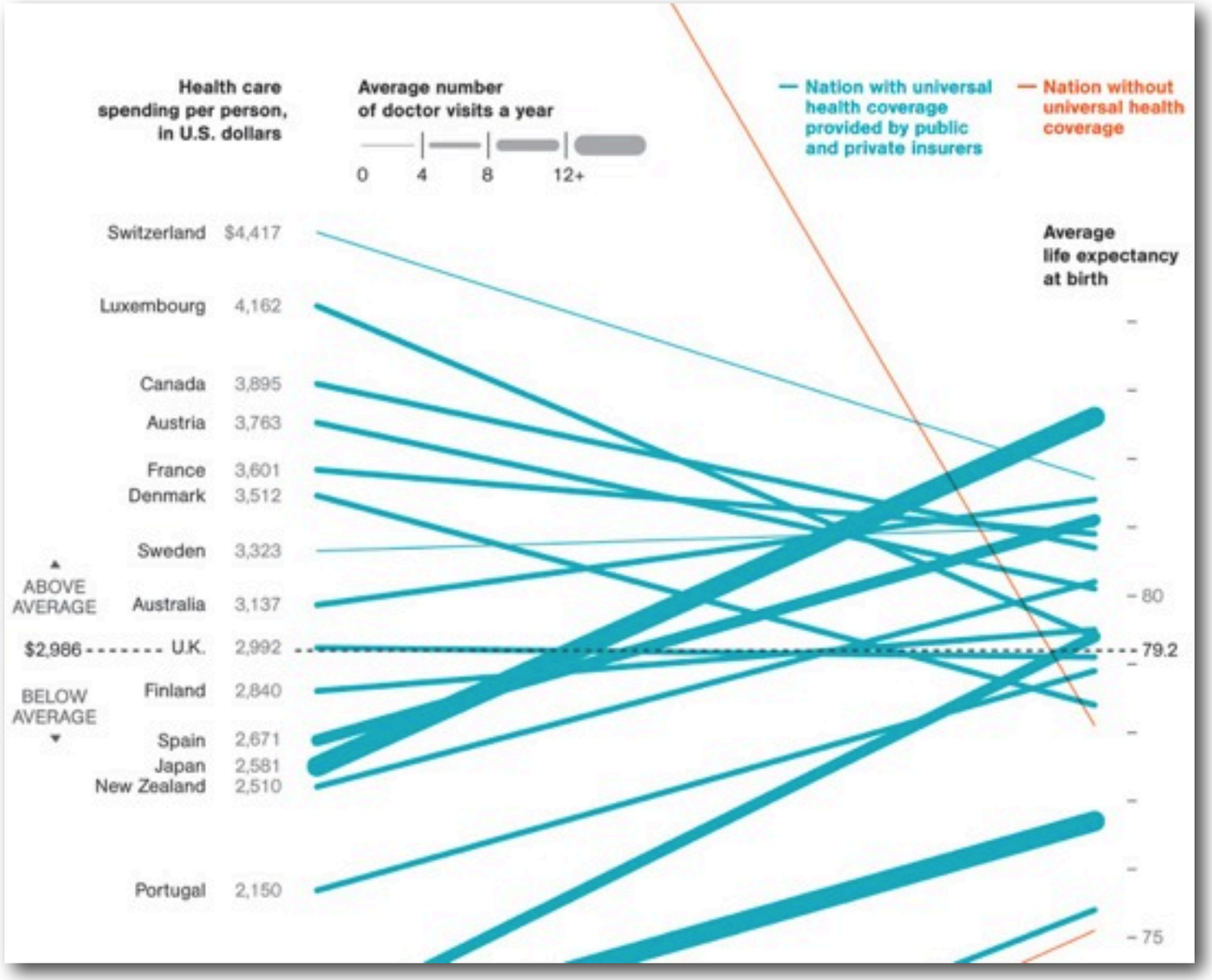
http://www.nytimes.com/imagepages/2007/02/25/business/20070225_CHRYSLER_GRAPHIC.html


>MA
boys
girls
both
2005 rank: boys 1000 500 100 25 1
girls 1000 500 100 25 1
Names starting with "MA", per million babies
Mabel
Margaret
Marie
Martha
Mary
Mark
Madison
Matthew
1880s 1890s 1900s 1910s 1920s 1930s 1940s 1950s 1960s 1970s 1980s 1990s 2003 2006
Adam
Rank in 1980s: 22
Alex
Alexander
Adam
Alfred
Alan
Andrew


Baby Name > Erik
Both Boys Girls
2009 rank: boys 1000 500 100 25 1
girls 1000 500 100 25 1
Babies named "ERIK" per million babies
964
800
600
400
200
Erik
1880s 1890s 1900s 1910s 1920s 1930s 1940s 1950s 1960s 1970s 1980s 1990s 2000s 2009


The Baby Name Wizard's NameVoyager
About The Baby Name Wizard | Blog
NameVoyager FAQ | Buy the Book
>LIBBY
boys
girls
both
2004 rank: boys 1000 500 100 25 1
girls 1000 500 100 25 1
Usage of "LIBBY", per million babies
60
50
40
30
20
10
Libby
1880s 1890s 1900s 1910s 1920s 1930s 1940s 1950s 1960s 1970s 1980s 1990s 2004

United States $7,290
Dollar figures reflect all public and private spending on care, from doctor visits to hospital infrastructure. Data are from 2007 or the most recent year available.
GRAPHIC: OLIVER UBERTI, NG STAFF. SOURCE: "OECD HEALTH DATA 2009," ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT
Health care spending per person, in U.S. dollars
Average number of doctor visits a year
0 4 8 12+
Nation with universal health coverage provided by public and private insurers
Nation without universal health coverage
Average life expectancy at birth
Switzerland $4,417
Luxembourg 4,162
Canada 3,895
Austria 3,763
France 3,601
Denmark 3,512
Sweden 3,323
ABOVE AVERAGE
Australia 3,137
$2,986 U.K. 2,992
BELOW AVERAGE
Finland 2,840
Spain 2,671
Japan 2,581
New Zealand 2,510
Portugal 2,150
South Korea 1,658
Czech Republic 1,626
Slovak Republic 1,555
Hungary 1,388
Poland 1,035
ALL 30 OECD COUNTRIES NOT SHOWN
Mexico 823
80
79.2
75


Health care spending per person, in U.S. dollars
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Nation with universal health coverage provided by public and private insurers
Nation without universal health coverage
Average life expectancy at birth
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Canada 3,895
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ABOVE AVERAGE
Australia 3,137
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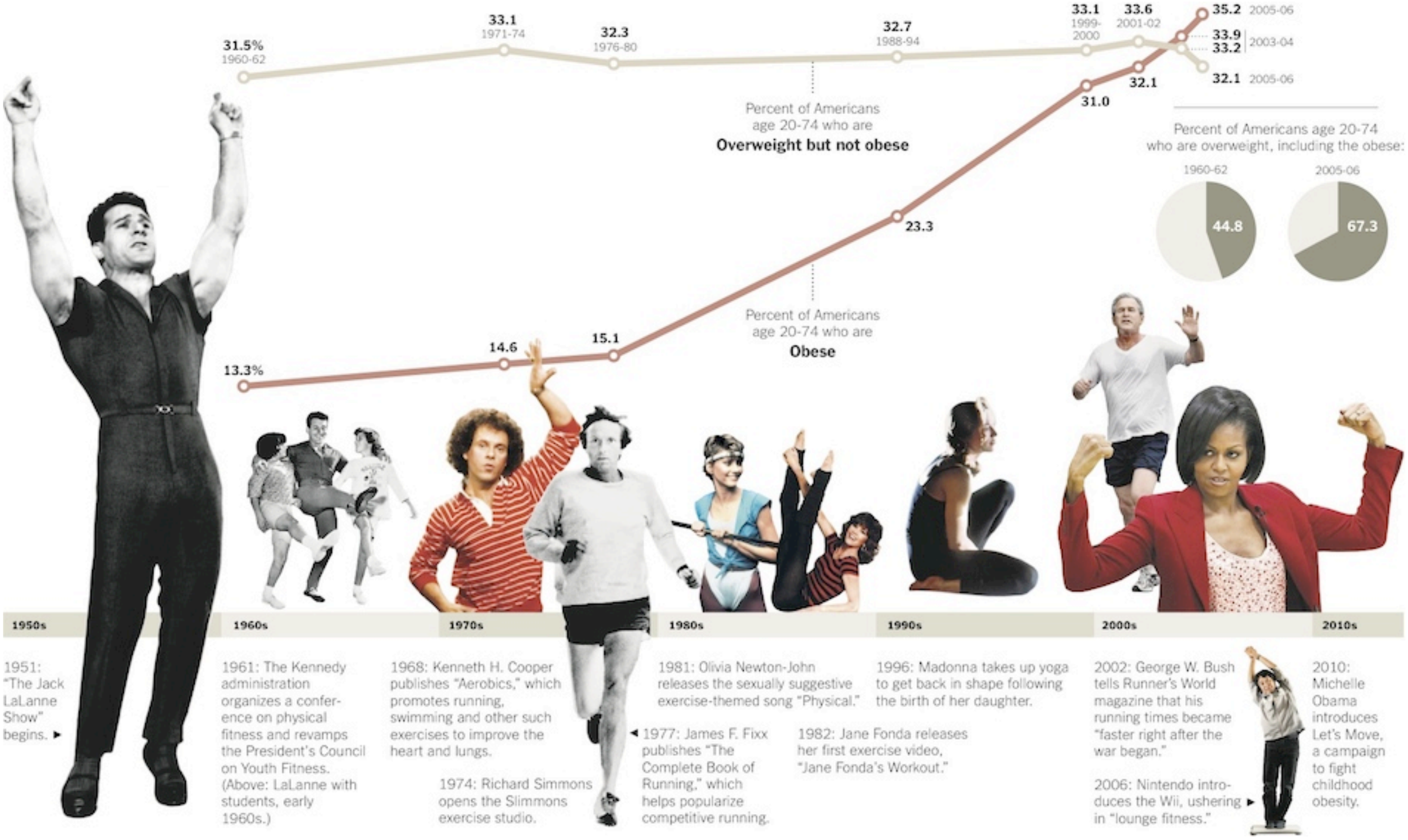
BELOW AVERAGE
Finland 2,840
Spain 2,671
Japan 2,581
New Zealand 2,510
Portugal 2,150
80
79.2
75



1951: "The Jack LaLanne Show" begins. ►

1961: The Kennedy administration organizes a conference on physical fitness and revamps the President's Council on Youth Fitness. (Above: LaLanne with students, early 1960s.)

1968: Kenneth H. Cooper publishes "Aerobics," which promotes running, swimming and other such exercises to improve the heart and lungs.

1974: Richard Simmons opens the Slimmons exercise studio.

◄ 1977: James F. Fixx publishes "The Complete Book of Running," which helps popularize competitive running.

1981: Olivia Newton-John releases the sexually suggestive exercise-themed song "Physical."

1982: Jane Fonda releases her first exercise video, "Jane Fonda's Workout."

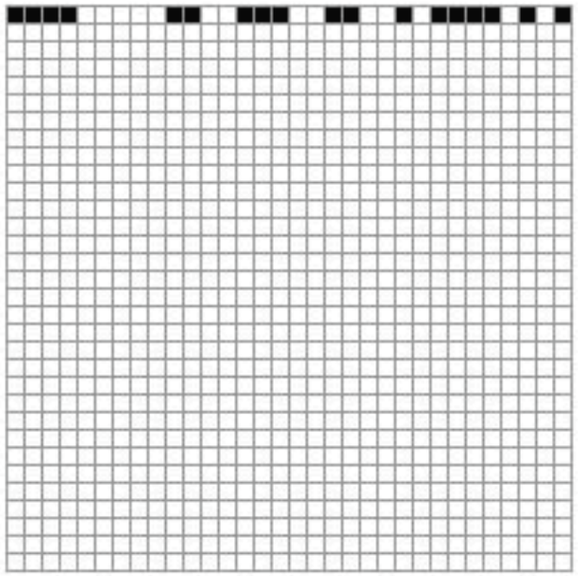
1996: Madonna takes up yoga to get back in shape following the birth of her daughter.

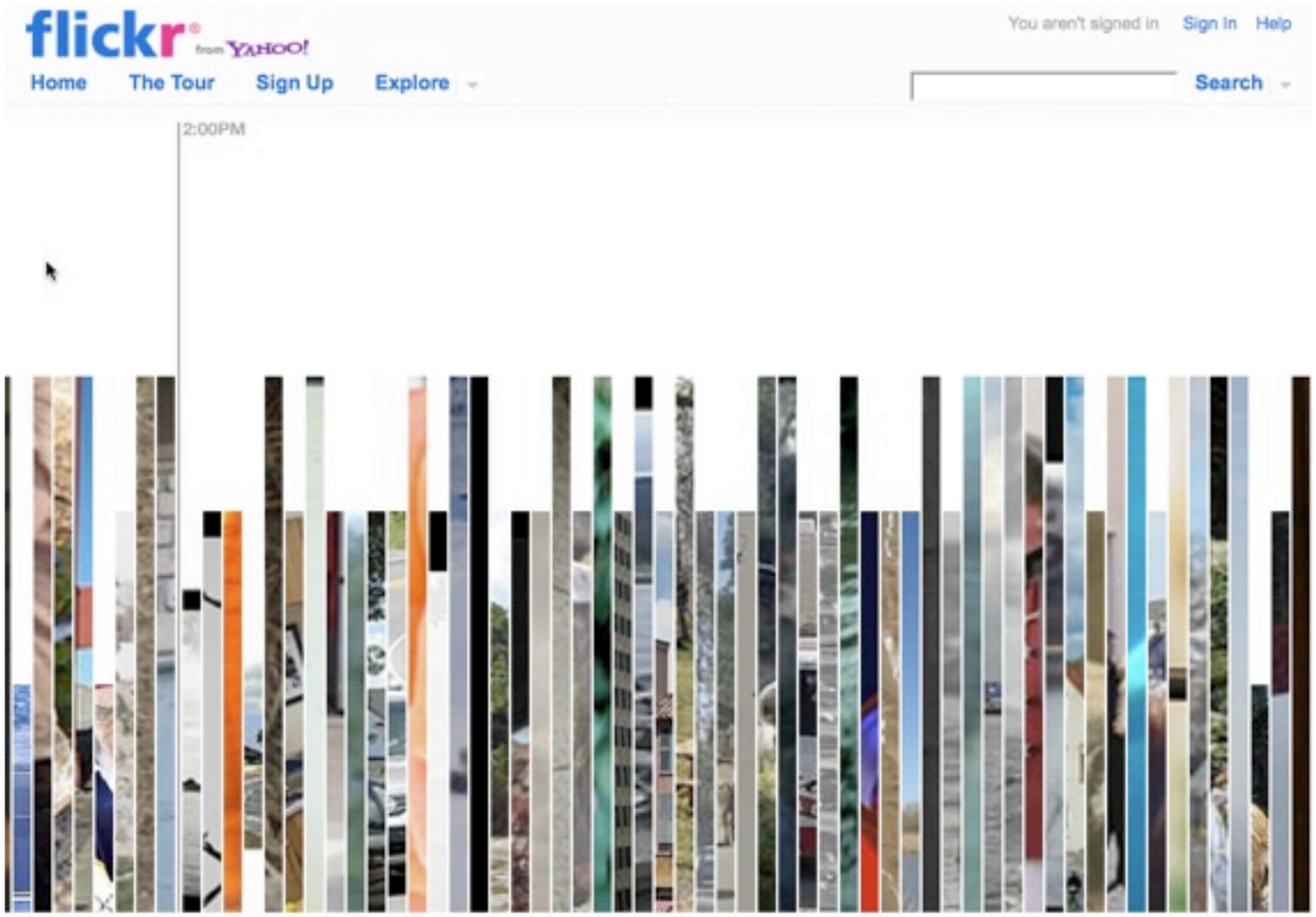
2002: George W. Bush tells Runner's World magazine that his running times became "faster right after the war began."

2006: Nintendo introduces the Wii, ushering in "lounge fitness." ►

2010: Michelle Obama introduces Let's Move, a campaign to fight childhood obesity.

Time

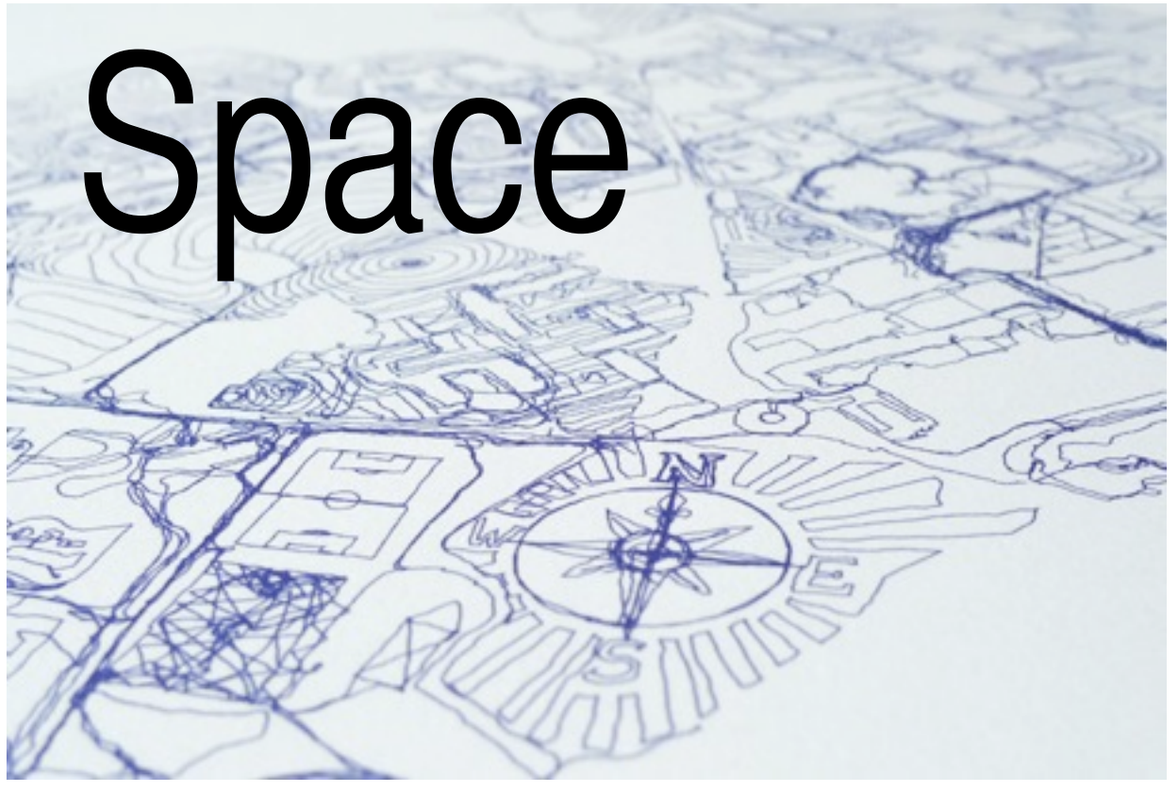


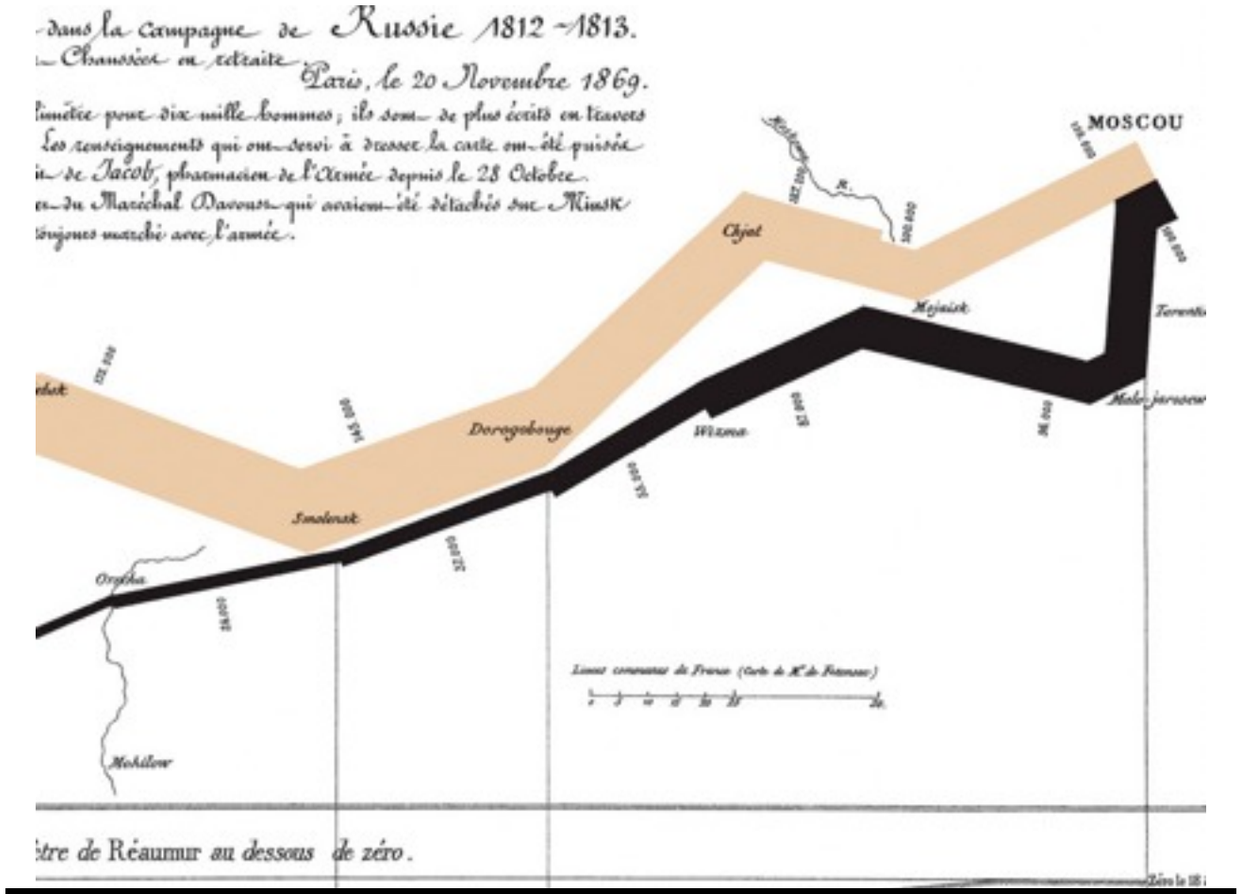


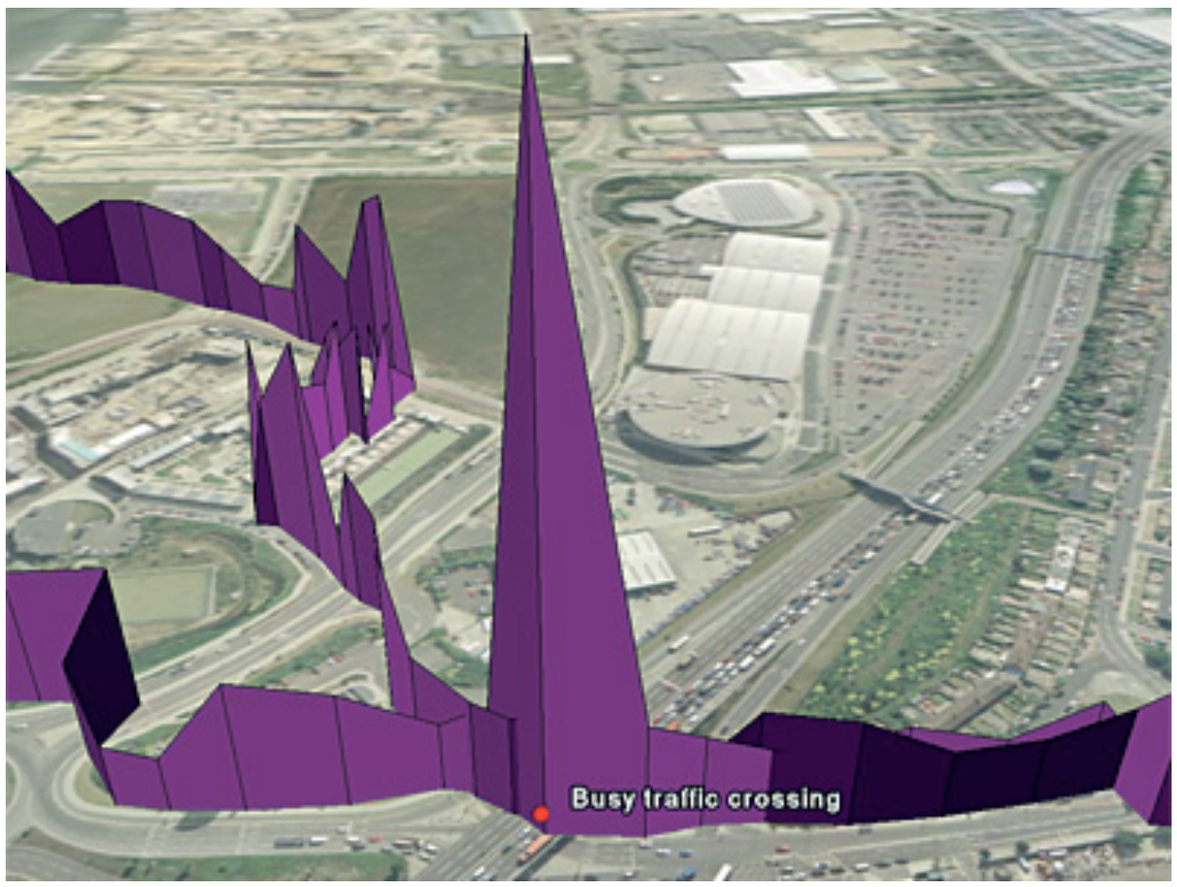
David McCandless, Dominic Busby, Alice Cho // v 1.0 // Aug 09
InformationIsBeautiful.net

source: Wikipedia // from the infographic book published in Oct 2009:
The Visual Miscellaneum

Space

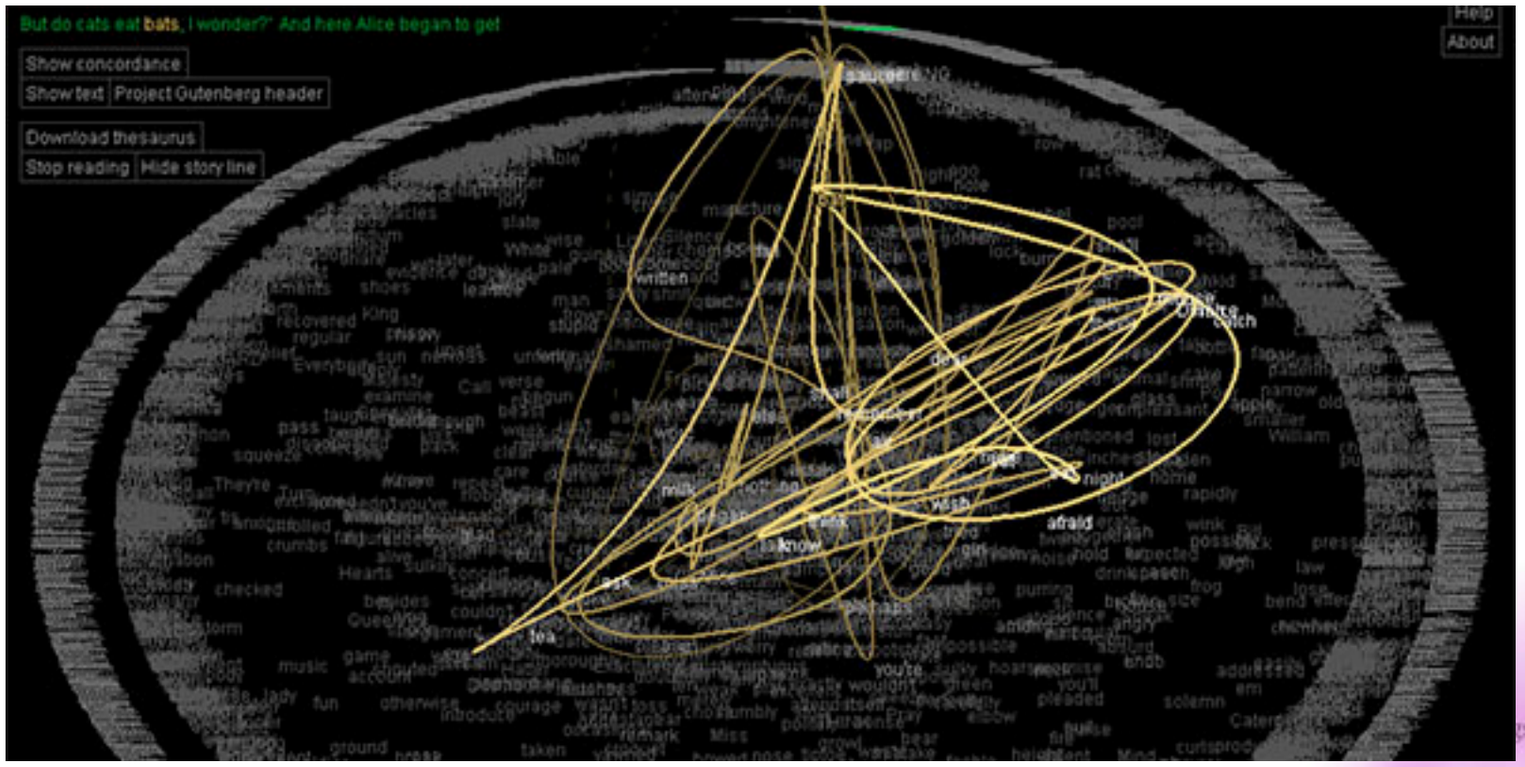


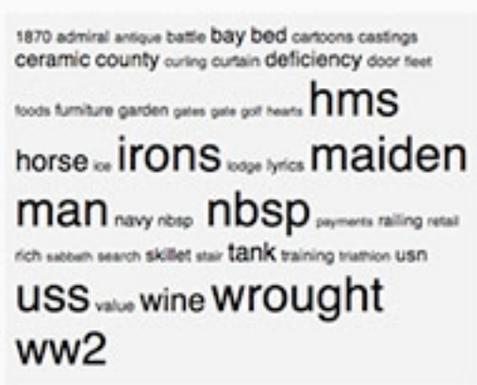

dans la campagne de Russie 1812-1813.
Paris, le 20 Novembre 1869.
MOSCOU
Chjat
Mojaisk
Dorogobouge
Wizma
Smolensk
Orscha
Mohilow
être de Réaumur au dessous de zéro.


Busy traffic crossing

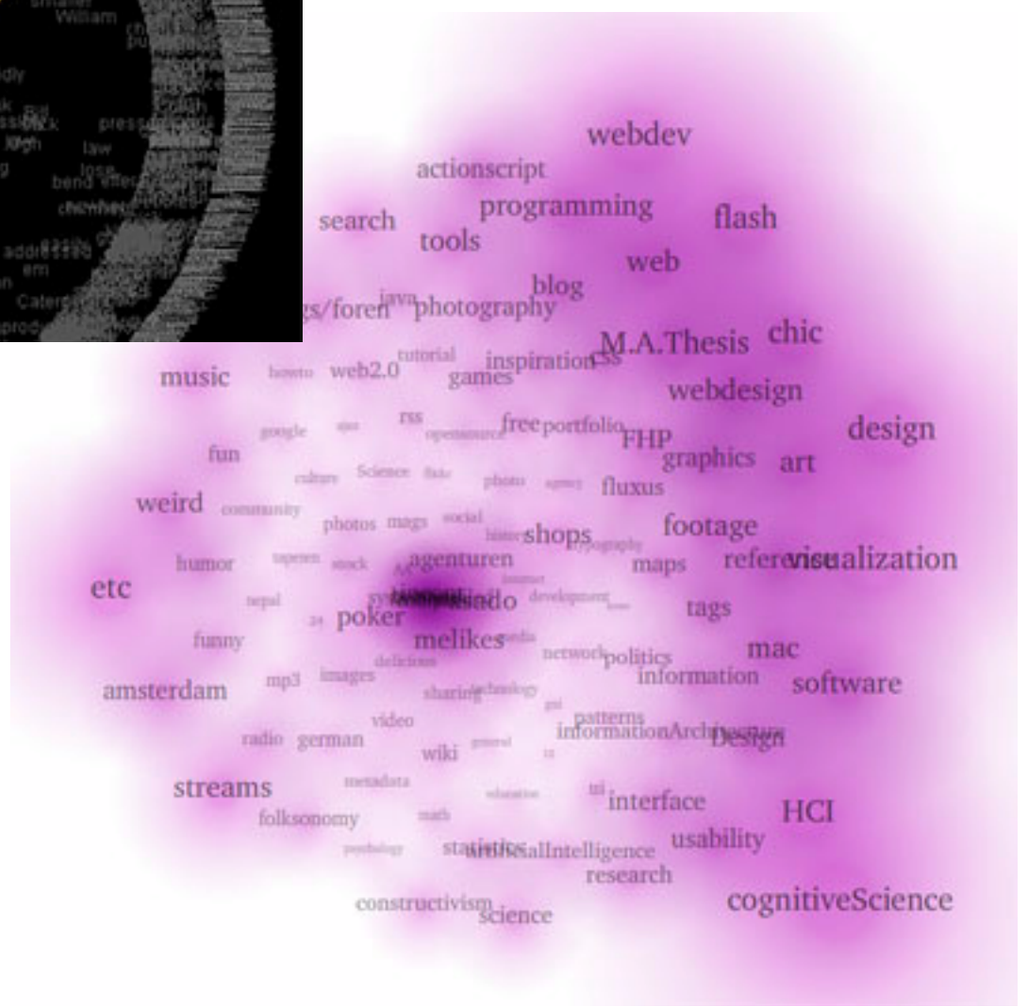
exploratorium / cabspotting.org
01/29/06
06:00am – 06:30am

Text


But do cats eat bats, I wonder?" And here Alice began to get
Show concordance
Show text
Project Gutenberg header
Download thesaurus
Stop reading
Hide story line
Help
About


1870 admiral antique battle bay bed cartoons castings
ceramic county curling curtain deficiency door fleet
foods furniture garden gates gate golf hearts hms
horse ice irons lodge lyrics maiden
man navy nbsp nbsp payments railing retail
rich sabbath search skillet stair tank training triathlon usn
uss value wine wrought
ww2

100 1942 1st 2nd badge border cased center
complete covered dark dated
document ehrenpokal enamel exc
factory finish germany goblet grades
grouping highlights honor included interior leaf lid lower
luftwaffe maker marked minor mint
near oak patina pin plate recently
recipient remaining showing shows superb surface
swastika unmarked wear wreath


webdev
actionscript
programming
flash
search
tools
web
blog
photography
M.A.Thesis
chic
music
web2.0
inspiration
games
webdesign
design
fun
graphics
art
weird
fluxus
footage
shops
visualization
etc
agenturen
maps
tags
poker
melikes
mac
amsterdam
information
software
streams
interface
HCI
usability
research
cognitiveScience
constructivism
science

Video!

Hans Rosling and Gap Minder

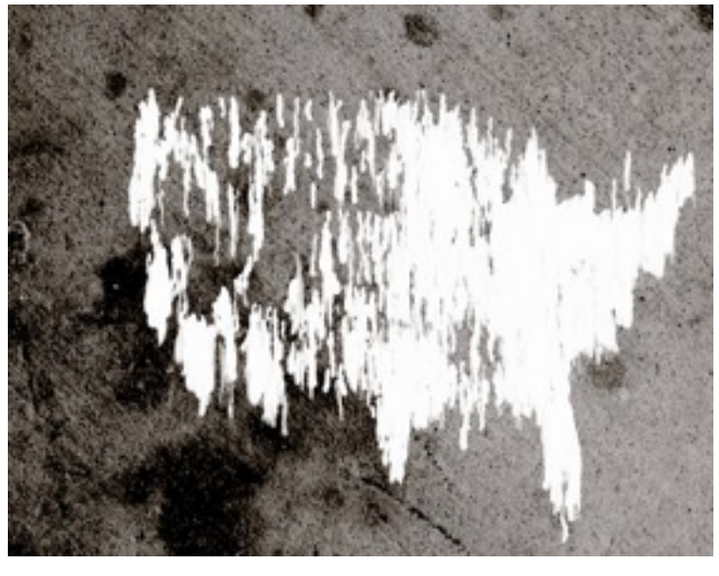
Introductions...

Moisture farm

twigster

freezing

AWKWARD
NYC

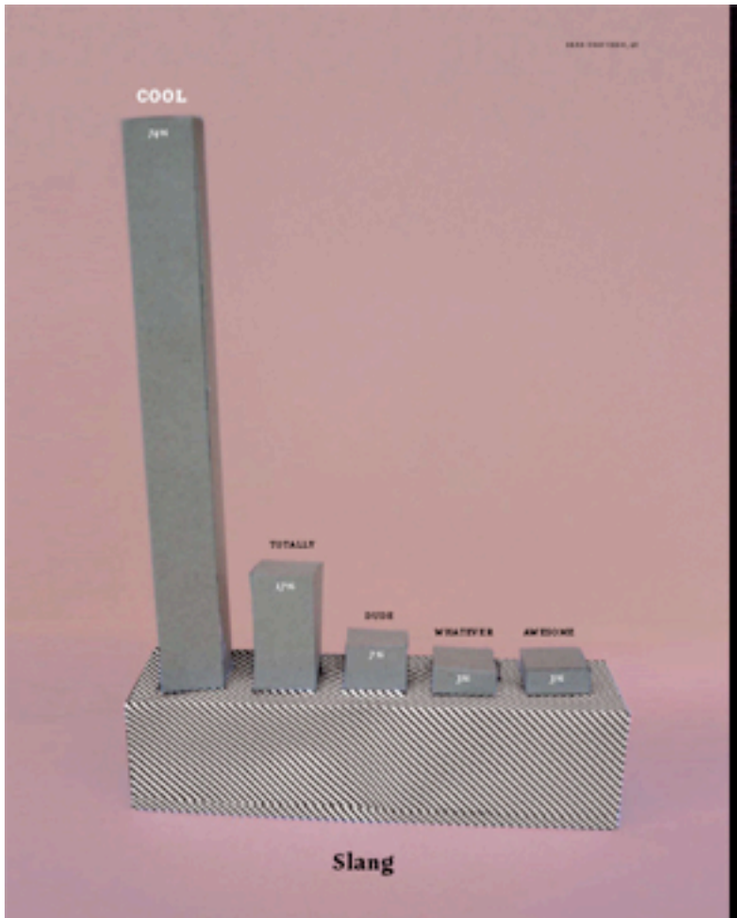


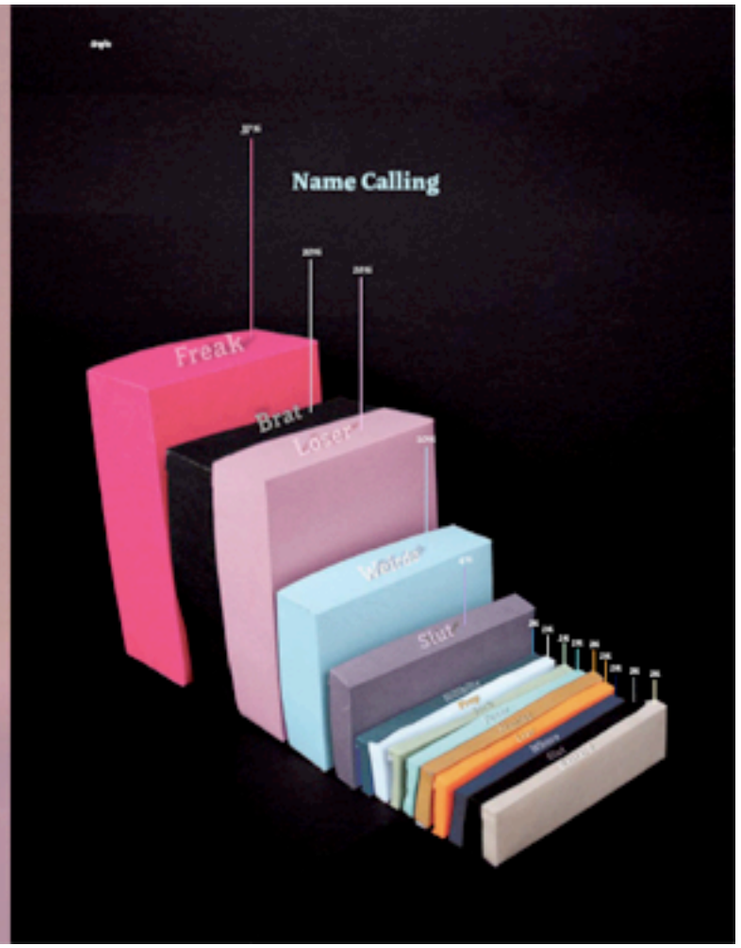
First Assignment

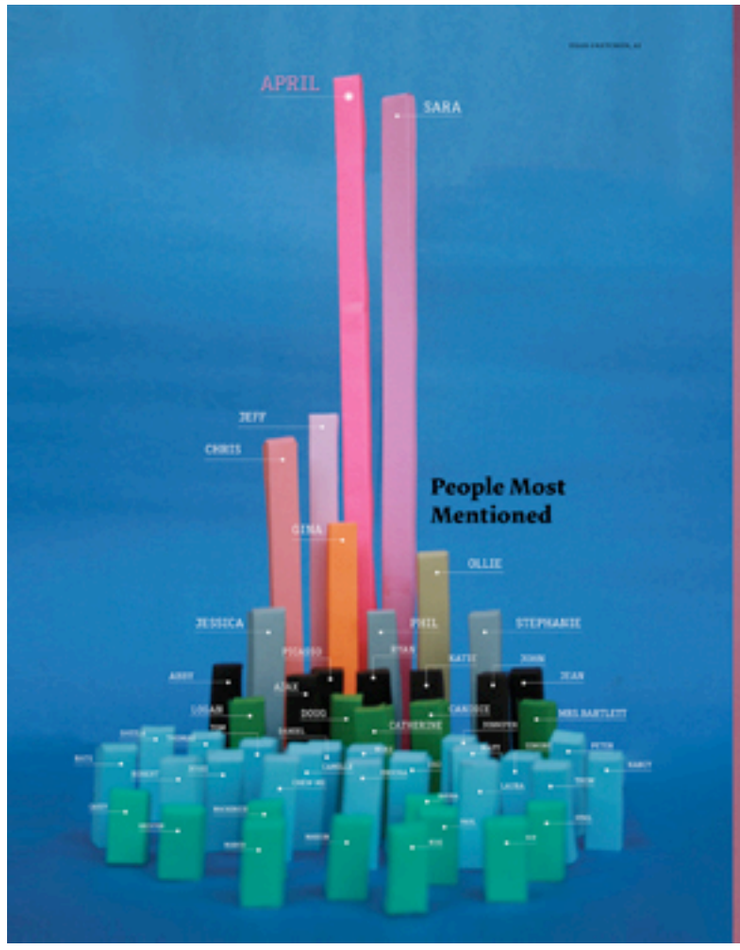
- Sketch two or three “analog” representations of aspects of our class data. Ask yourself a question about this data, and see if you can answer it.
- Make two “screen drawings” in Processing, using shape functions and colors.
- Animate your screen drawing in a loop, using a variable.

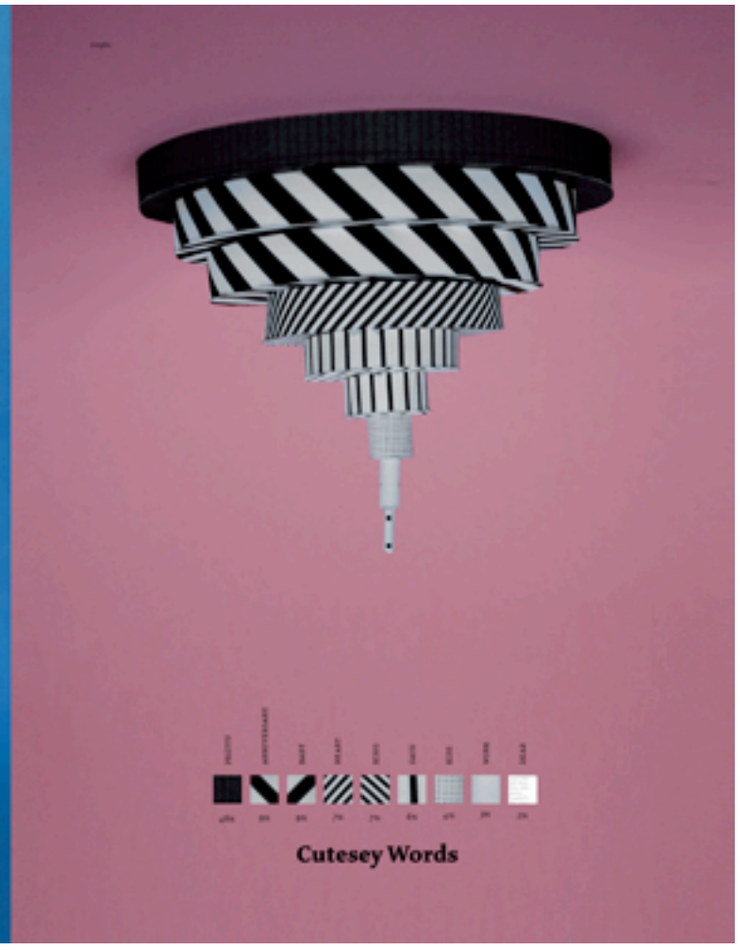
analog examples

gretchen nash http://www.gretchenetc.com/deargretchen.html

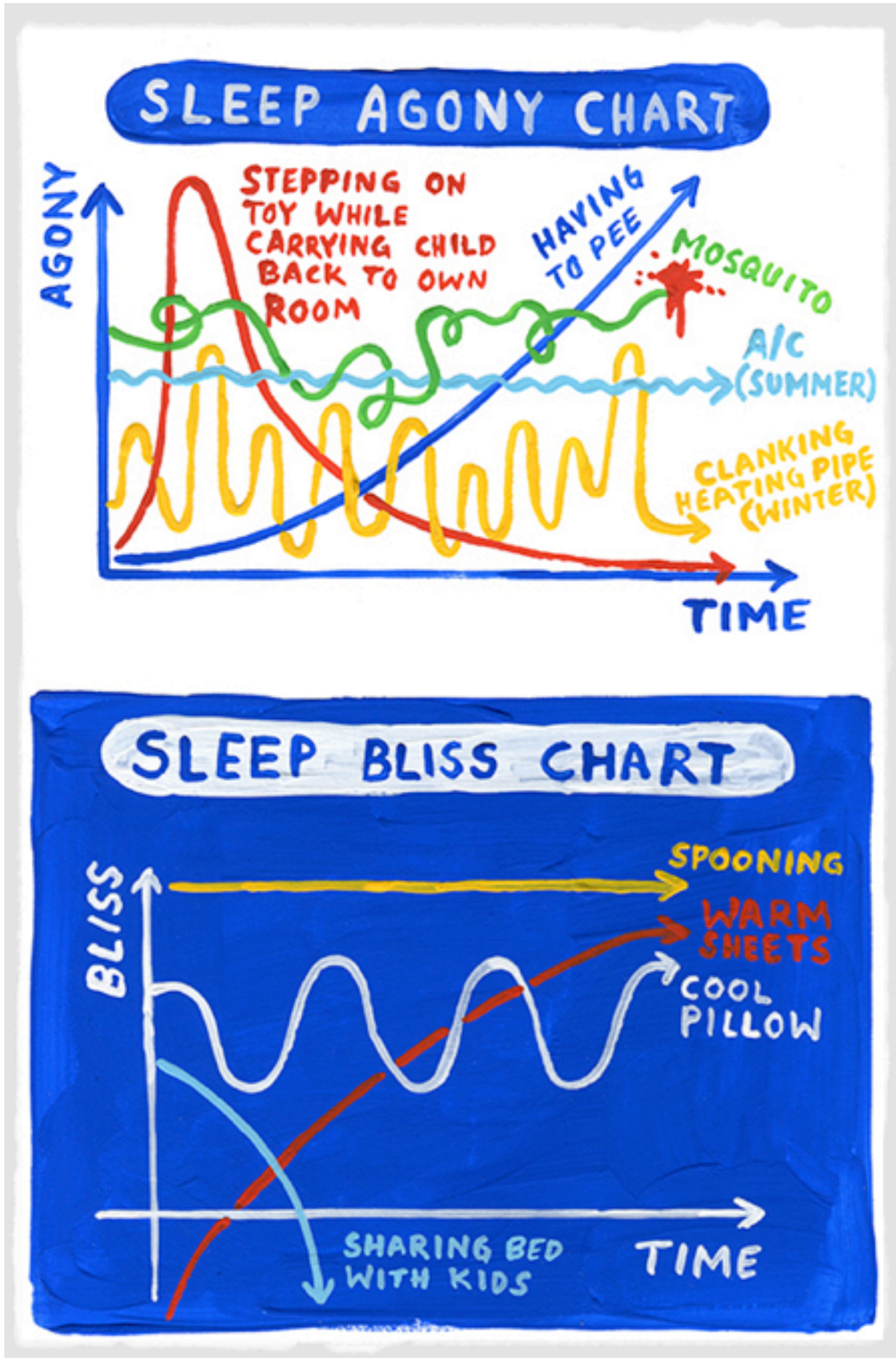

COOL
TOTALLY
DUDE
WHATEVER
AWESOME
Slang

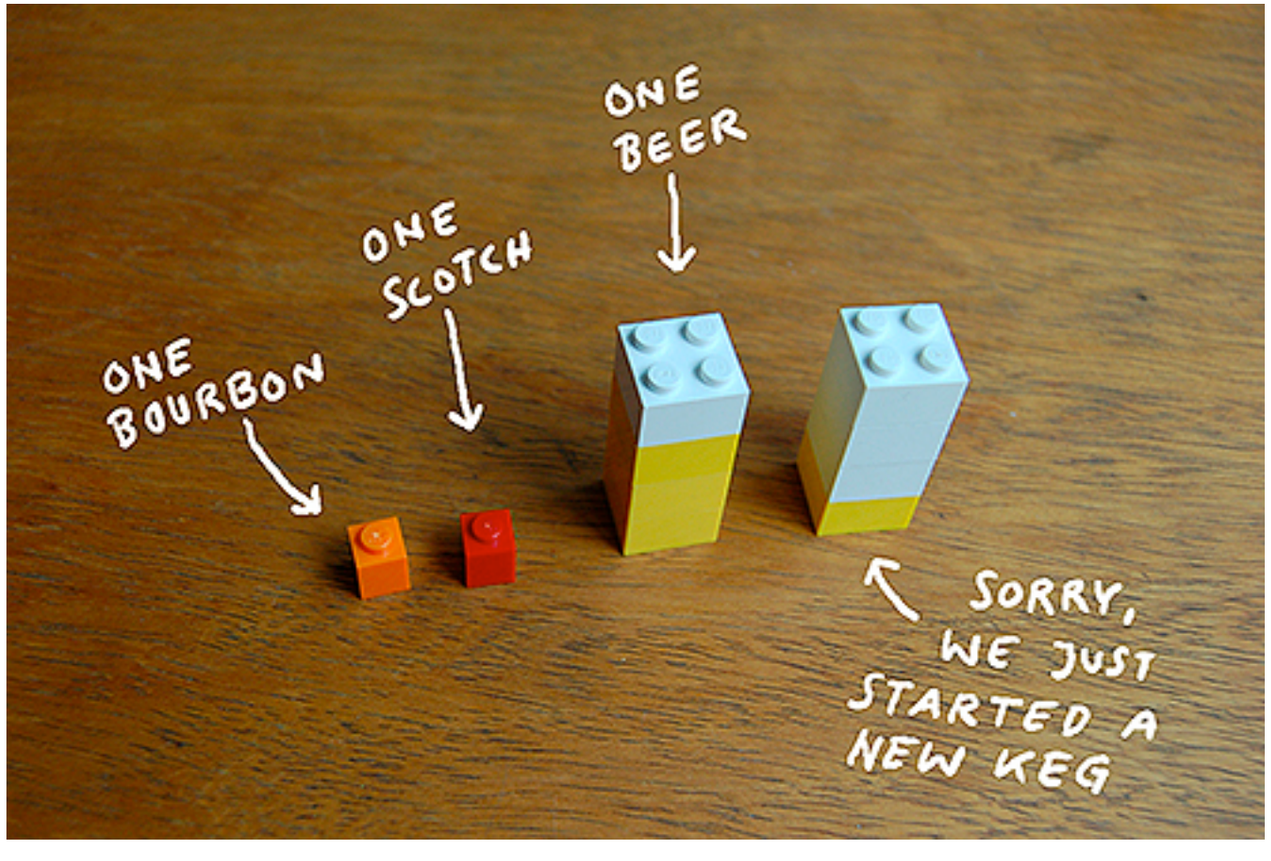

Name Calling
Freak
Brat
Loser
Weirdo
Slut


APRIL
SARA
JEFF
CHRIS
GINA
OLLIE
JESSICA
PHIL
STEPHANIE
JEAN
DOUG
CATHERINE
MRS BARTLETT
People Most
Mentioned


Cutesey Words

sarah illenberger http://www.sarahillenberger.com/stories.php?c=neon&n=2





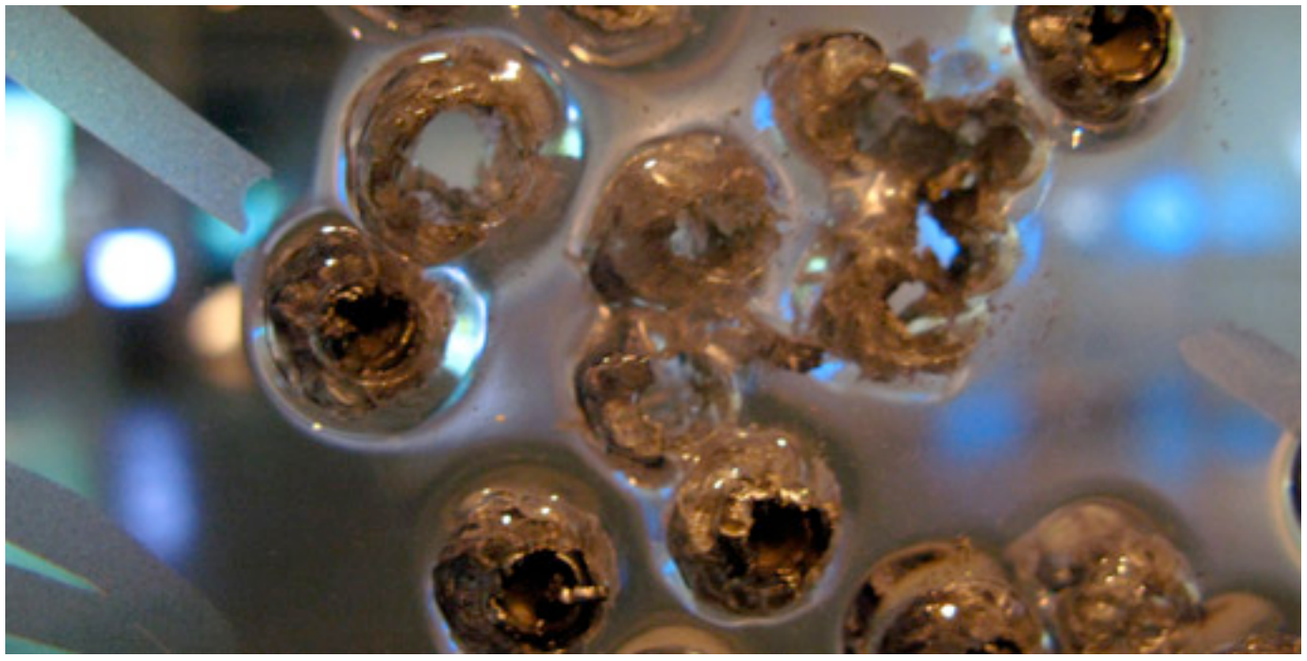
christoph neimann http://niemann.blogs.nytimes.com/

Mountain Dew
SugarStacks.com

Hostess
Twinkies
SugarStacks.com

valentina de filippo http://www.vale-n-tina.com/#138408/Relationship-matters

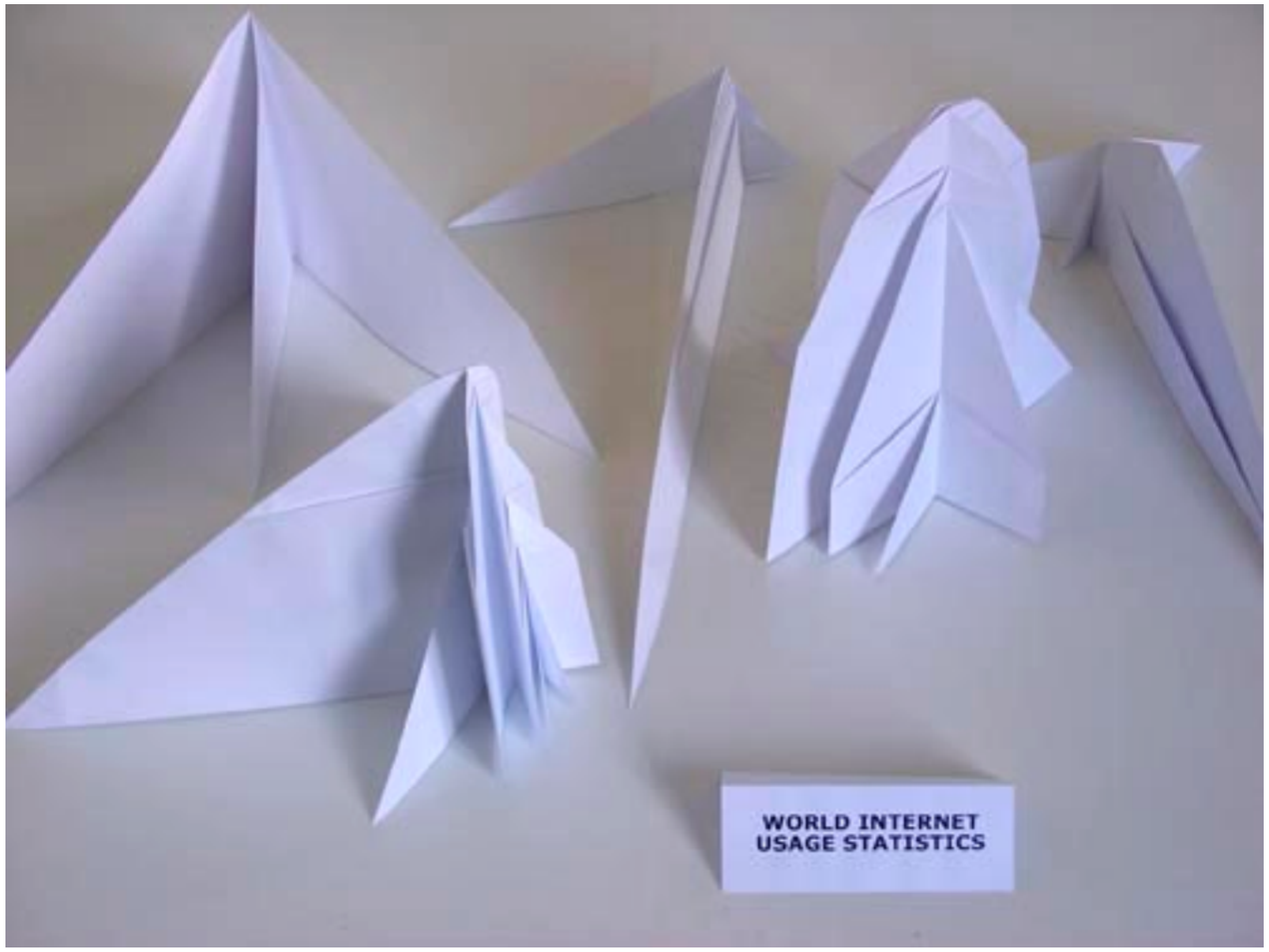
corriette schoenaerts



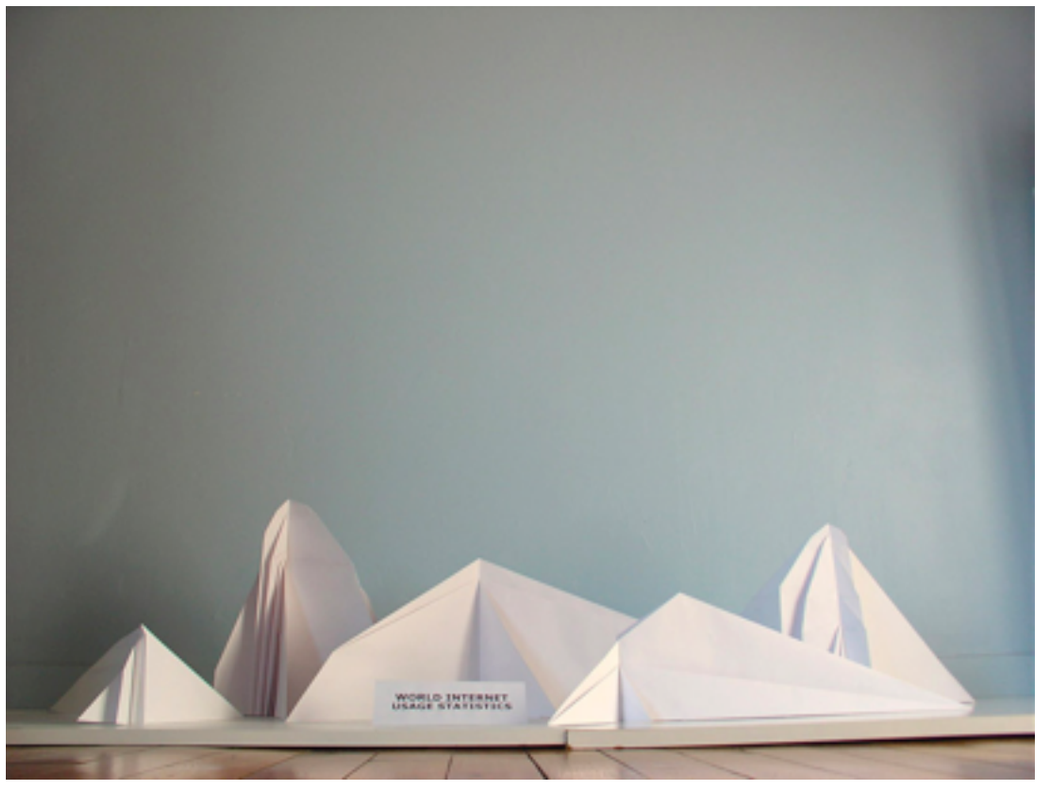
Instances of Use of United States Armed Forces Abroad, 1798–2006
.22 bullets shot into polycarbonate
157 inches x 78 inches x .5 inch
4 meters x 2 meters x 1 centimeter

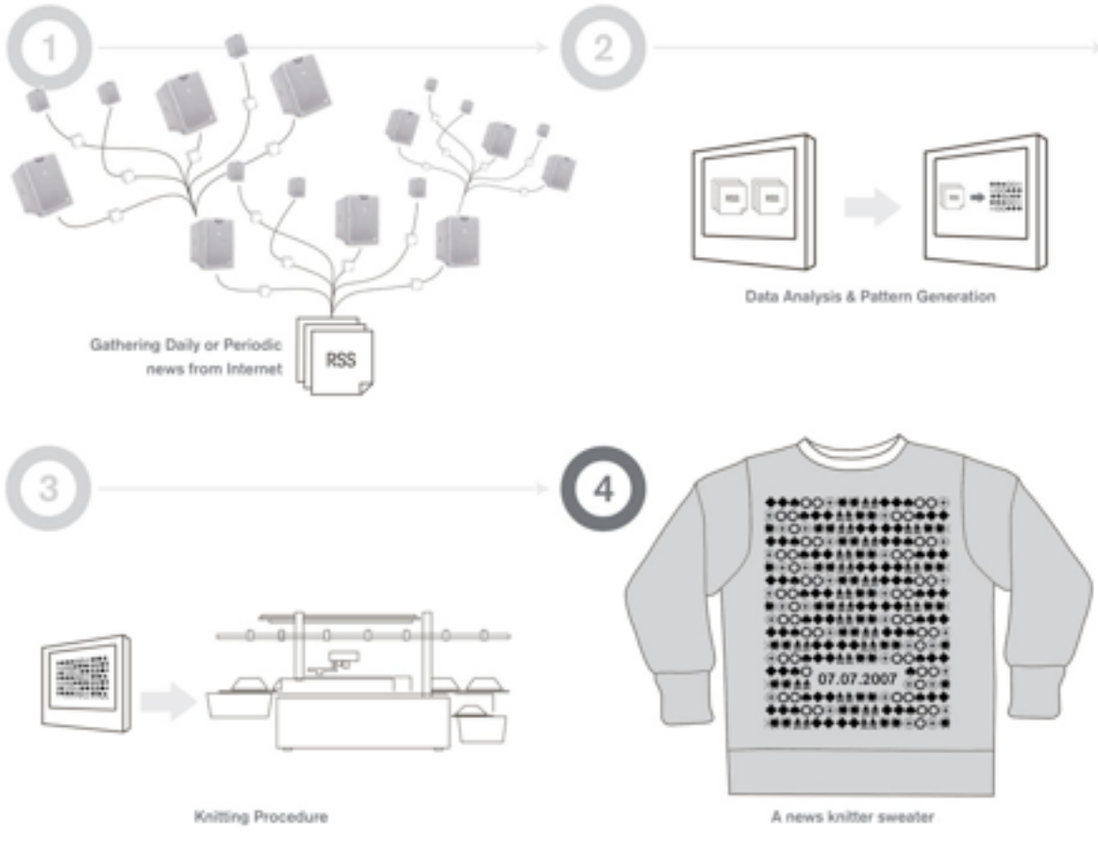
http://elahi.sjsu.edu/

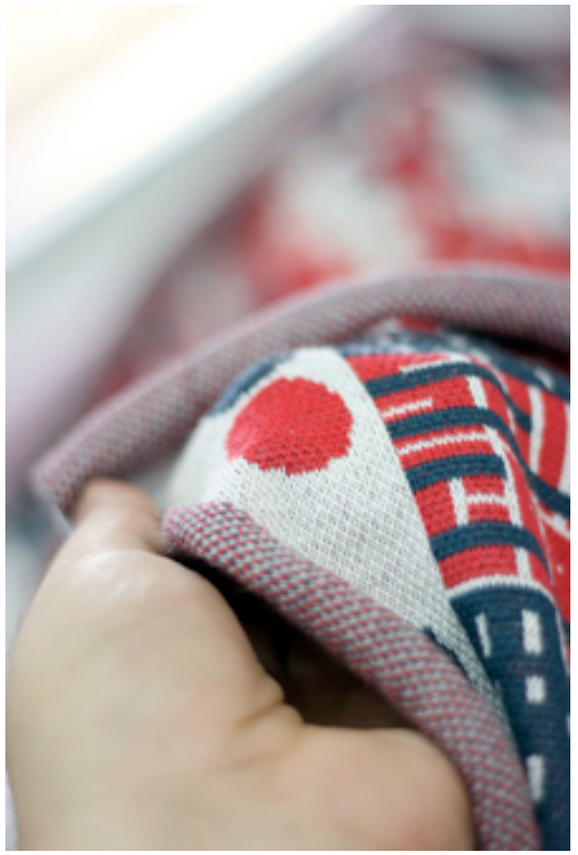
johann volkmer http://www.faltjahr2010.de/loop.html



Etienne Cliquet
World Internet Usage Statistics



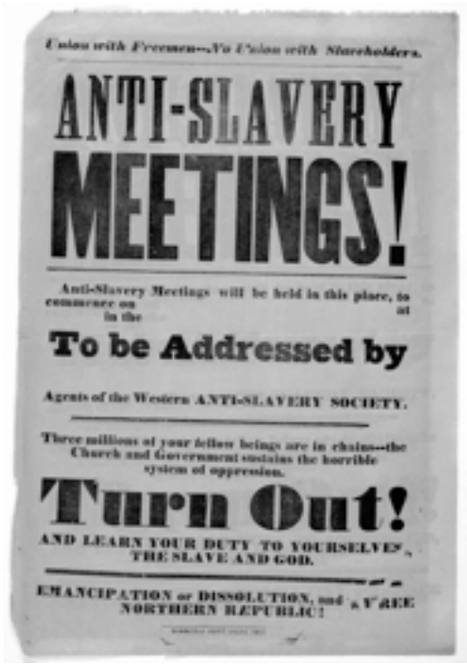


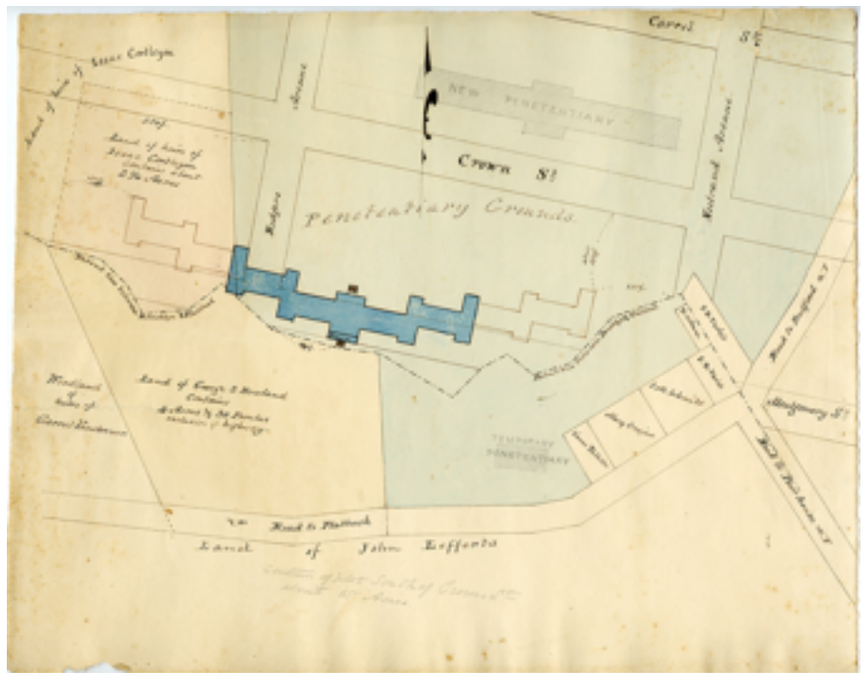


casual data *news knitter* http://www.casualdata.com/newsknitter/

Collaboration with Brooklyn Historical Society!

BROOKLYN
HISTORICAL
SOCIETY





Programming!

- When we program, we're **writing** instruction sets for the computer
- The computer will do **EXACTLY** as you say
- Computers are stupid: they will not guess or infer what you mean

YOU need to:

- Understand the **context and tools** that you and the computer share (languages and libraries)
- Understand which tools and contexts you need to **create or explain** to the computer
- Understand the **syntax** the computer needs you to use

Functions!

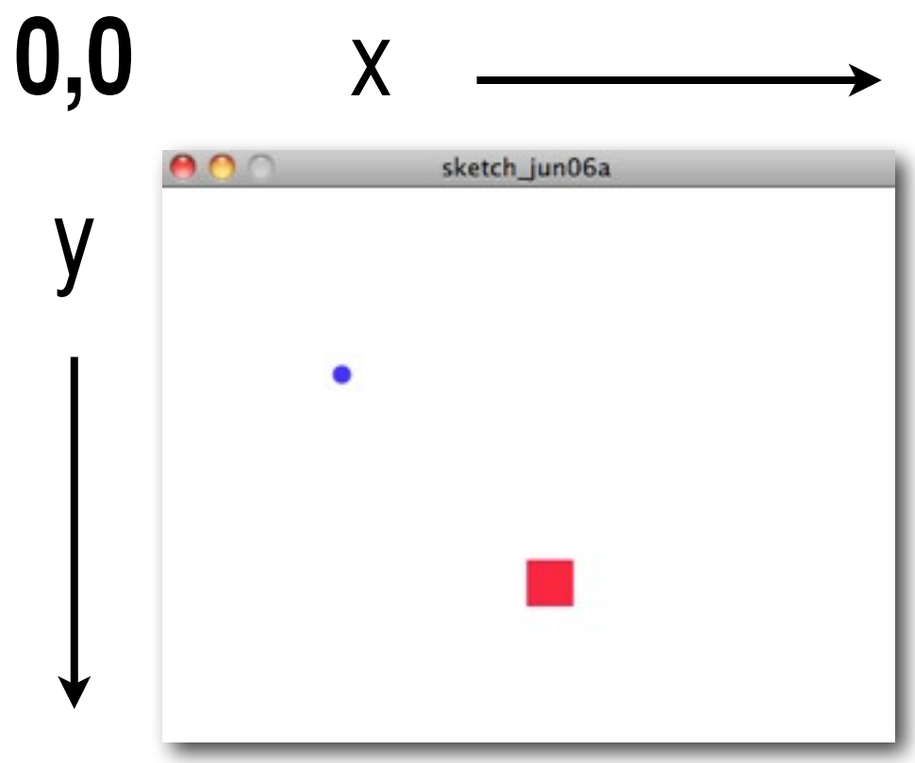
- Out-of-the-box reusable chunks of code! Shared tools or methods that you and the computer have at your fingertips
- You can give functions extra information to make them more flexible and useful
- Let's imagine a function called "openjar" for our sandwich making task, and write instructions for it

Now, on to Processing!

- Open source programming language for making visuals (text in → visuals out)
- Enables interaction
- Based on Java
- “High Level” Programming Language
- Cross-platform, free!
- download and reference at **processing.org**, comes with IDE

Processing Basics

- Visual output— program files are called **sketches**, program "**draws**" to the screen
- All measurements in pixels
- Built in **loop** for animation (change from frame to frame)
- Screen space defined by **coordinate system** (x, y, z)



Processing Syntax

- **Again, computers are dumb**
  - Punctuation, spelling and capitalization matters!
  - end your lines with “;”
  - functions take arguments inside ( ) like this: openJar(jamJar)

First Functions In Processing

- size(), background()
- rect(), ellipse(), line(), triangle(),
- fill(), stroke()
- colors in B&W or RGB: values from 0 to 255
- alpha values for opacity
- Remember, functions take **arguments!**

text in...

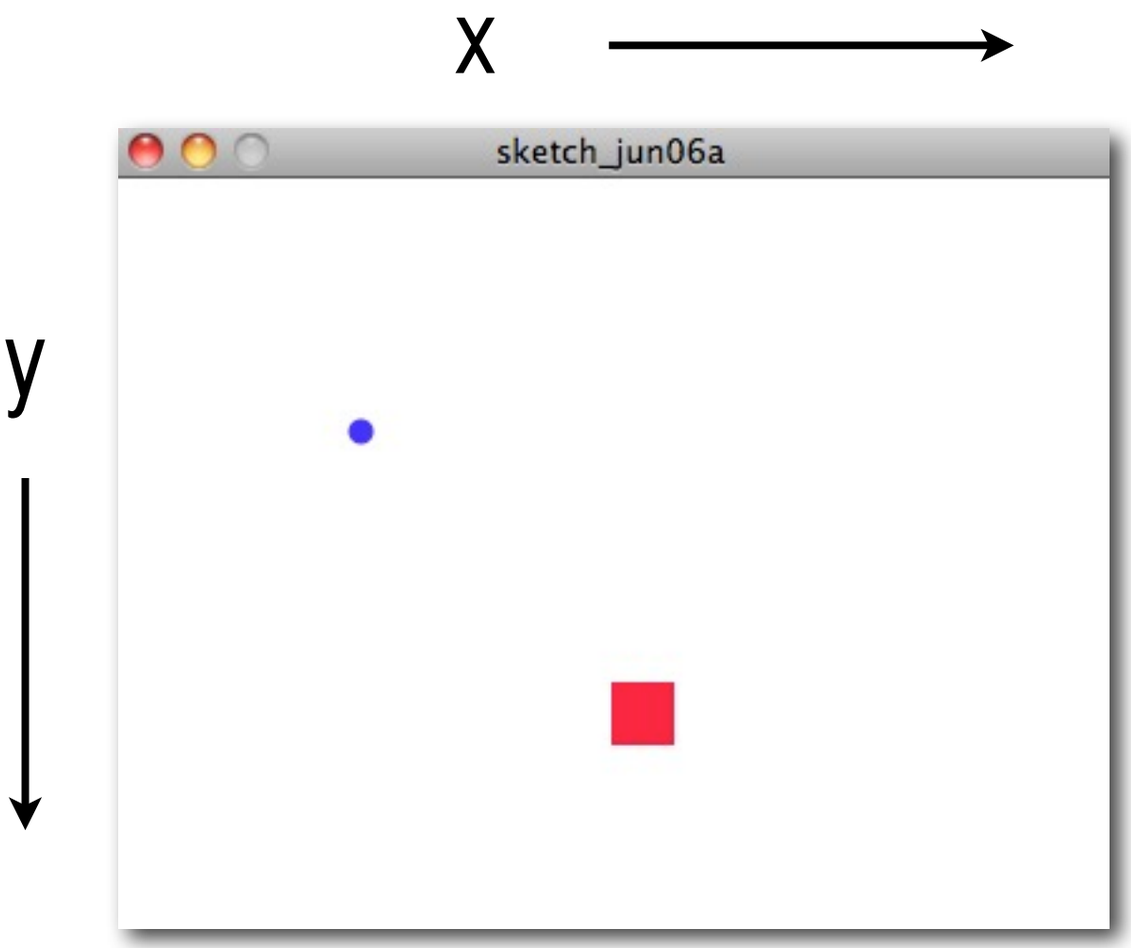
...visuals out

sketch_jun06a | Processing 1.2.1

sketch_jun06a §

```
//set the size of your sketch (w,h in pixels)
size(400,300);
//change the color for the background
//0 to 255, 0 is back, 255 is white
background(255);
//turn off the outline around things
noStroke();
//smooth out my shapes
smooth();

//fill red-ish
fill(255,0,50);

//draw a rectangle at x=200, y=200, with width of 25
//and height of 25
rect(200,200,25, 25);

//fill blue-ish
fill(50,0,250);

//draw an ellipse at x=100, y=200, with a
//width and height of 10
ellipse(100,100,10,10);
```

21



Let’s Try It!

Using void setup() and void draw()

- Both are functions, neither take parameters
- setup() does preliminary stuff once
- draw() loops over and over again until you close the sketch
- void means neither of the functions will “return” (give back) anything to you

Using a variable

- A variable is a **place to store some useful data** (like a number, a sequence or string of letters that make up a word, or a object (more on these later))
- Variables have a **datatype**, so the computer knows what it can and can't do with the value (int, string, float, etc)
- Variables point to spaces in memory where data is save; values held there can be **changed**
- In Processing, variables must be **declared** and **initialized** before you use them!

basicDrawLoopVar | Processing 1.5.1

STANDARD

basicDrawLoopVar §

```
int ypos; //declare your variable type and give it a name

void setup() //do  some stuff to get ready for the sketch
{
  size(400, 400); //set window size
  stroke(255); //set color of stroke or outline
  background(0); //set background color to black
  smooth(); //smooth out any shapes you draw
  ypos = 0; //set your variable (we'll change it in the draw loop)
  fill(255); //fill color is white
}

void draw()
{
  ellipse(200, ypos, 20, 20); //use the variable to draw the ellipse
  ypos += 2;  //update the variable
}
```

what will this sketch do?