

# Charles Joseph Minard (1781-1870)



# Biography

- Born in Dijon, France
- Son of a court clerk
- Showed early promise—learned to read & write at 4
- Studied civil engineering at École nationale des ponts et chaussées
- Built dams, canals and bridge projects across Europe



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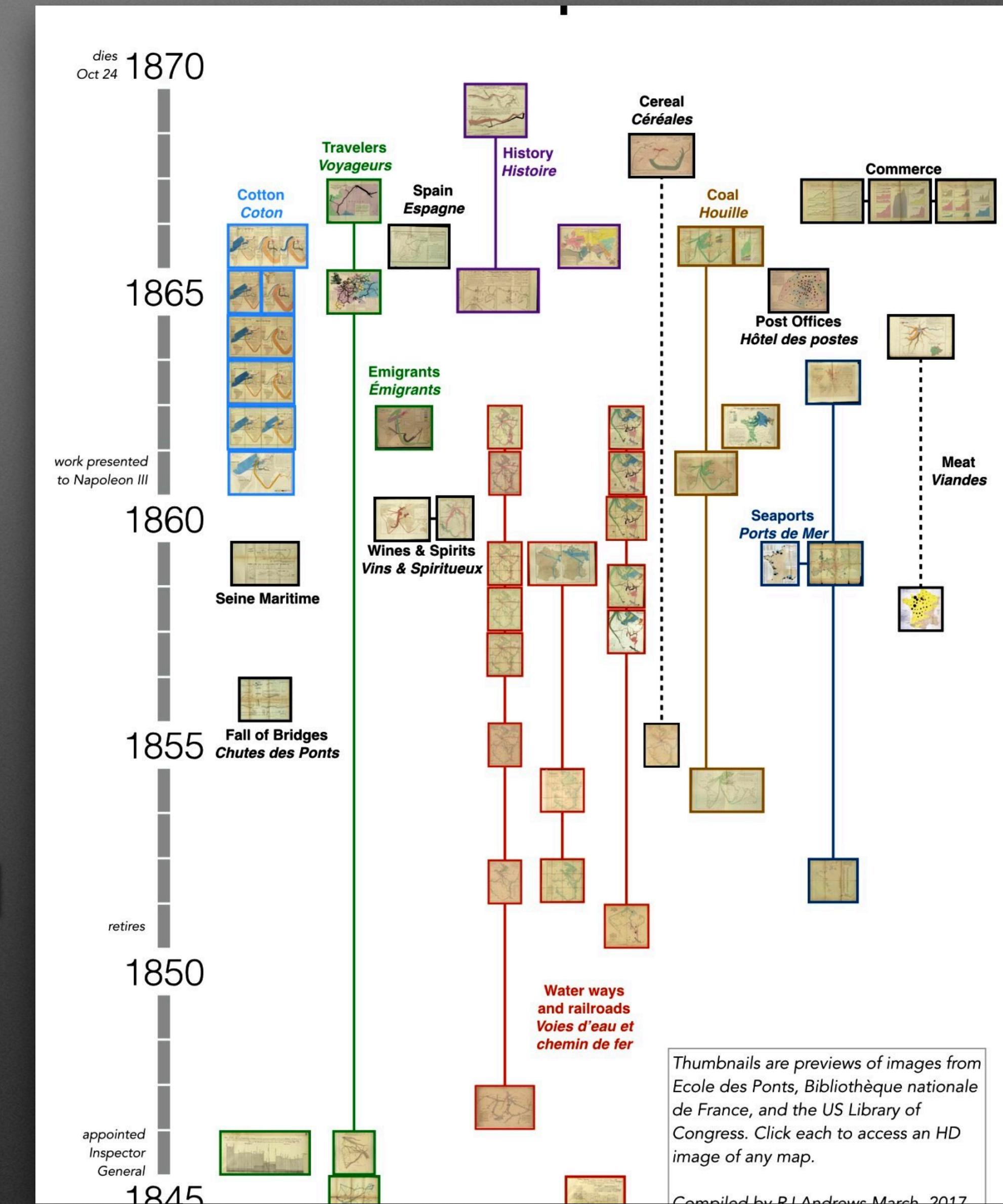
# Biography 2

- Experiences bloody Siege of Antwerp in 1814
- Named superintendent of the École nationale des ponts et chaussées in 1830
- Begins work on statistical representations of passenger traffic and goods transport while teaching at the École
- Inspector of the Corps des ponts 1836-1851
- After forced retirement at 70, begins second career in research and data visualization
- Dies after fleeing Prussian march on Paris



# Minard visual catalog

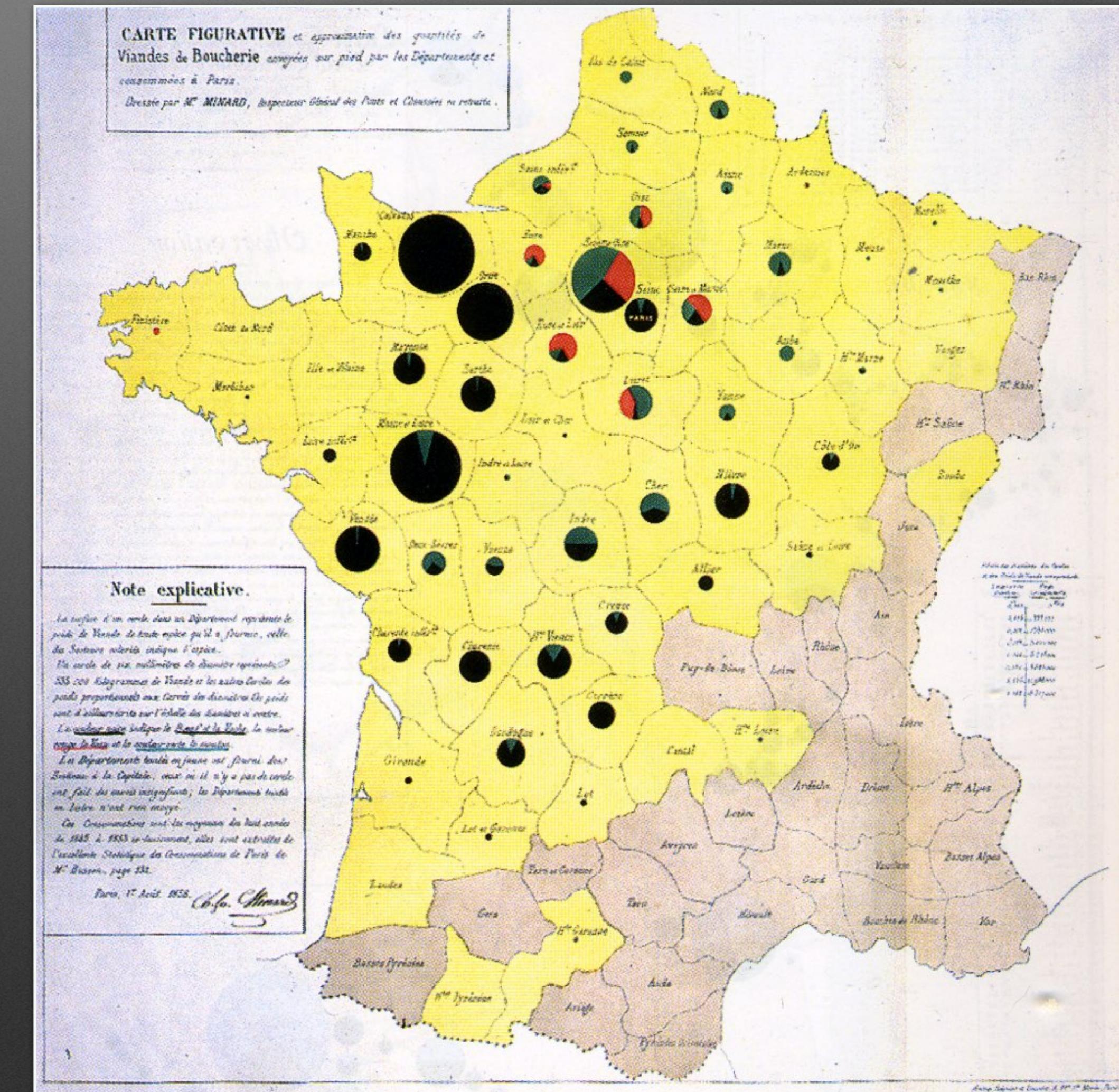
- Minard's interests included commerce, transportation technology, migration patterns, history and more
- Minard frequently returned to themes of interest, creating updated visualizations with new data



# “Speak to they eyes”

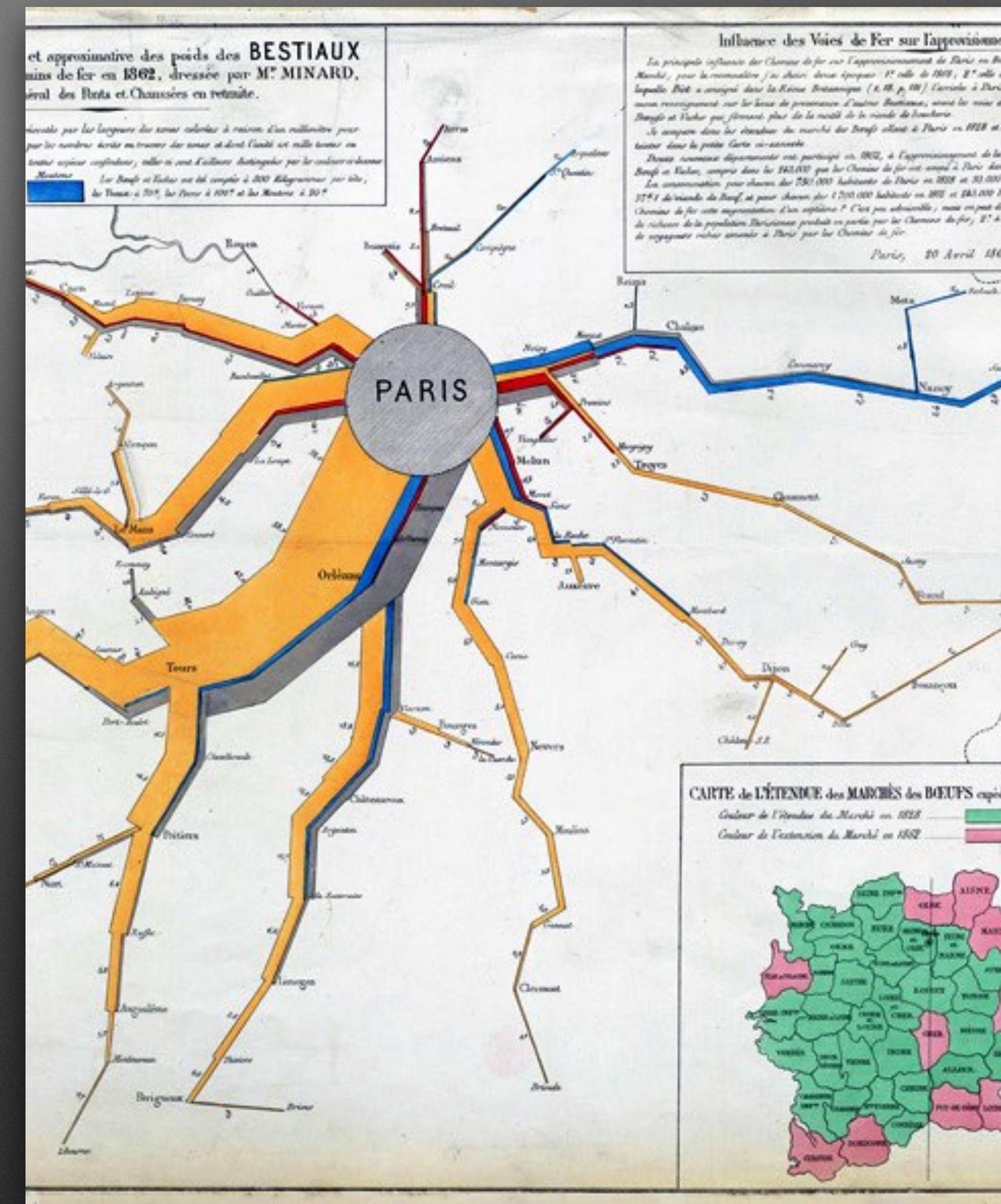
(Friendly, Michael (2002). Visions and Re-Visions of Charles Joseph Minard)

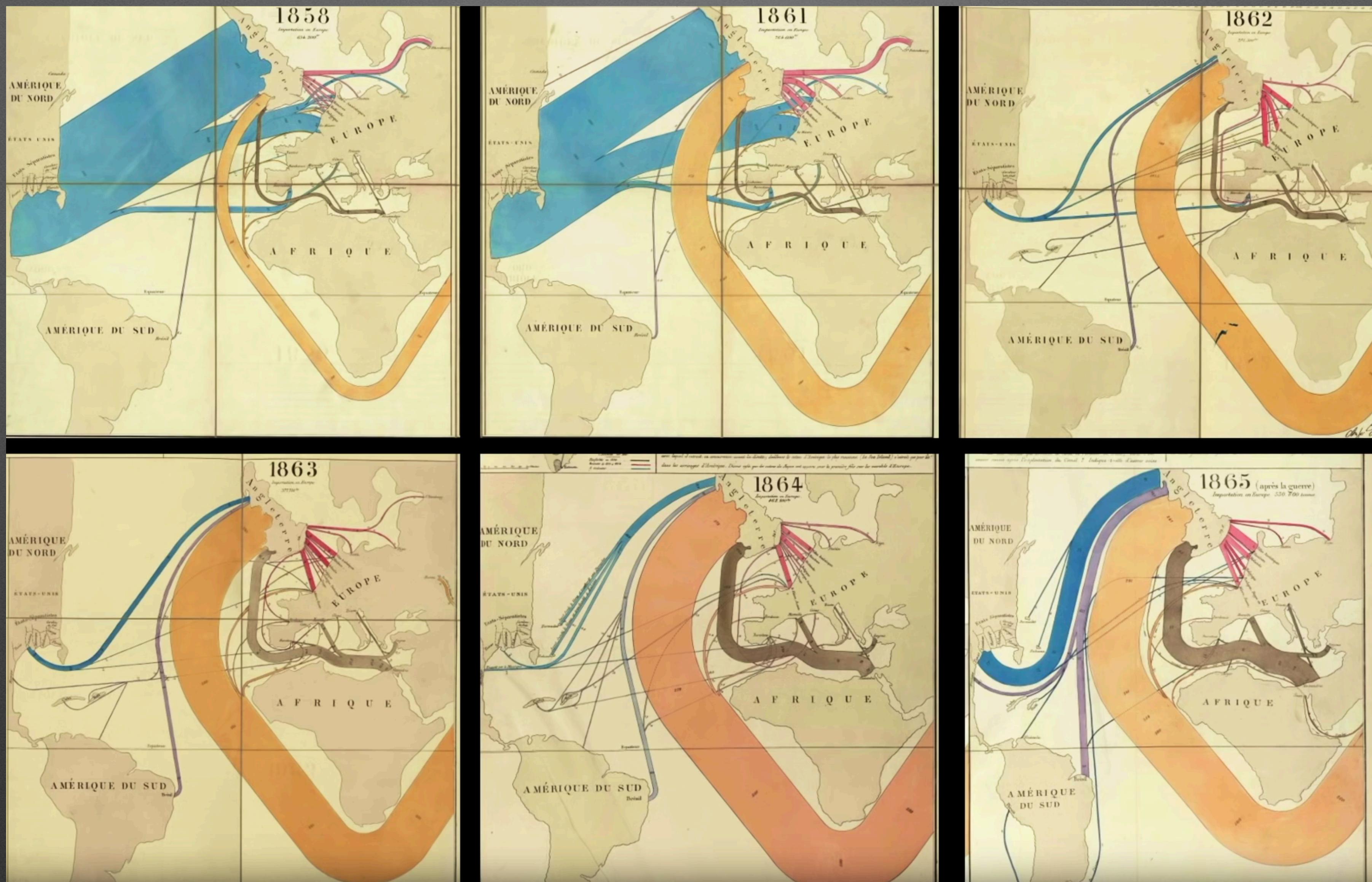
- One of Minard's first pie-chart maps shows meats supplied to Paris markets in 1858
- Black stands for beef, red for veal, and green for mutton
- Circle size stands for overall contribution
- Provinces that didn't contribute are colored tan



# Meat exported to Paris in 1862

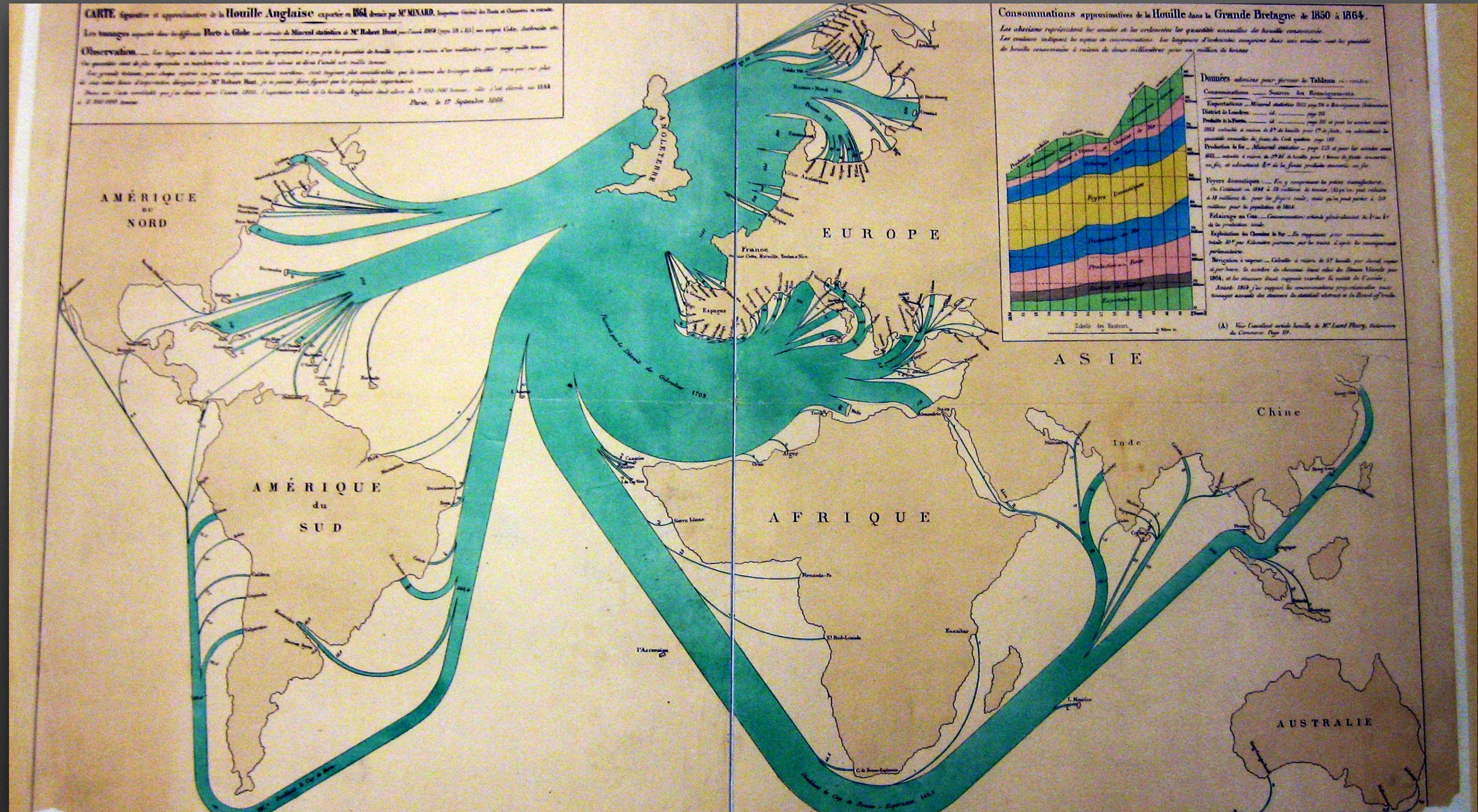
- Colors represent different types of meat (yellow = beef, grey = pork etc.)
  - Map of France is simplified to accommodate data, a common technique of Minard's
  - Width of bands visualize meat movement to Paris from various regions of the country (1mm band = 1000 tons of meat)
  - Insert map shows expansion of provinces exporting since the dawn of railways. Green = 1828





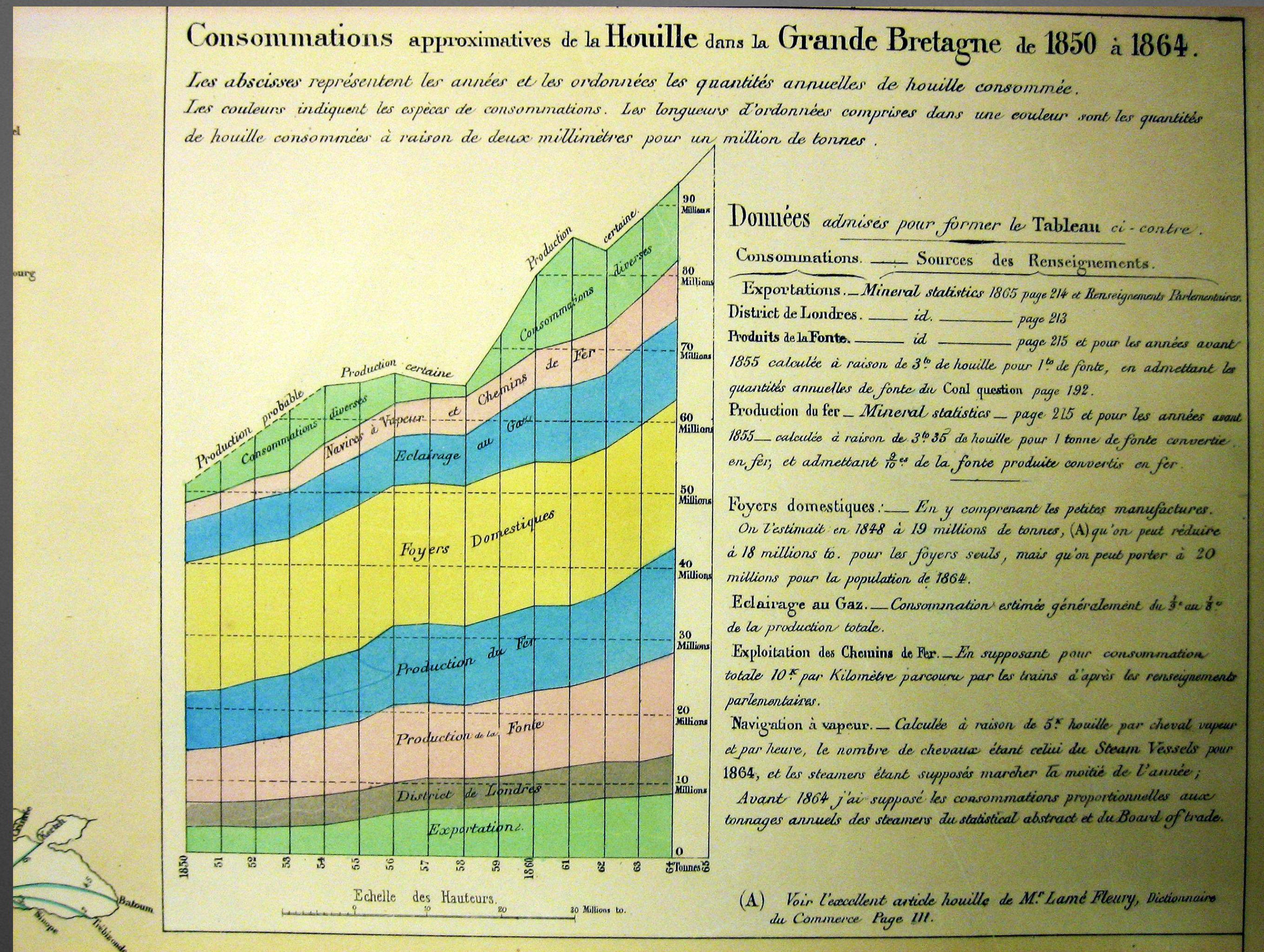
## Changes in the cotton trade 1858-1865

Showing a dramatic decline in US exports and rise in Indian exports due to the civil war



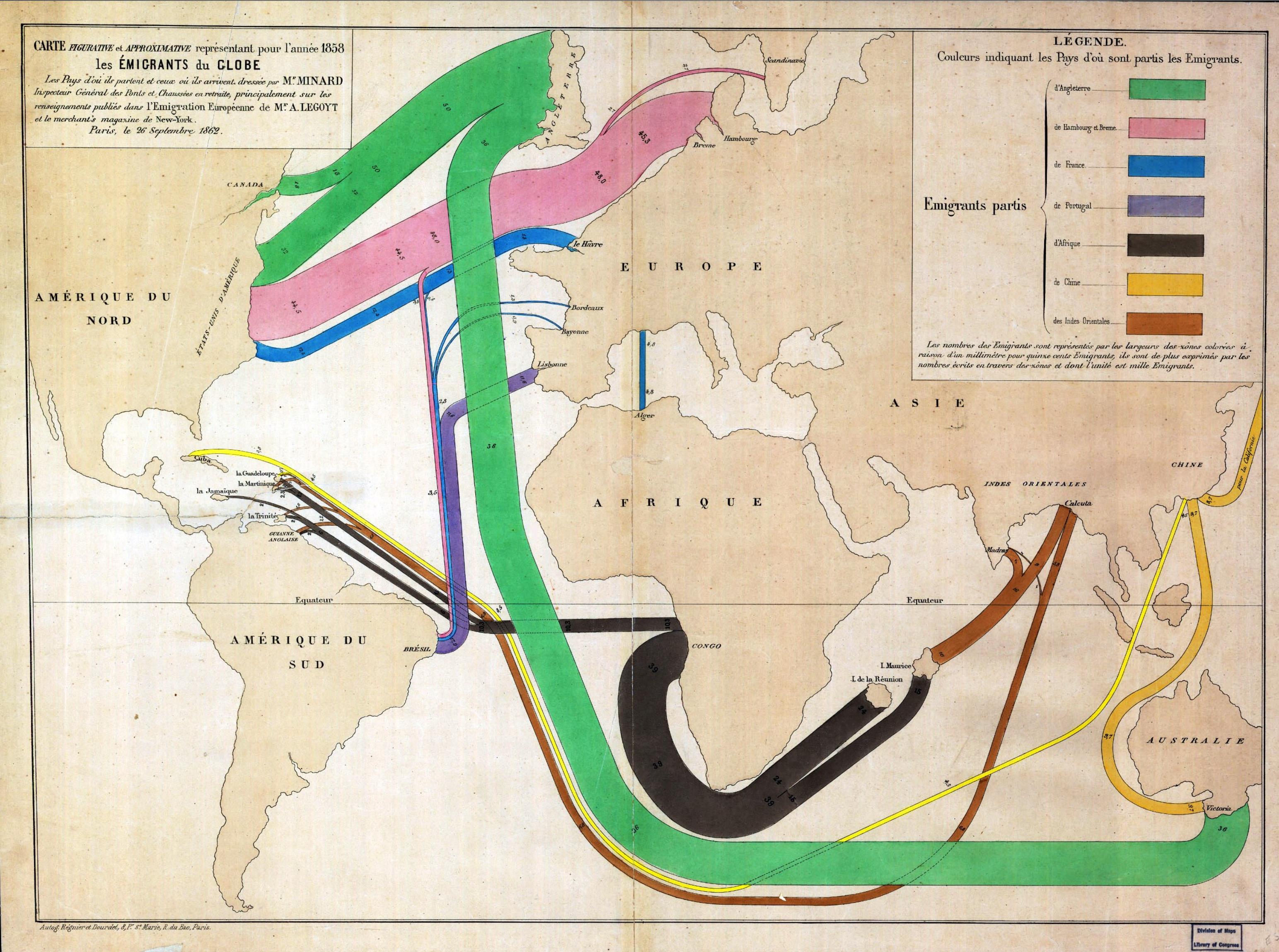
# British coal exports 1864

1 millimeter of thickness represents 20,000 tons of coal



# British coal production 1850-64

Output rose from 50 to nearly 95 million tons. Only 10% was for export. Major uses of coal: the production of iron ("Fer") and cast iron ("Fonte"), gas lighting ("Eclairage au gas"), steam engines in ships and trains ("Navires a Vapeur et Chemins de Fer"), and domestic fireplaces ("Foyers Domestiques"). A large amount of production was specifically for use in London.

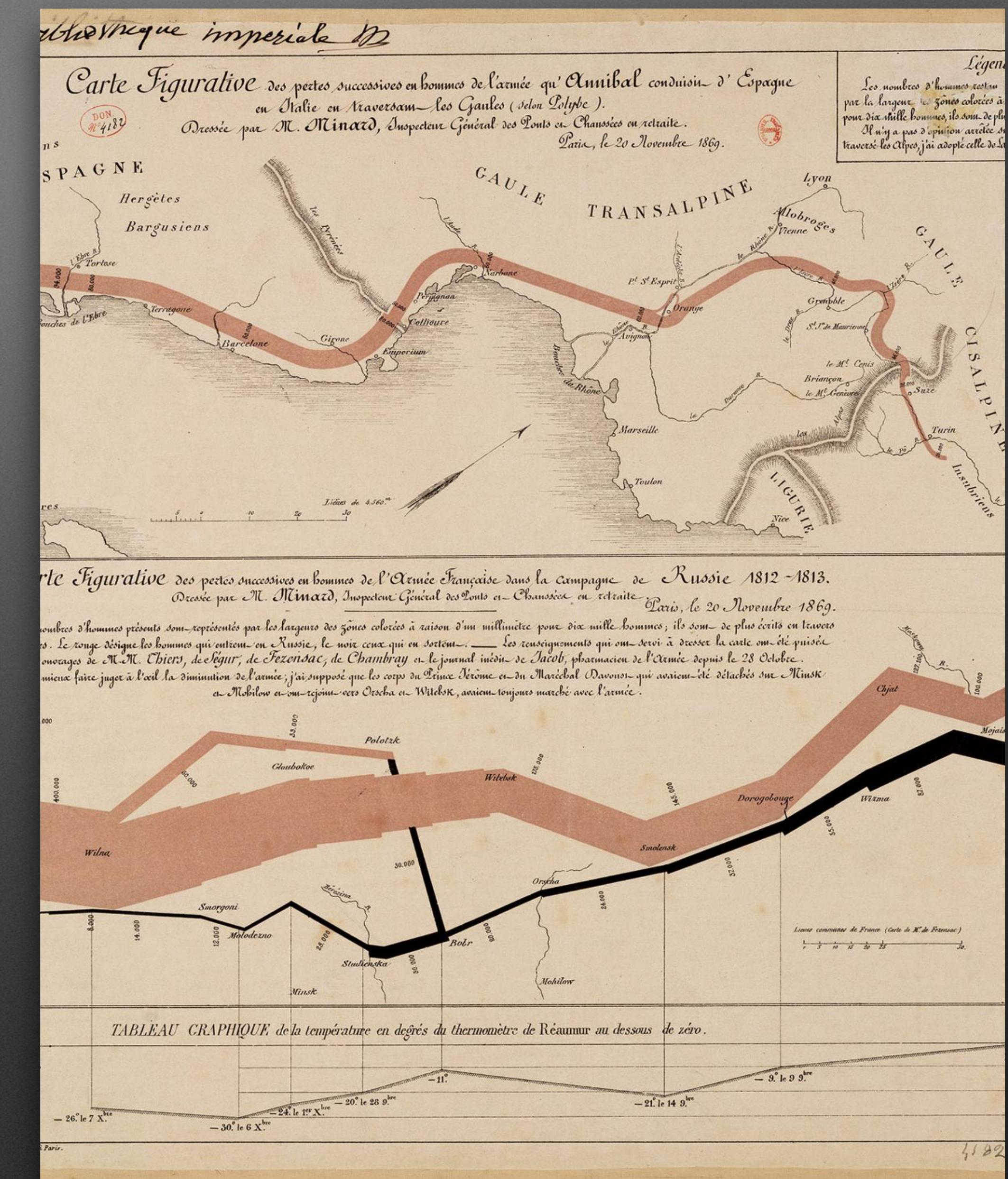


# Global immigration 1858

Numbers and destinations of emigrants from Europe, Africa, China, and South Asia. One millimeter equals 1,500 people.

# Napoleon's March, 1812

- Called by Tufte ‘Probably the best statistical graphic ever drawn,’ the lower map shows catastrophic losses suffered by Napoleon’s army in the Russian campaign of 1812. 1mm=10,000 men
  - The graphic integrates several variables: force size, location, direction, temperature and time
  - This type of band graph was later called a Sankey diagram, though Sankey first used it only 30 years later
  - The less-well known above visualization maps Carthaginian commander Hannibal’s 218 BC tragic crossing of the Pyrenees and Alps



- French public works ministers are painted with Minard creations in the background



Charles Brun.  
*Portrait De M. Rouher.*  
1861. Oil on canvas.  
Musée Mandet, Riom, France.



# Discussion Topics

- What did Minard gain by sacrificing geographic accuracy?
- How does Minard make best use of available space?
- How do Minard's textual additions enhance his designs?
- Why did Tufte think so highly of Minard?
- How can we analyze Minard's work from the viewpoints of Bertin-ian variables and basic color theory?

# Sources & Explorations

- Edward Tufte: *The Visual Display of Quantitative Information*
- RJ Andrews: [infowetrust.com](#): [Seeking Minard](#), [Finding Minard](#)
- Betsy Mason, National Geographic: [The Underappreciated Man Behind the “Best Graphic Ever Produced”](#)
- Cartographia: [Minard’s Map of British Coal Exports](#), [Minard on Immigration](#)
- Sandra Rendgen: Research: “The Forgotten Maps of Minard” (Paris)
- Dr. James Grime: [The Greatest Ever Infographic - Numberphile](#) (video)
- Info We Trust: [Minard's World](#) (video)