

# Storytelling

CS 7250

SPRING 2020

*Prof. Cody Dunne*

*NORTHEASTERN UNIVERSITY*

*Slides and inspiration from Michelle Borkin, Krzysztof Gajos, Hanspeter Pfister, Miriah Meyer, Jonathan Schwabish, and David Sprague*

**BURNING QUESTIONS?**

# TRACE EVALUATIONS

The screenshot shows the Canvas LMS interface. At the top left, the Canvas logo is visible. The breadcrumb navigation shows 'CS 7250 S20 > Quizzes > Quiz – Storytelling'. On the left sidebar, there are navigation links for Home, Syllabus, Pages, Announcements, Assignments, Quizzes (highlighted), Discussions, Grades, People, and Files. At the top right of the quiz page, there are three buttons: 'Published' (green with a checkmark), 'Preview', and 'Edit'. The main content area is titled 'Quiz – Storytelling' and contains the following text: 'Answer the questions below and click "submit quiz" when done. **This is an open-book quiz but you only have 8 minutes to complete it.**'

# READING QUIZ

## Quiz – Storytelling

*8 min limit*  
*~10 min total*

Now, ON CS 7250...

# STORYTELLING

# GOALS FOR TODAY

- Learn about the basic narrative elements of a story arc.
- Learn about the three basic storytelling scenarios, and how that informs your visualization.
- Learn the 7 genres of visual storytelling, and what the advantages of each one are.

Hall of Fame or Hall of  
Shame



# 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 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 Davout qui avaient été détachés sur Minsk et Mohilow et ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.

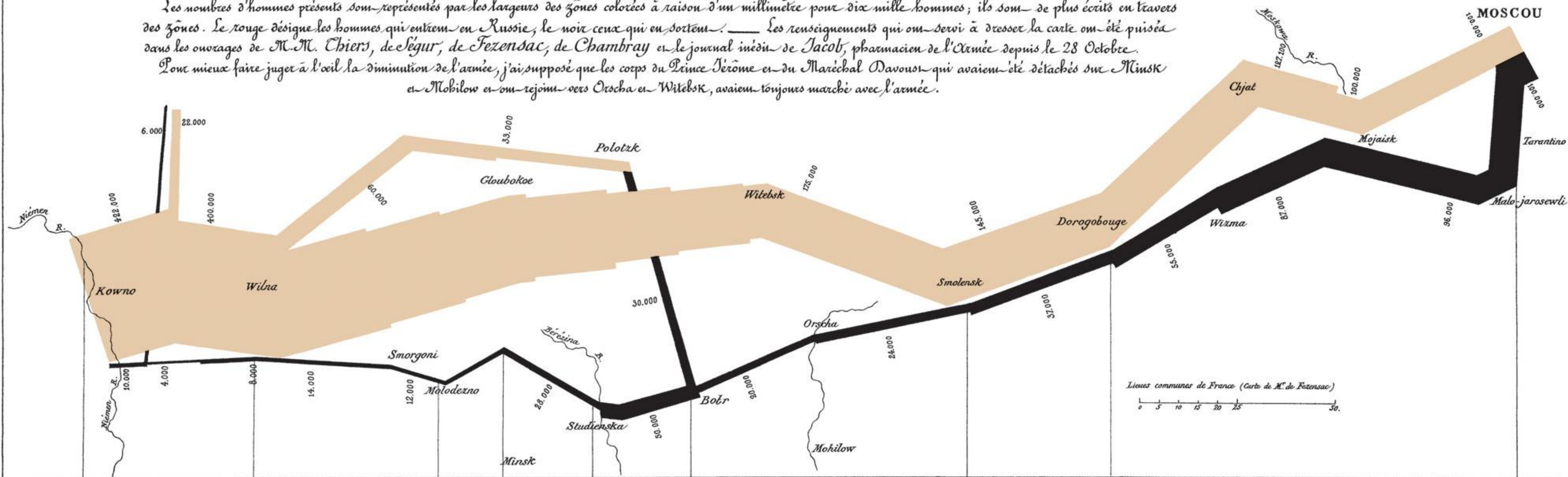
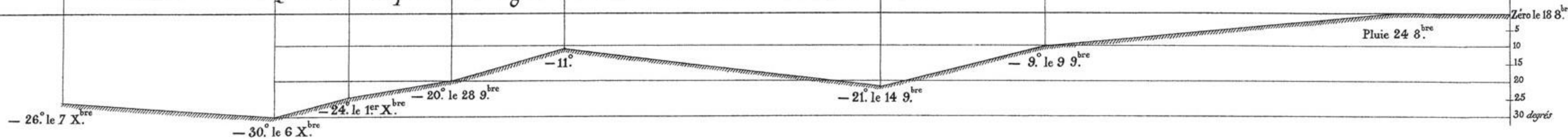


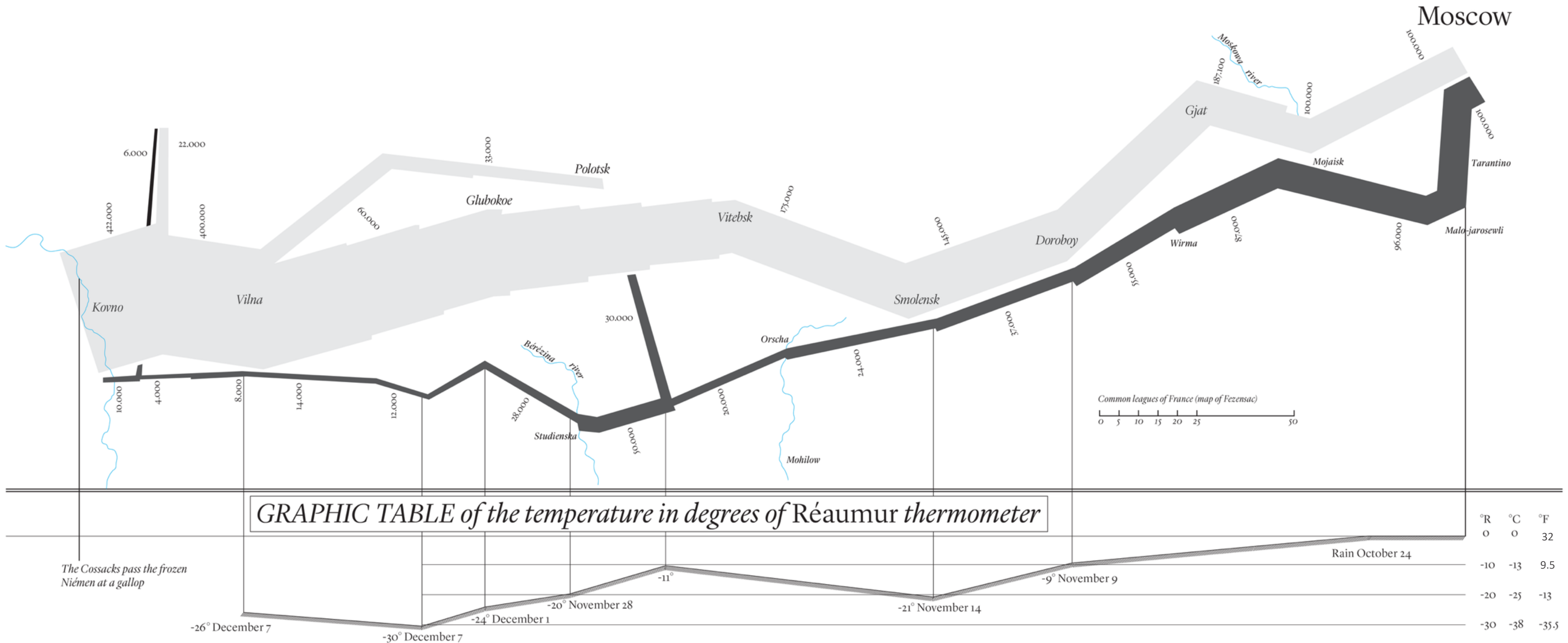
TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.

Les Cosaques passent au galop le Niemen gelé.



# FIGURATIVE MAP of the successive losses in men of the French Army in the RUSSIAN CAMPAIGN OF 1812-1813

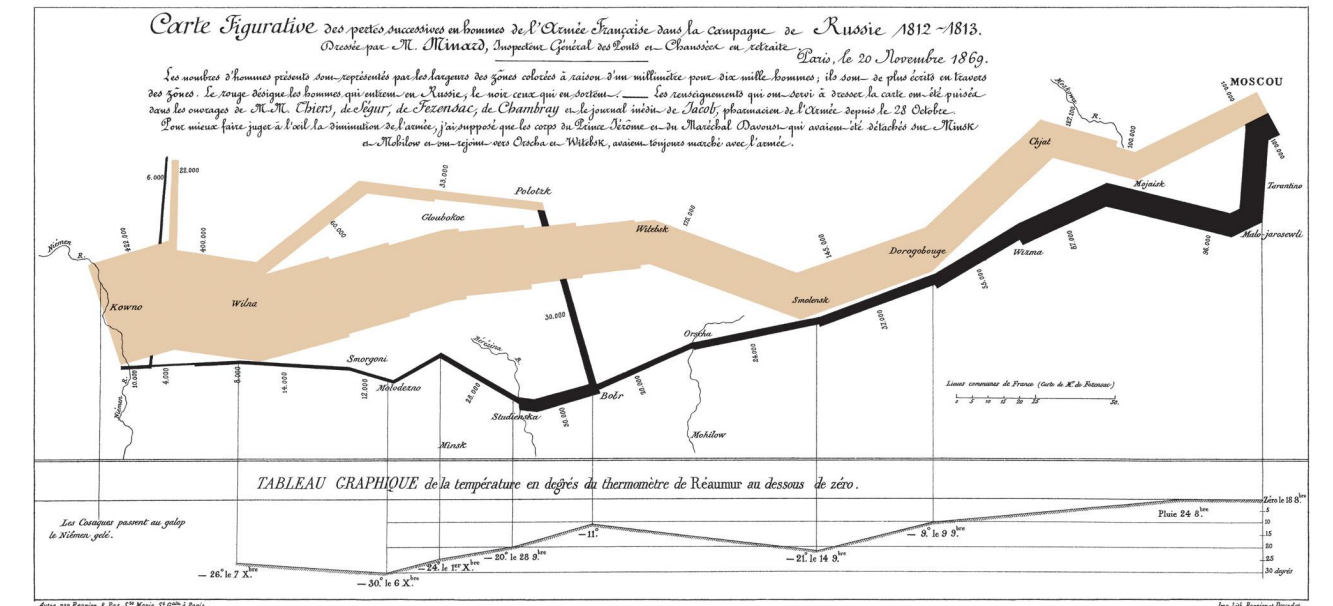
Drawn by Mr. Minard, Inspector General of Bridges and Roads in retirement. Paris, 20 November 1869. The numbers of men present are represented by the widths of the colored zones in a rate of one millimeter for ten thousand men; these are also written beside the zones. Red designates men moving into Russia, black those on retreat. — The informations used for drawing the map were taken from the works of Messrs. Chiers, de Ségur, de Fezensac, de Chambray and the unpublished diary of Jacob, pharmacist of the Army since 28 October. In order to facilitate the judgement of the eye regarding the diminution of the army, I supposed that the troops under Prince Jérôme and under Marshal Davoust, who were sent to Minsk and Mobilow and who rejoined near Orscha and Witebsk, had always marched with the army.



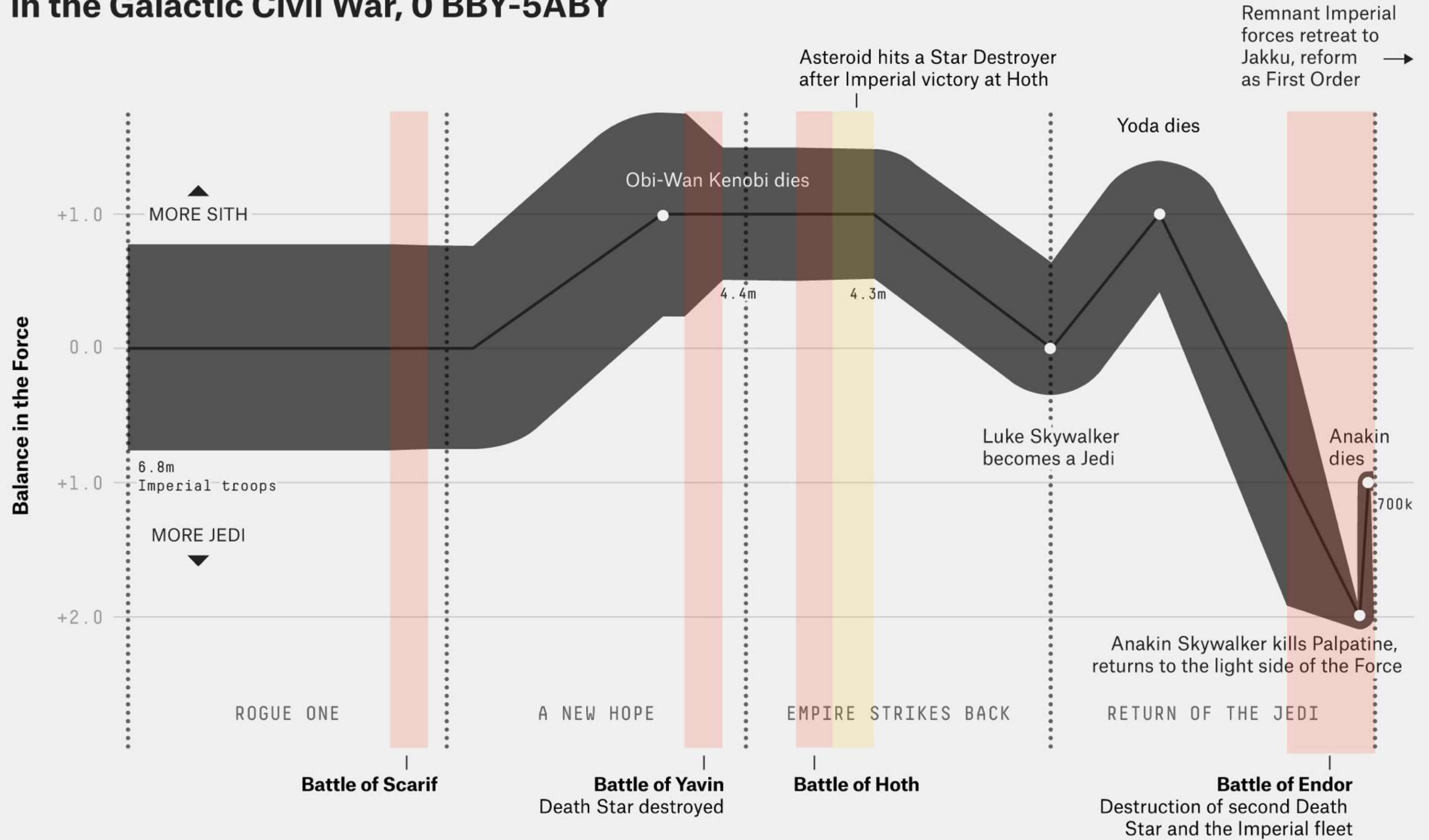
# MARCH TO MOSCOW

## Charles Joseph Minard

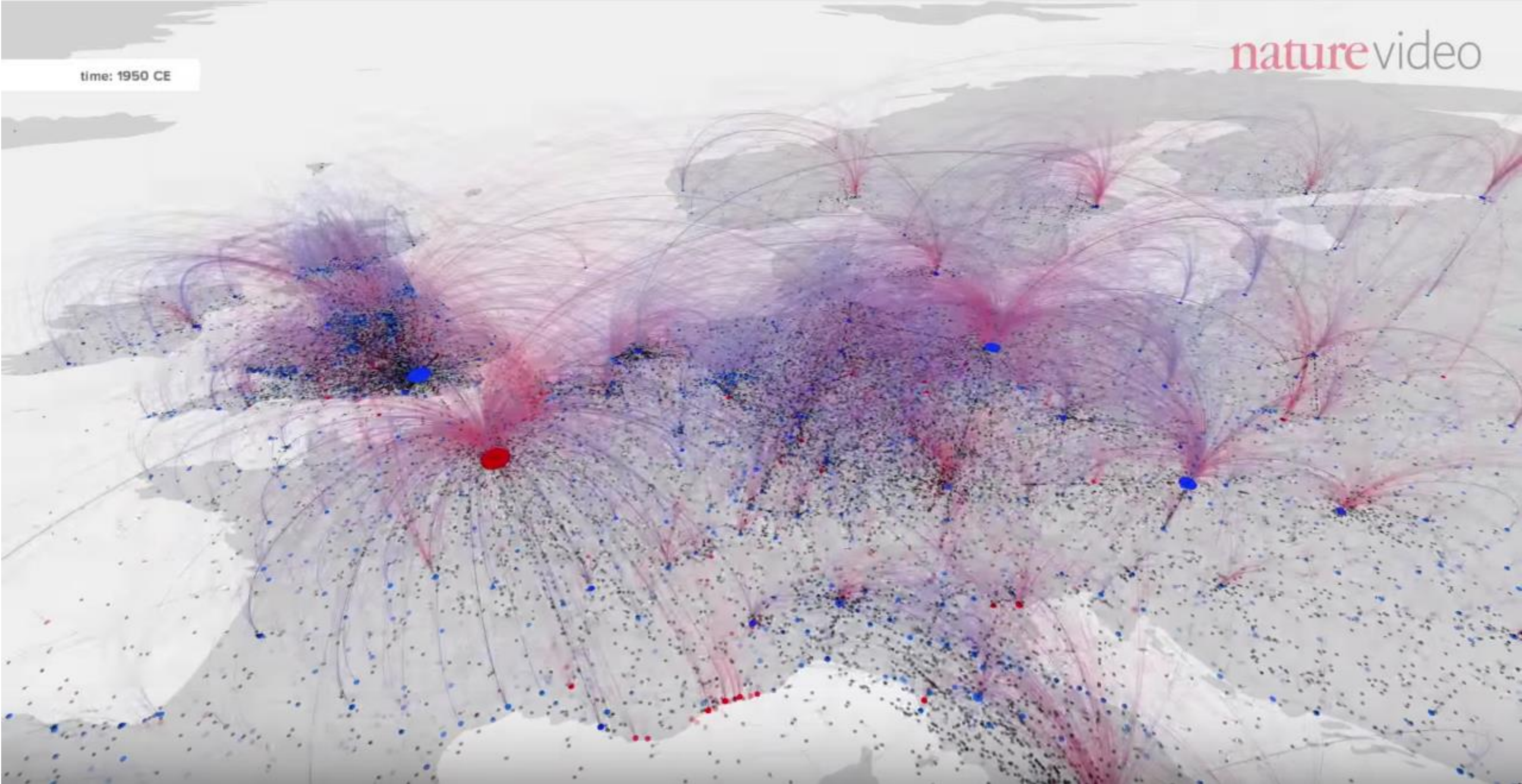
- French civil engineer (1781-1870)
- Pioneer in using graphics in engineering and statistics
- “March to Moscow” graph most famous work; considered by many including Tufte to be one of the best graphics ever



# Figurative map of Imperial Navy troop losses in the Galactic Civil War, 0 BBY-5ABY



time: 1950 CE



Year: 1875 CE

11



# STORYTELLING

YOUR READING LIST



Data Storytelling: The Essential Data Science Skill Everyone Needs

# Data Storytelling: The Essential Data Science Skill Everyone Needs



**Brent Dykes**, CONTRIBUTOR

[FULL BIO](#) ▾

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## TWEET THIS

People hear statistics, but they feel stories

Once your business has started collecting and combining all kinds of data, the next elusive step is to extract value from it. Your data may hold tremendous amounts of *potential value*, but not an ounce of value can be created unless insights are uncovered and translated into actions or business outcomes. During a [2009 interview](#), Google’s Chief Economist Dr. Hal R. Varian stated, “The ability to take data—to be able to understand it, to process it, to extract value from it, to visualize it, to communicate it—that’s going to be a hugely important skill in the next decades.” Fast forward to 2016 and many businesses would agree with Varian’s astute assessment.

As data becomes increasingly ubiquitous, companies are

[Active on LinkedIn](#)



Beyond Kimchi And Kale: How Millennial 'Foodies' Are Challenging The Supply Chain From Farm To Table

[Active on Twitter](#)



The Future Is Now: Five Awesome Uses Of Virtual Reality In Marketing

[Active on Twitter](#)



GreenWave's Startup Program For Ocean Farmers Can Change The Planet (And The Typical Seafood Menu)



# Primary Sources for Today's Lecture

## Storytelling: The Next Step for Visualization

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Robert Kosara, Jock Mackinlay

Tableau Software

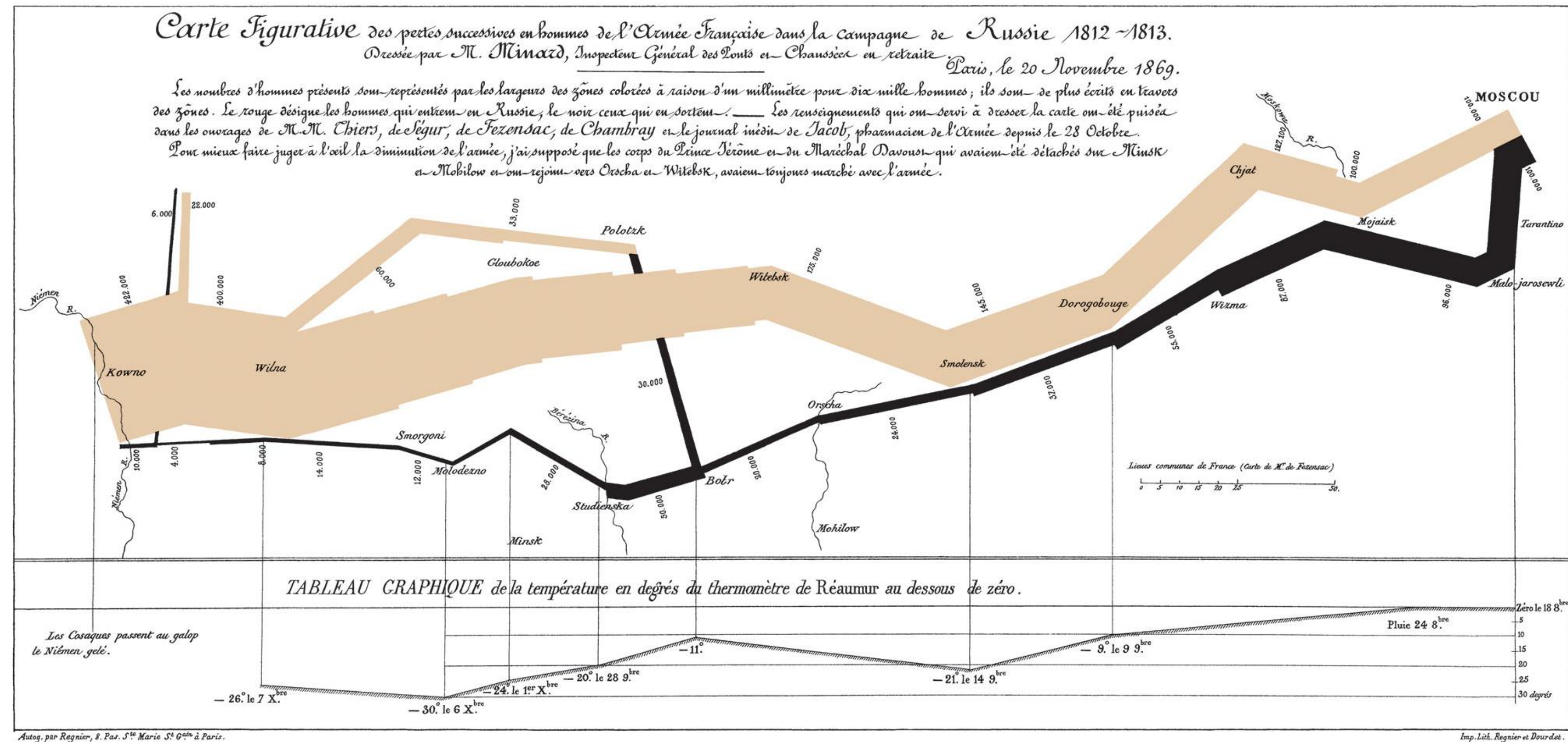
[rkosara@tableausoftware.com](mailto:rkosara@tableausoftware.com), [jmackinlay@tableausoftware.com](mailto:jmackinlay@tableausoftware.com)

## Narrative Visualization: Telling Stories with Data

Edward Segel and Jeffrey Heer

# What is a story?

- Story - an ordered sequence of steps with a clearly defined path through it.
- Common components:
  - Characters
  - Setting
  - Plot
  - Conflict
  - Resolution



# What is a story in visualization?

- Story - an ordered sequence of steps with a clearly defined path through it.
- Steps can contain text, images, visualizations, or video, or combinations.
- Order is a key element of stories (usually linear in time).

# What is a story in visualization?

## Actions

---

### Analyze

#### → Consume

##### → *Discover*



##### → *Present*



##### → *Enjoy*



#### → Produce

##### → *Annotate*



##### → *Record*



##### → *Derive*



# What is a story in visualization?

## Actions

---

➔ Analyze

➔ Consume



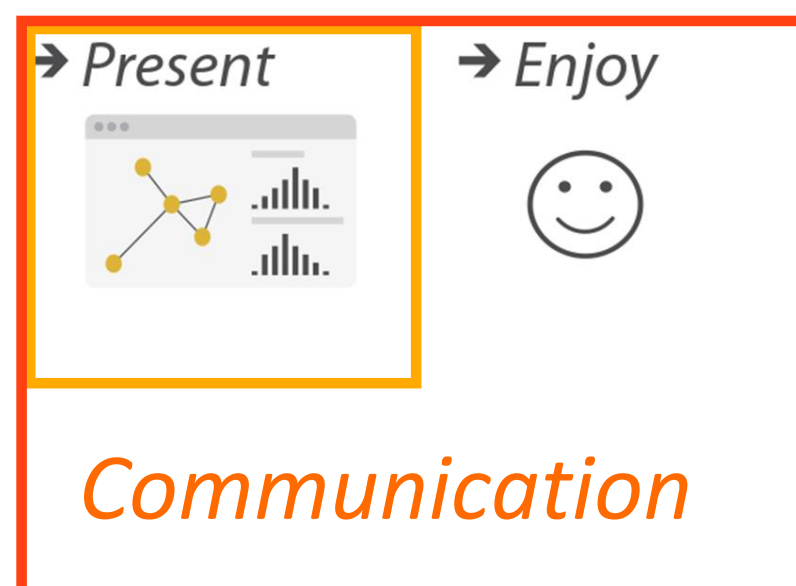
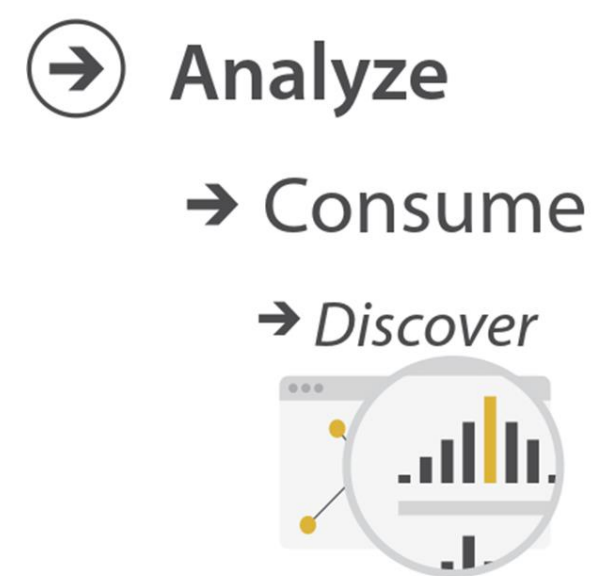
*Storytelling*

# Cholera Epidemic of 1854

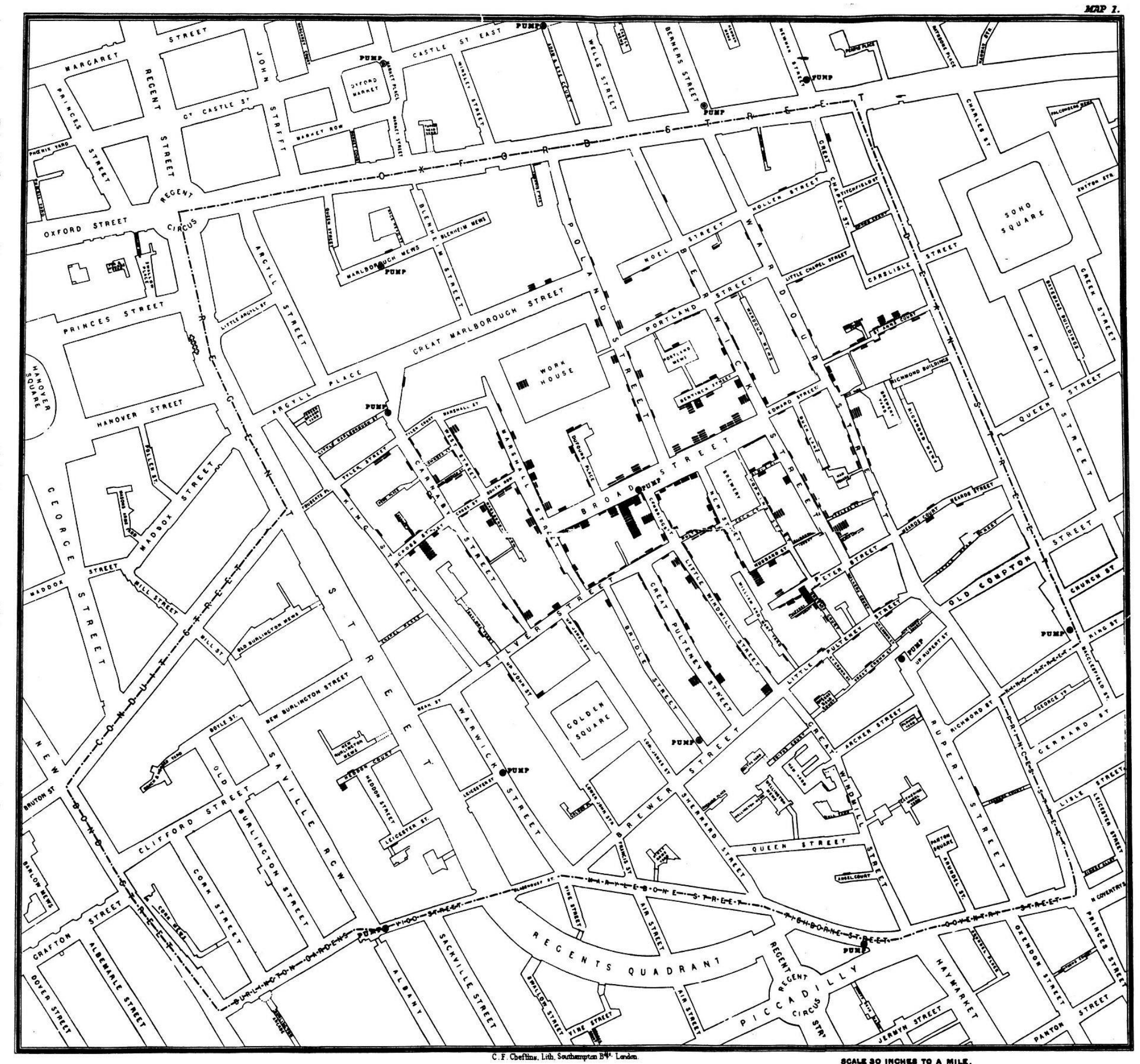
Map by John Snow (physician)

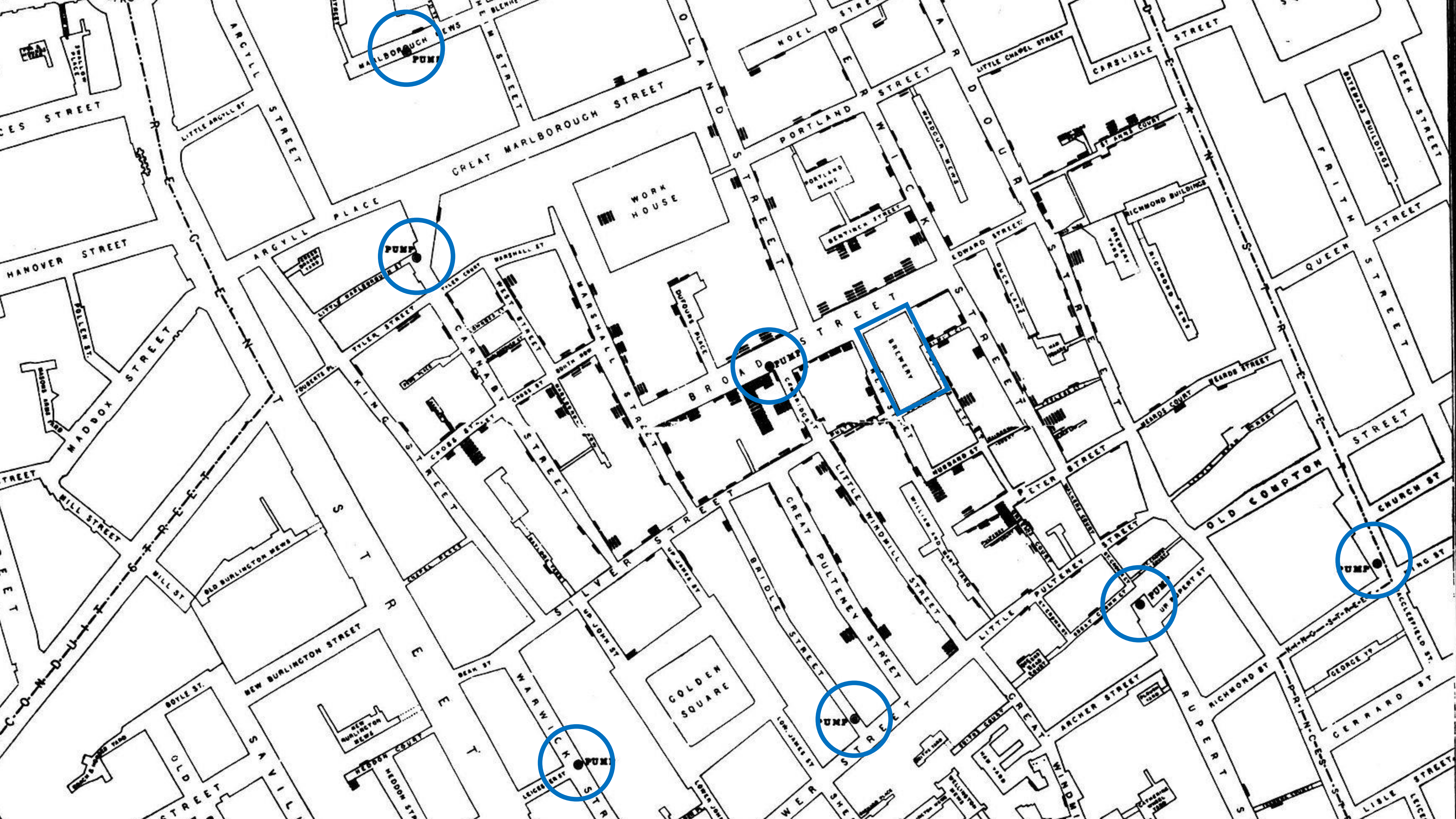
First to demonstrate cholera is a water-born illness

616 people died



Storytelling





MARLBOROUGH PUMP

PUMP

PUMP

BREWERY

PUMP

PUMP

PUMP

PUMP

WORK HOUSE

GOLDEN SQUARE

RICHMOND BUILDINGS

# Storytelling Scenarios

- Self-running presentation to a large audience: Self-explanatory; limited interaction; similar to a written story.
- Live presentation by a speaker in front of audience: Speaker can respond to audience, answer questions, pause story and interact. Additional layers/annotations, interactivity.
- Individual/small-group presentation of results: More interaction with audience; presentation leads to new questions; collect and consolidate information.

Slidedeck online

Gapminder

Business meeting





# “Narrative Storytelling”

- Visual Narrative techniques:
  - Visual Structure
  - Highlighting
  - Transition Guidance
- Narrative structures:
  - Ordering
  - Interactivity
  - Messaging

# Genres of “Narrative Data Storytelling”

Seven  
Genres

*Note: not mutually exclusive!*

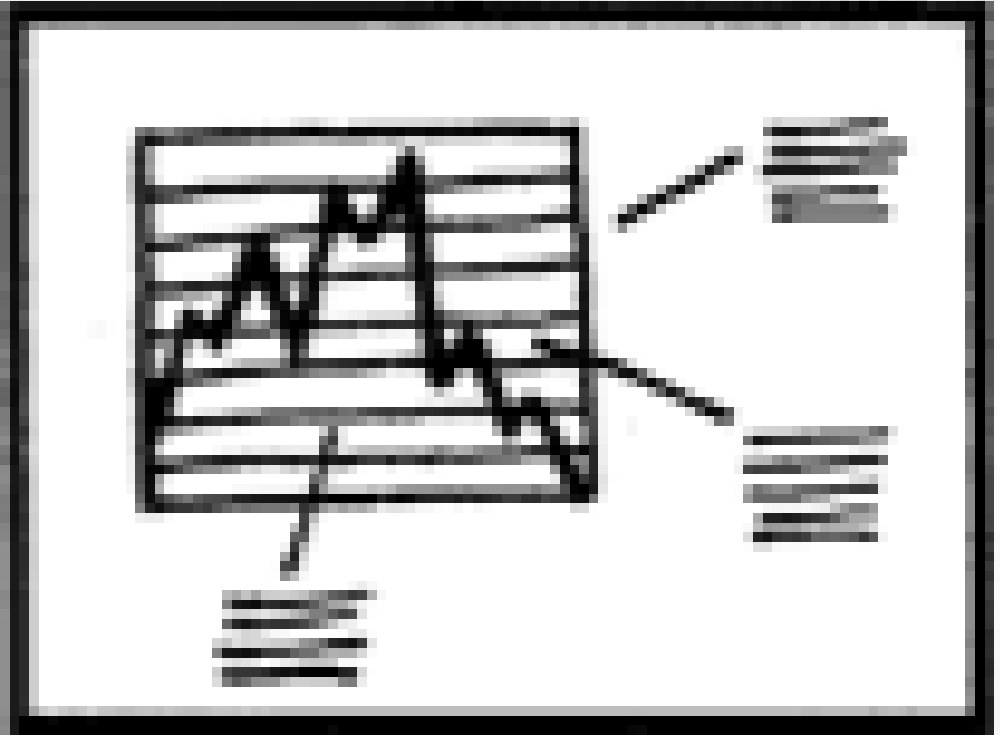
# Genres of “Narrative Data Storytelling”



Seven Genres



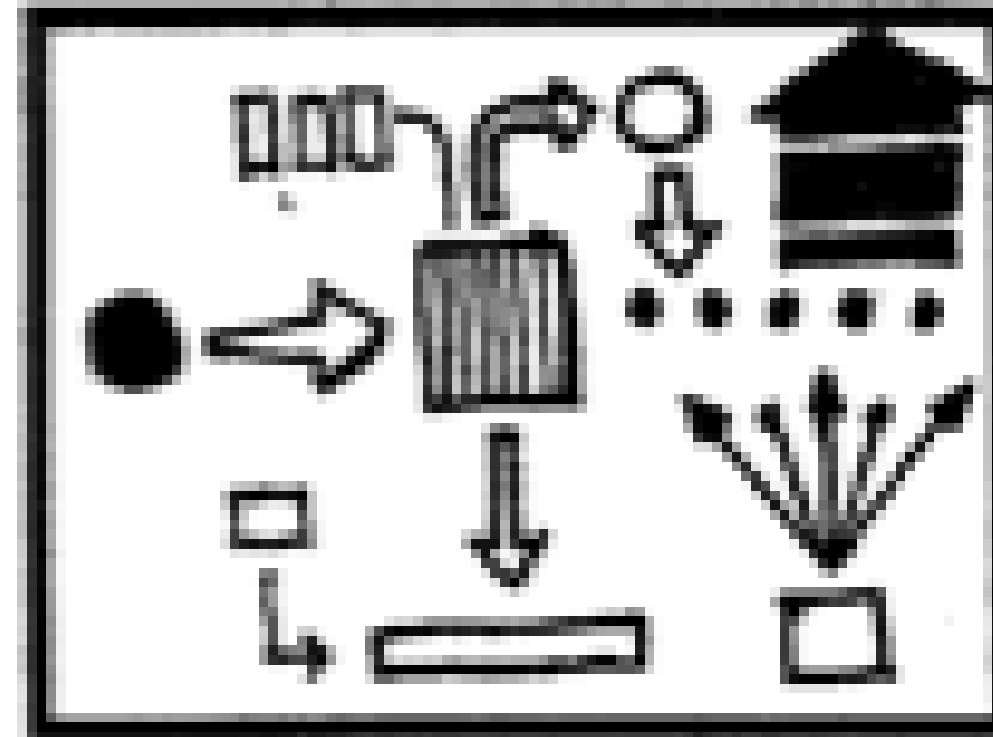
Magazine Style



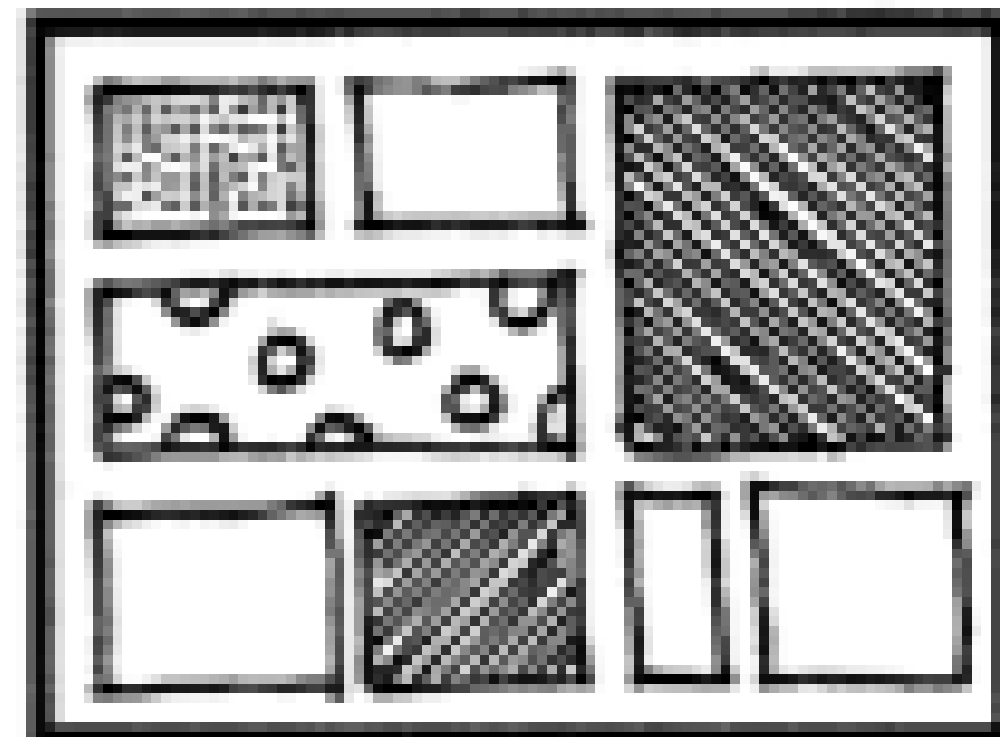
Annotated Chart



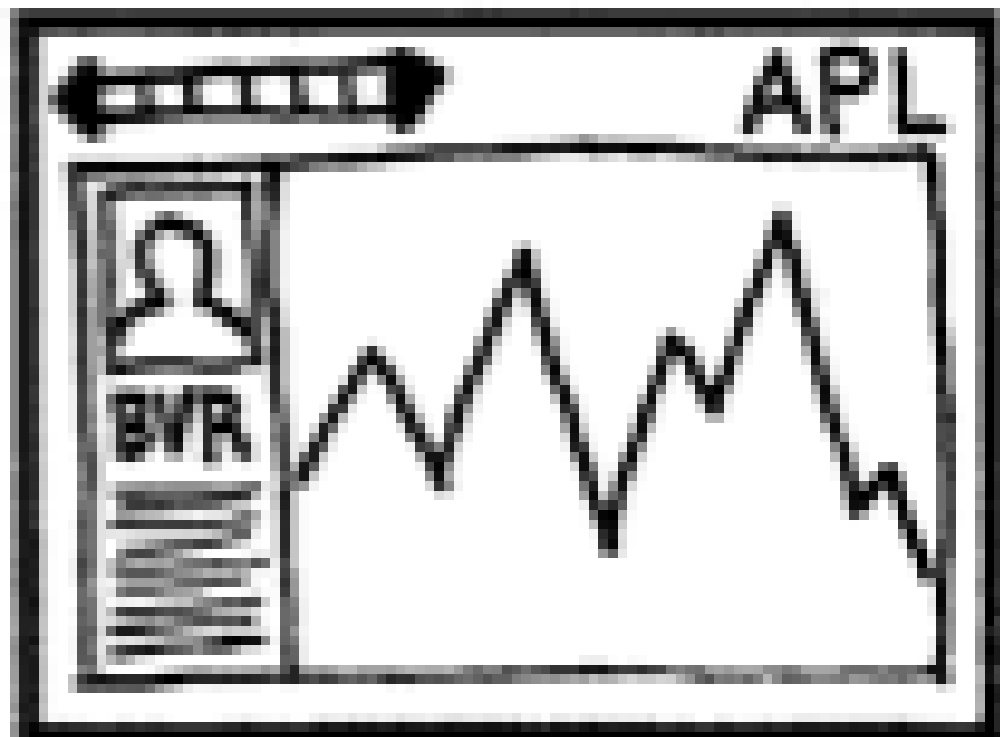
Partitioned Poster



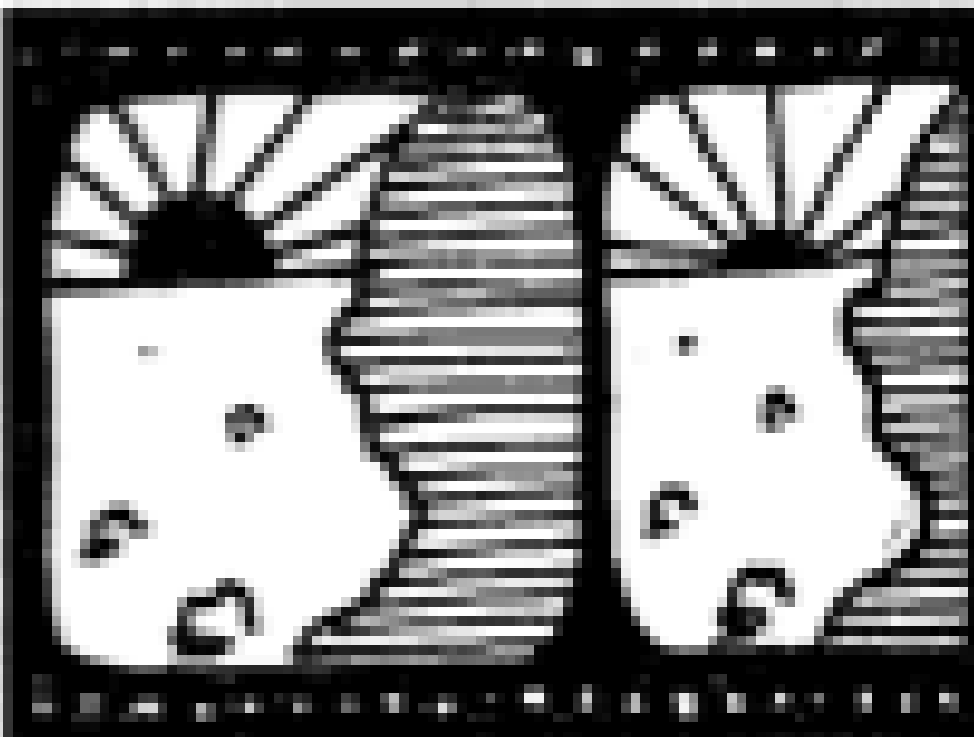
Flow Chart



Comic Strip



Slide Show

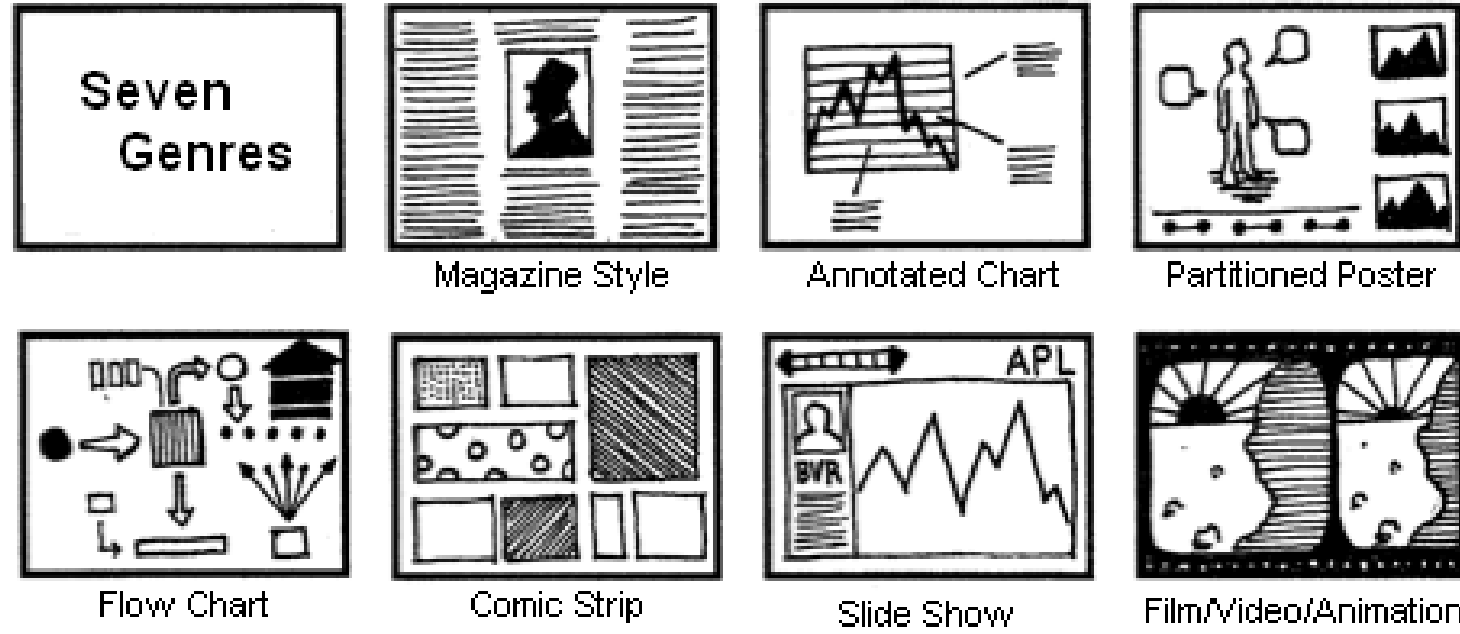


Film/Video/Animation

*Gapminder*

*Note: not mutually exclusive!*

Magazine Style	<b>Genre</b>
Annotated Graph / Map	
Partitioned Poster	
Flow Chart	
Comic Strip	
Slide Show	
Film / Video / Animation	



Establishing Shot / Splash Screen	<b>Visual Structuring</b>	<b>Visual Narrative</b>
Consistent Visual Platform		
Progress Bar / Timebar		
"Checklist" Progress Tracker	<b>Highlighting</b>	
Close-Ups		
Feature Distinction		
Character Direction		
Motion	<b>Transition Guidance</b>	
Audio		
Zooming		
Familiar Objects (but still cuts)		
Viewing Angle		
Viewer (Camera) Motion		
Continuity Editing		
Object Continuity		
Animated Transitions		

Random Access	<b>Ordering</b>	<b>Narrative Structure</b>
User Directed Path		
Linear		
Hover Highlighting / Details	<b>Interactivity</b>	
Filtering / Selection / Search		
Navigation Buttons		
Very Limited Interactivity		
Explicit Instruction	<b>Messaging</b>	
Tacit Tutorial		
Stimulating Default Views		
Captions / Headlines		
Annotations		
Accompanying Article		
Multi-Messaging		
Comment Repitition		
Introductory Text		
Summary / Synthesis		

# Author versus Reader-Driven

## Author-Driven

Linear ordering of scenes

Heavy messaging

No interactivity

## Reader-Driven

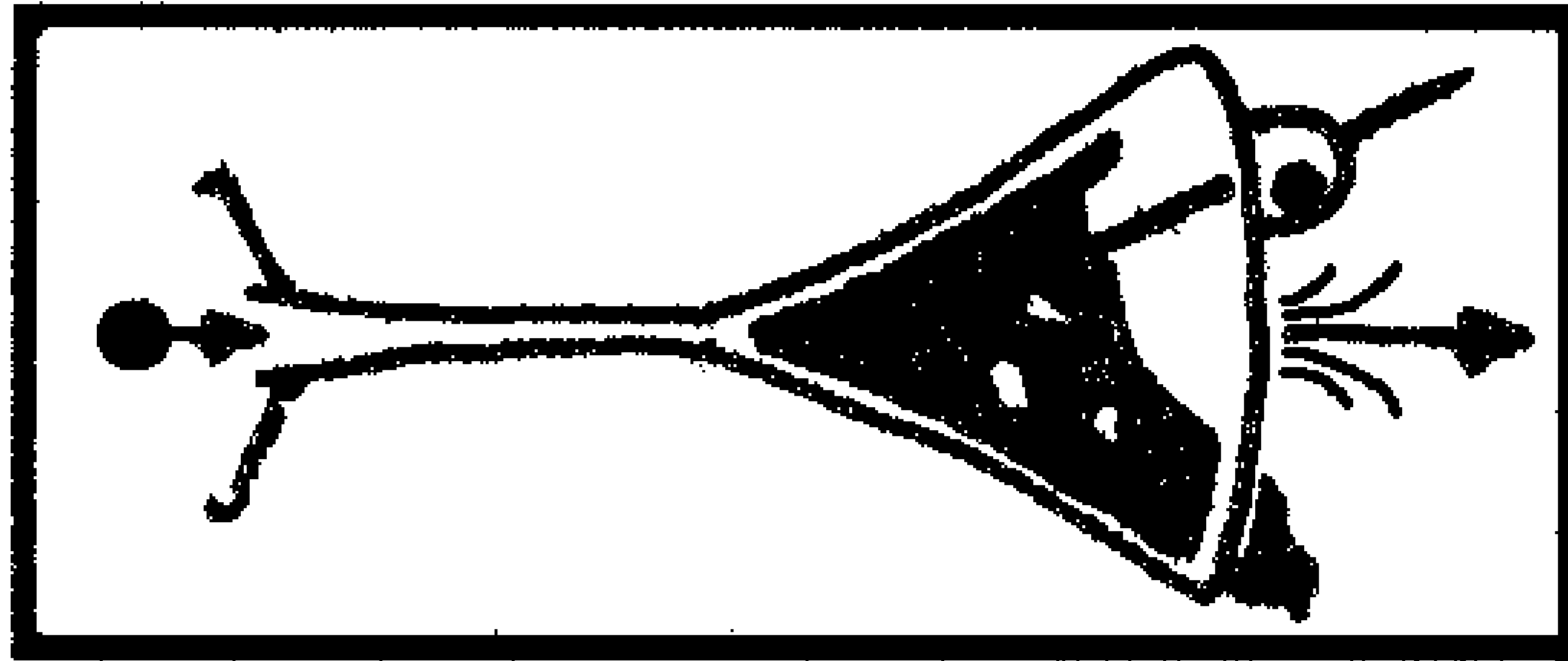
No prescribed ordering

No messaging

Free interactivity

# Author versus Reader-Driven

“Martini Glass Structure”



Starts as Author-driven

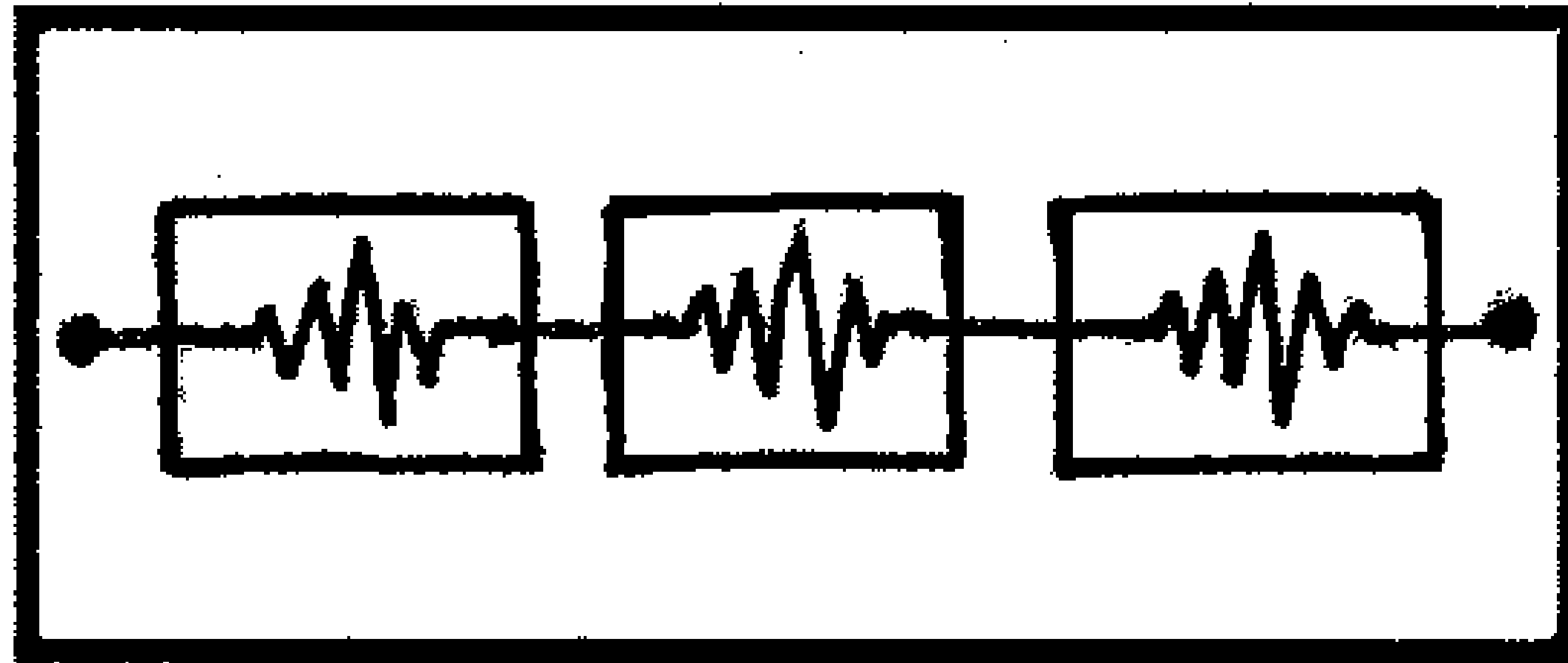
Leads to Reader-driven exploration

# Author versus Reader-Driven

Interactive Slideshow

Overall Author-driven

e.g., Gapminder



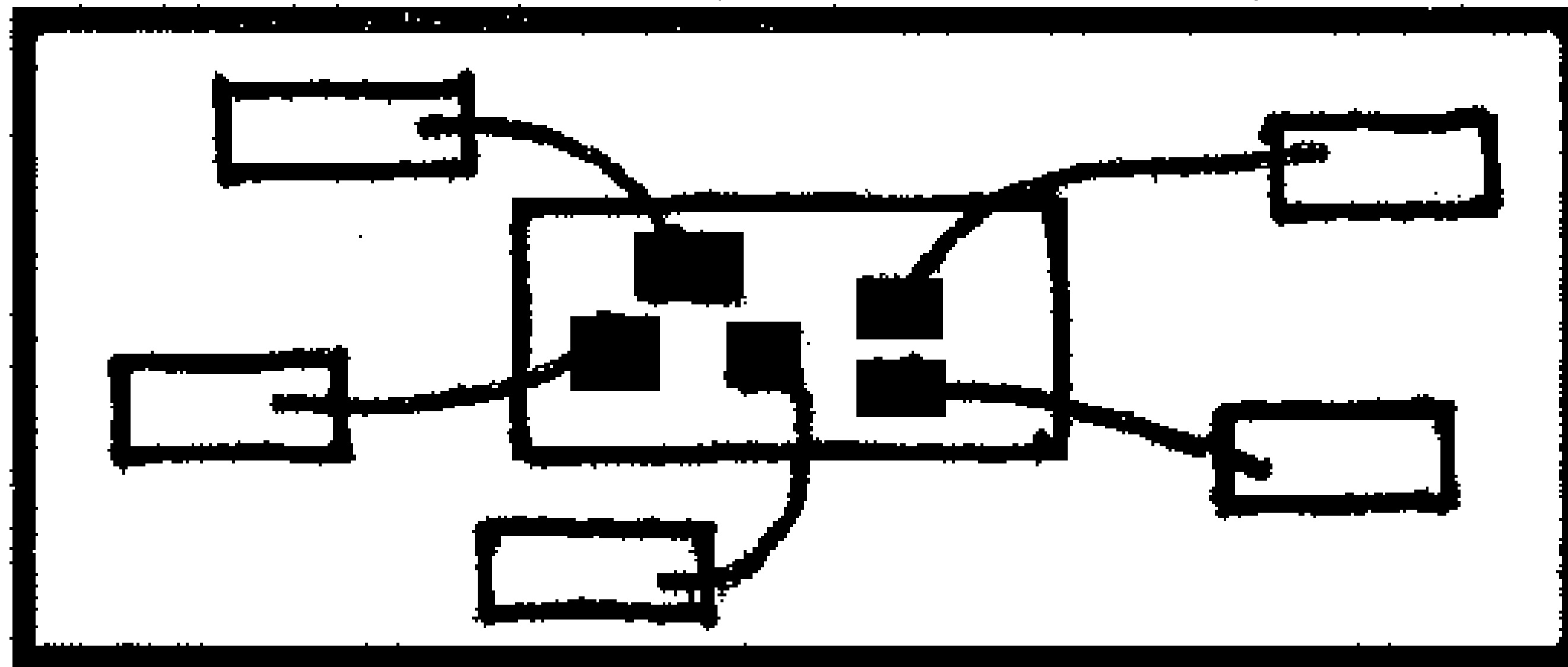
Allows for Reader-driven exploration on each slide



# Author versus Reader-Driven

Drill-down Story

Overall Reader-driven

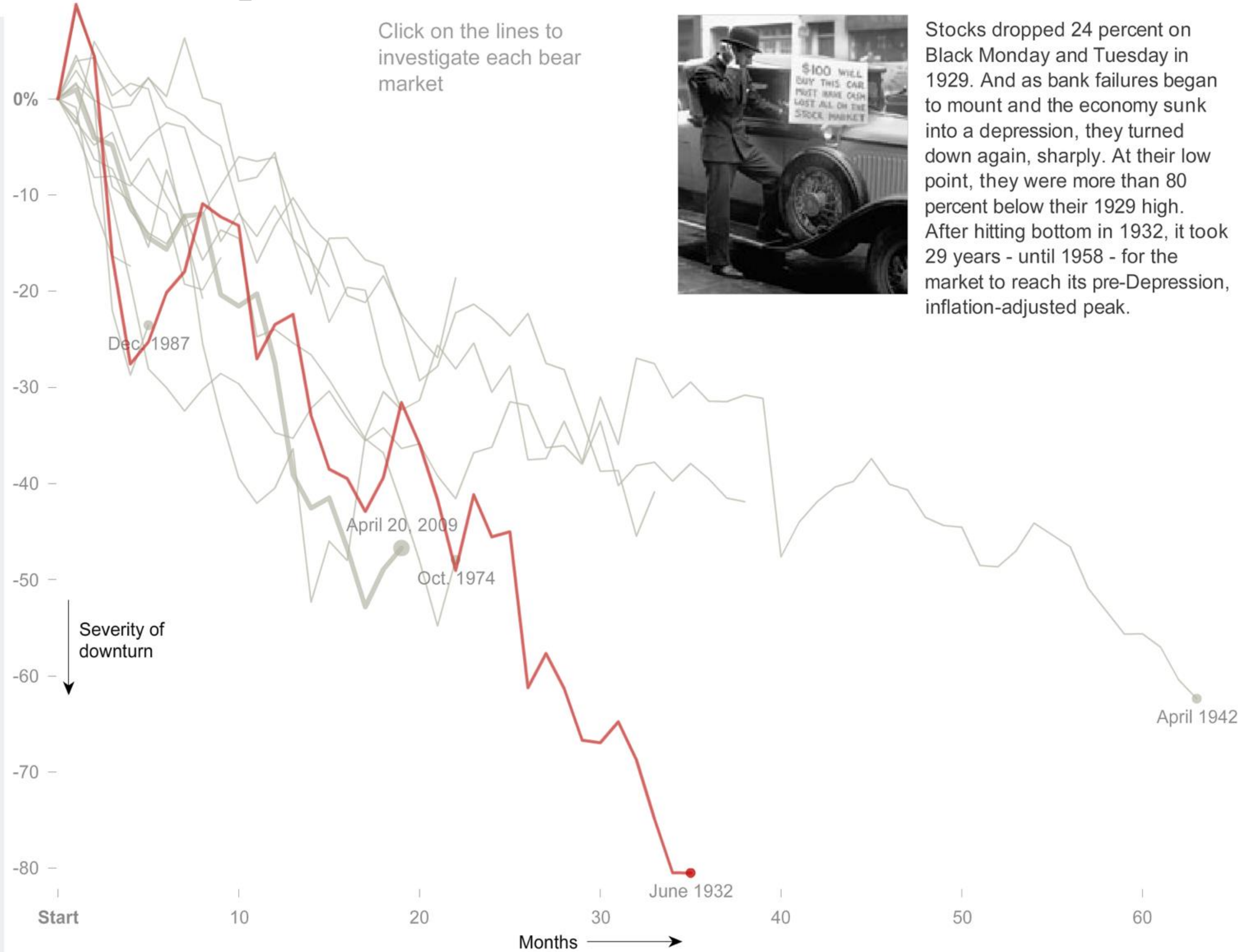
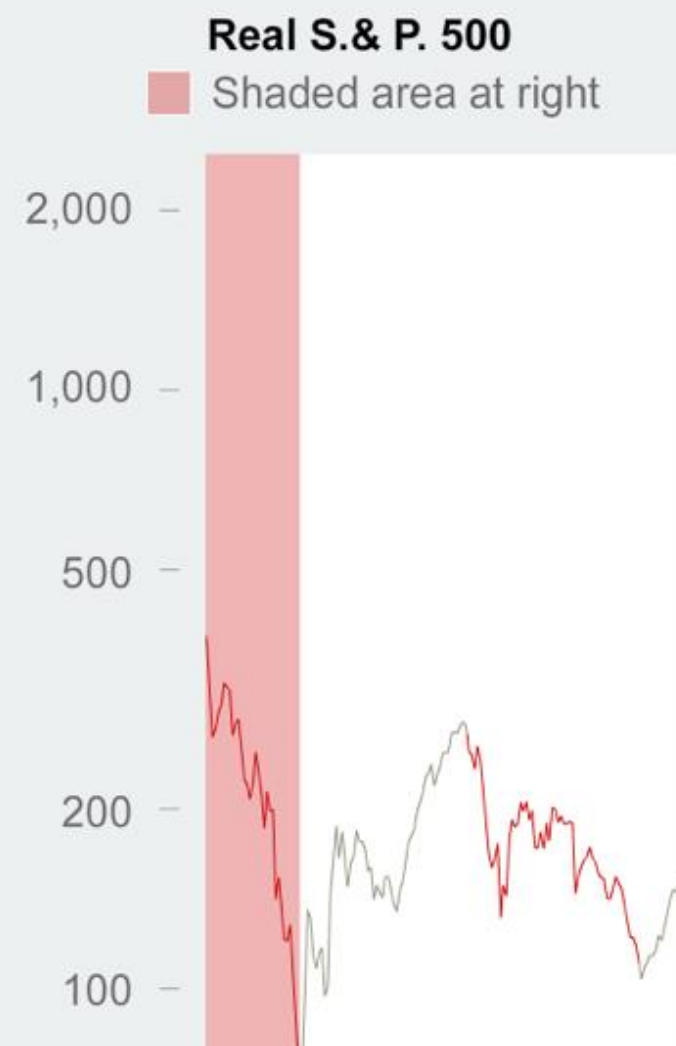


Requires lots of advanced Authoring to create narrative paths

# How This Bear Market Compares

The current bear market is already among the worst in history. Here is how it lines up – in losses and length – with those of the last 80 years.

**The S.& P. 500**, adjusted for inflation, shown monthly during bear markets.

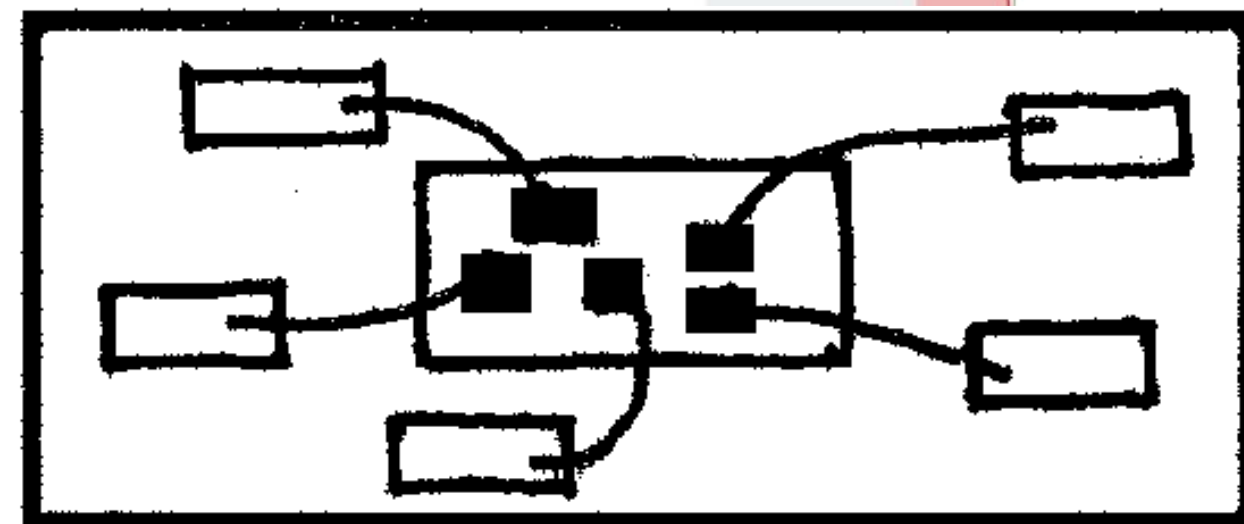


Stocks dropped 24 percent on Black Monday and Tuesday in 1929. And as bank failures began to mount and the economy sunk into a depression, they turned down again, sharply. At their low point, they were more than 80 percent below their 1929 high. After hitting bottom in 1932, it took 29 years - until 1958 - for the market to reach its pre-Depression, inflation-adjusted peak.



's; Robert J. Shiller

Amanda Cox, Xaquín G.V. and David Leonhardt



Hall of Fame or Hall of  
Shame

# The Fastest Pitchers in Baseball

By JOE WARD and AMANDA COX OCT. 27, 2015 | [RELATED ARTICLE](#)



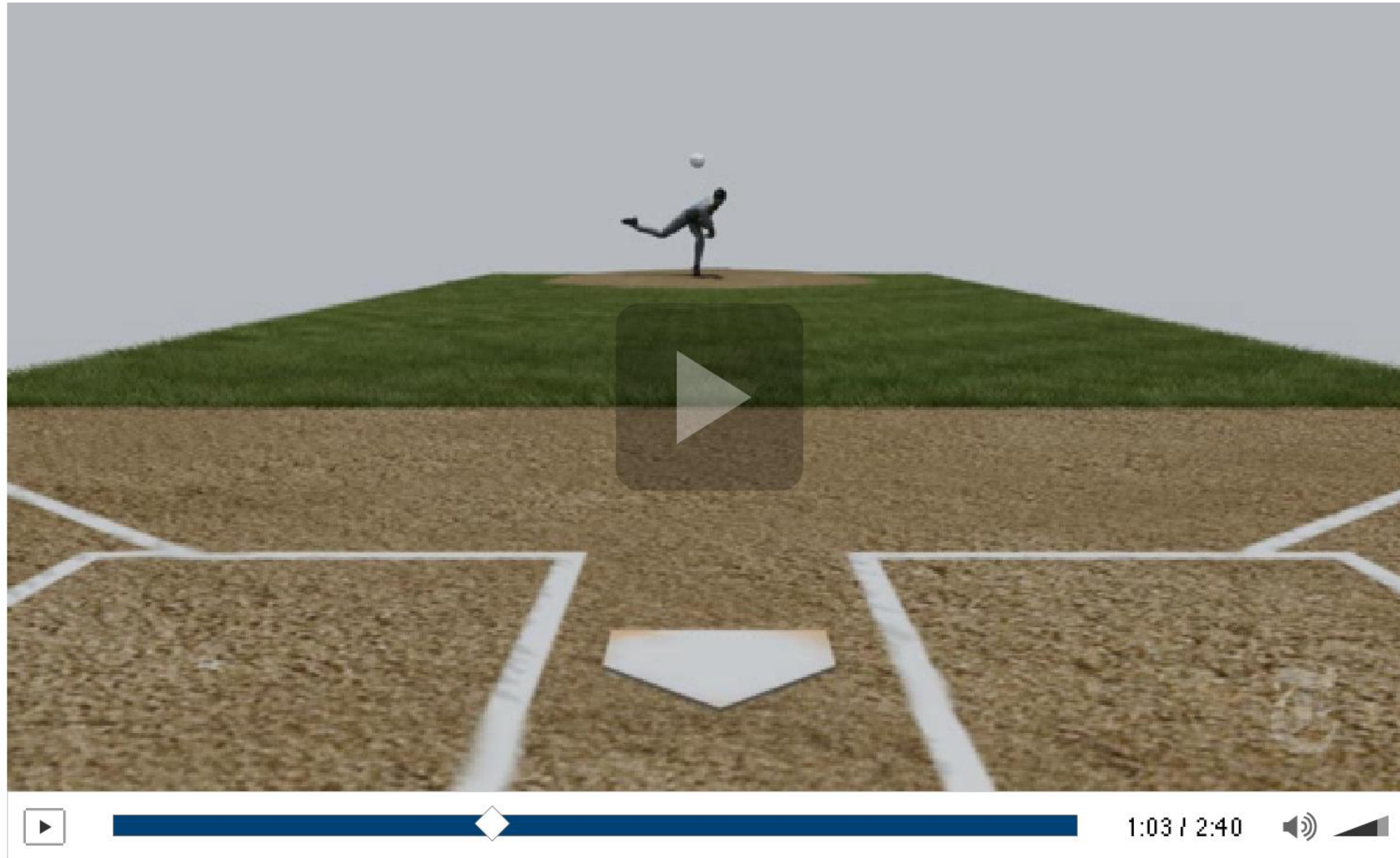
Two feet.

That is the difference between the average major league fastball and the fastballs thrown by the Mets' postseason starters. For every mile an hour faster, the ball is about six inches farther on its path when it crosses the plate.

Published: June 29, 2010

# How Mariano Rivera Dominates Hitters

The closer confounded hitters with mostly one pitch: his signature cutter. [Related Article »](#)



By GRAHAM ROBERTS, SHAN CARTER and JOE WARD

Sources: Major League Baseball; New York University Movement Lab; Complete Game Consulting

[NY Times \(Video\)](#)

[NY Times \(Flash\)](#)

Published: November 6, 2009

# The Jobless Rate for People Like You

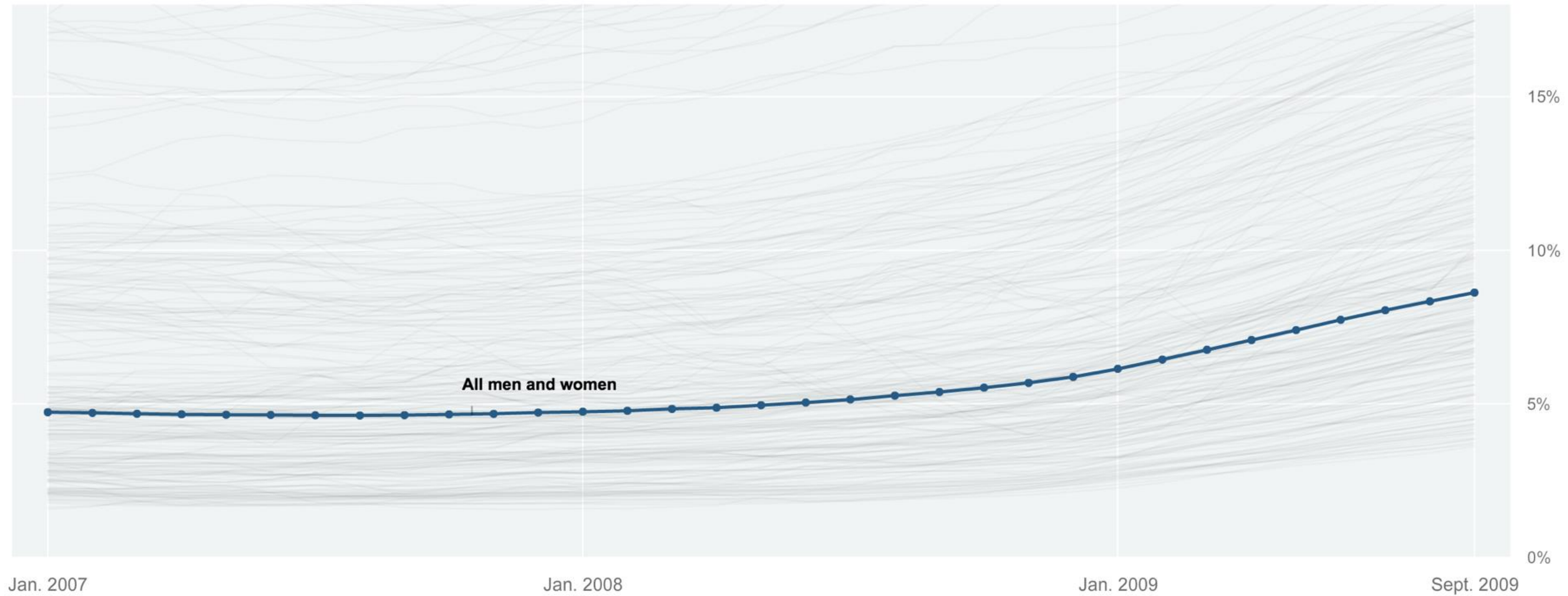
Not all groups have felt the recession equally.

<b>All races</b> >	<b>Men and Women</b> >	<b>All ages</b> >	<b>All education levels</b> >
White	Men	Ages 15 to 24	Not a high school grad...
Black	Women	Ages 25 to 44	High school graduate
Hispanic		Age 45 and older	College graduate
All other races			

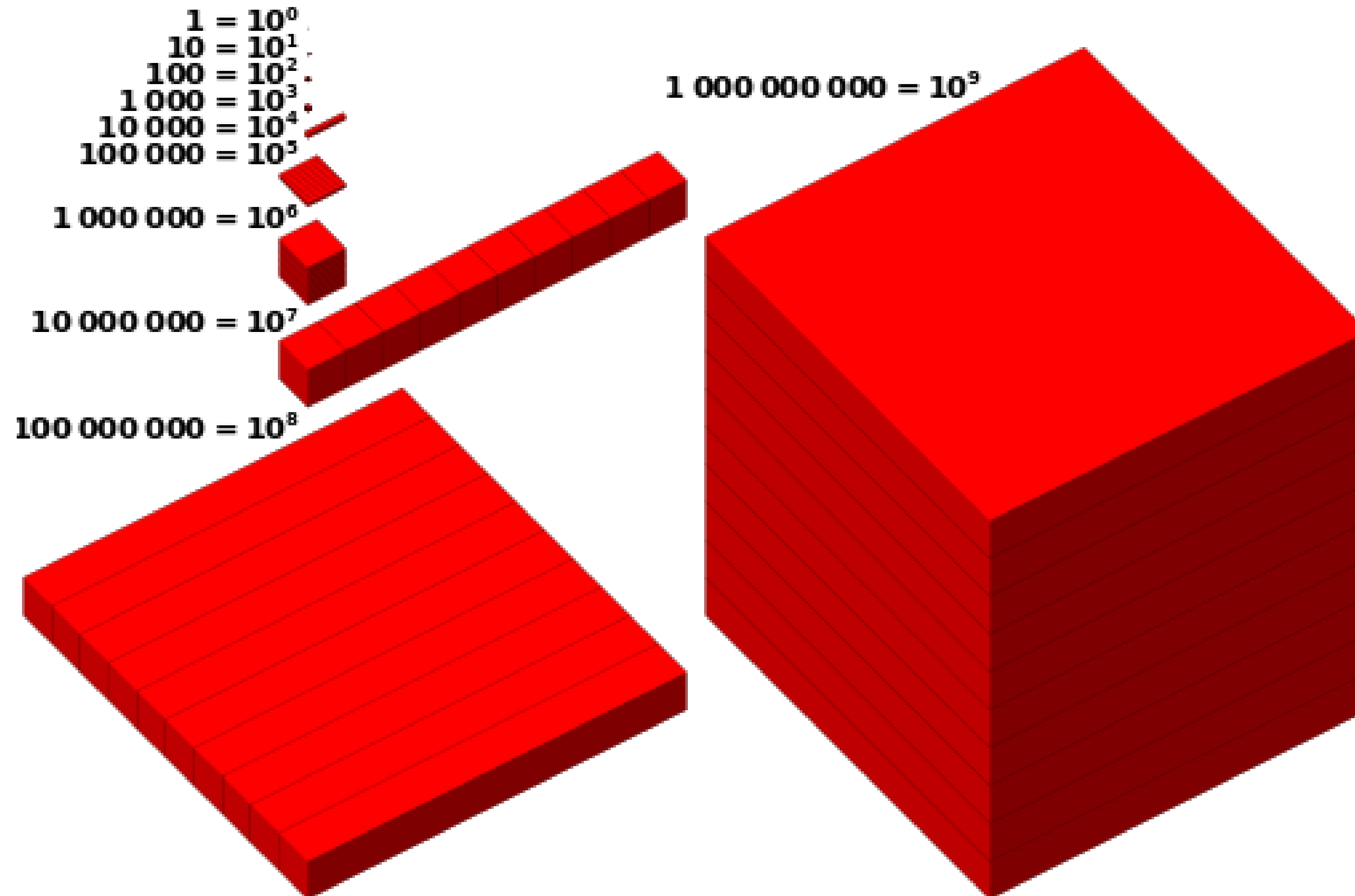
UNEMPLOYMENT RATE,  
12 MONTH AVG. ENDING SEPT. '09

# 8.6%

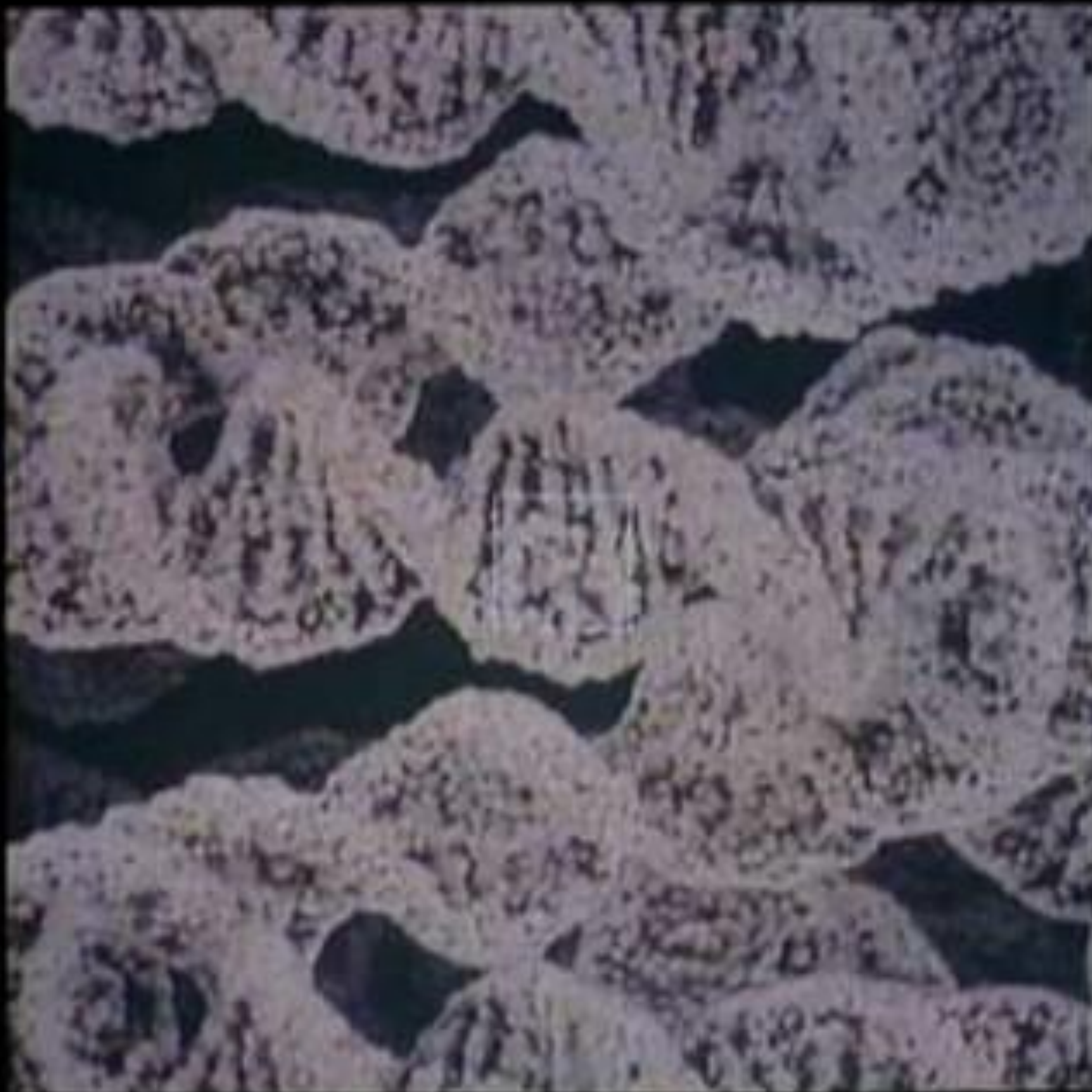
For all men and women



# Powers of Ten



100 ångstroms



$10^{-8}$   
meters



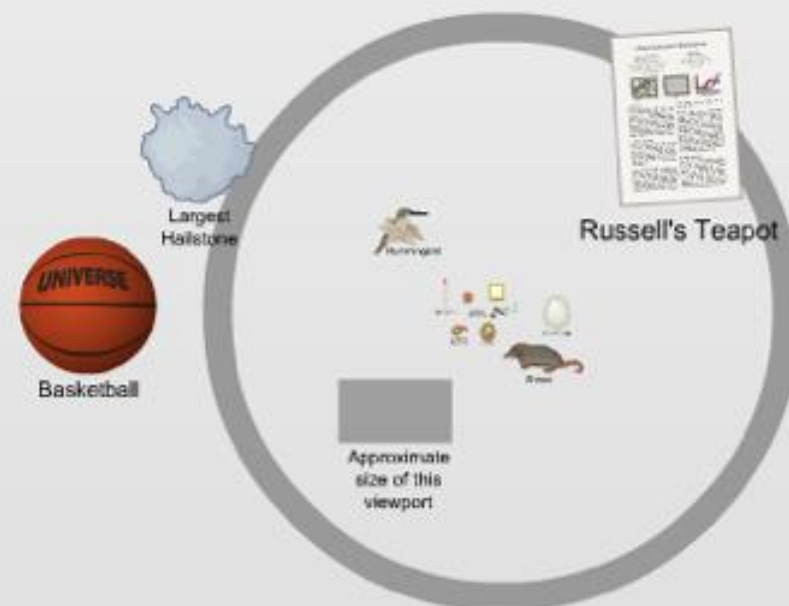
# Giant Earthworm



Meter (m)  
 $10^0$  meters



Human



1 m



Inch Ruler



Dodo Bird



Rafflesia



Beach ball



$10^{0.0}$