

“Most of my work has been secretly about trying to make people smarter. The - and it means smart both in terms of science and seeing and information and art. The science and art, at least at a high level, have in common intense seeing, bright-eyed observing and deep curiosity. And I'm starting to now surface these ideas that have been lurking in my work for so long in my project "The Thinking Eye," which will be a book-movie. It's going so slowly that I think books and movies will be the same by the time I get it done.”

-Edward Tufte, [Edward Tufte Wants You to See Better](#)



EDWARD TUFTE

BEAUTIFUL EVIDENCE



What is the style/use/purpose of your subject?

An examination of evidence
presentations and a discussion
of their components.





Counter rotation of the upper body in the opposite direction of the intended turn.

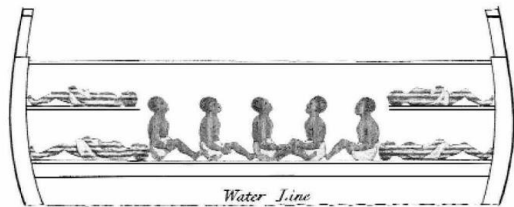
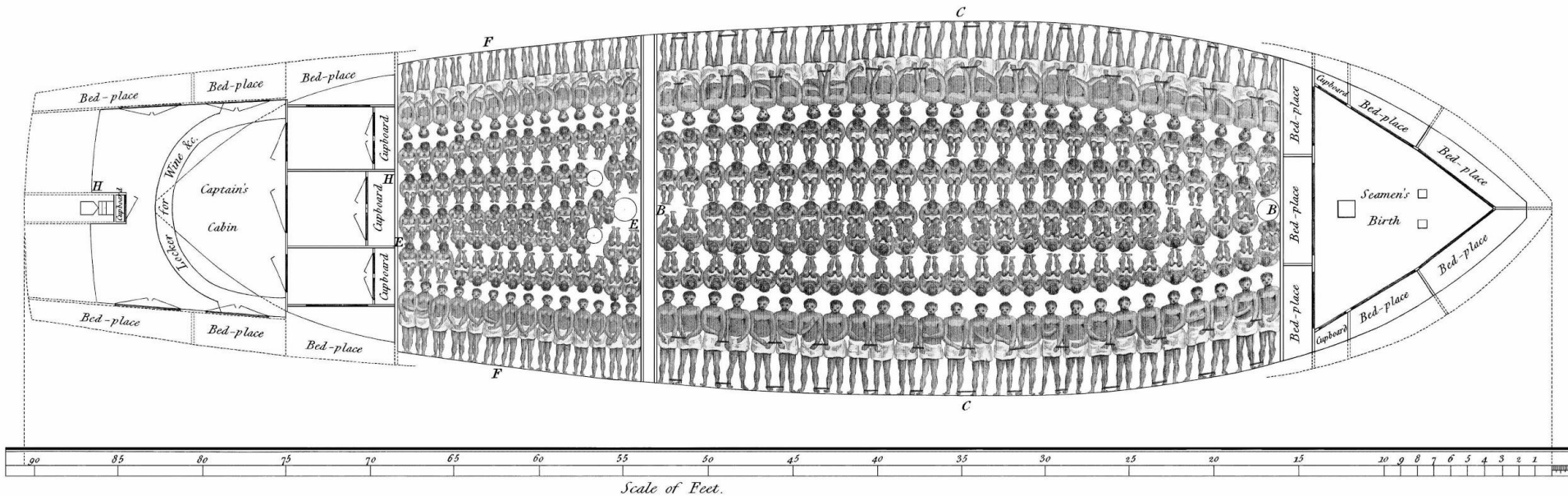
The final rotation is started off energetically in the direction of the intended turn. The outer arm and shoulder are decisively swung forward thus giving power to the rotation.

The rotation is passed on to the skis by temporary blocking of the hips.

The arm follows through together with the torso and shoulders. This part of the rotation should be carried out very smoothly with the arm now going in a forward direction to avoid rotation into the hill.

‘Insistent application’ of analytical thinking and design principles in the production of credible evidence.

Making an evidence presentation is a moral act and intellectual activity.

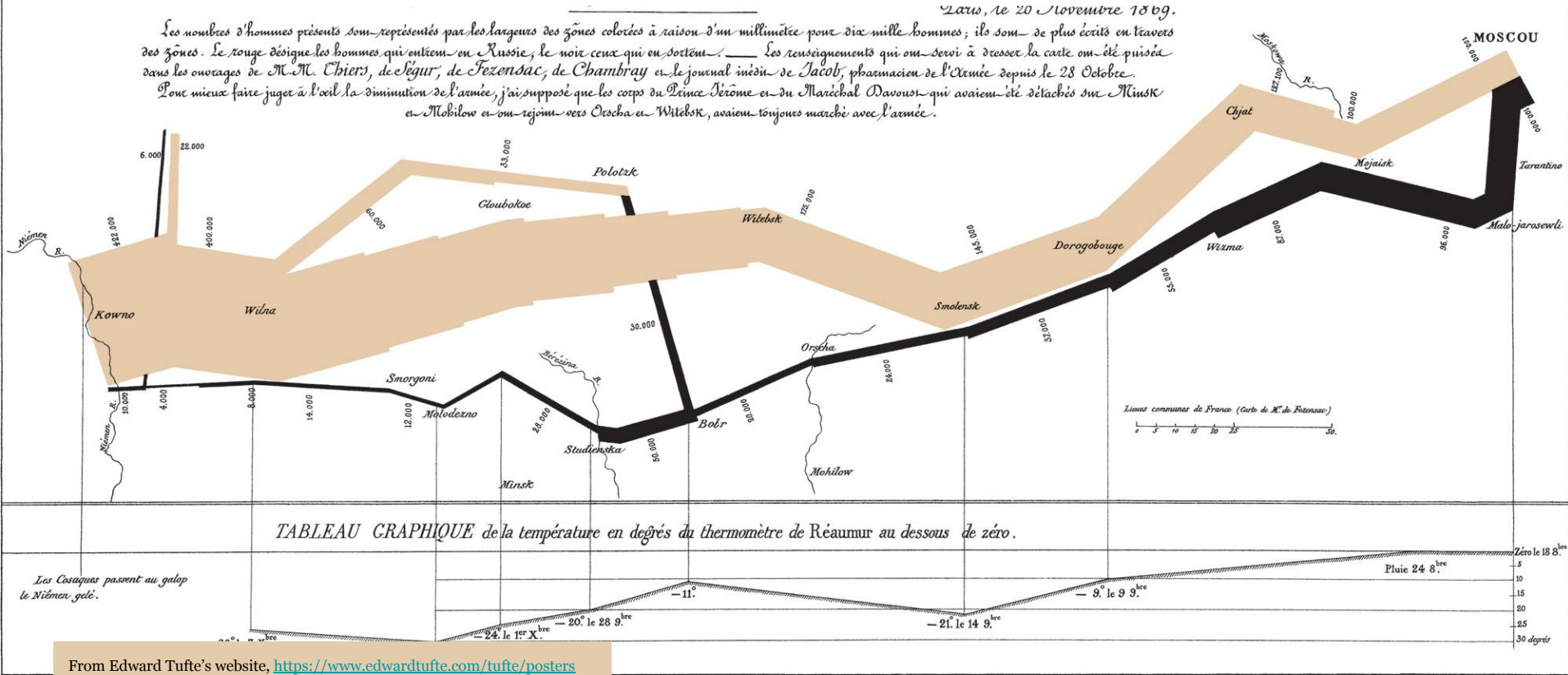




Published in 2006. Relevant today.

POSTER: NAPOLEON'S MARCH

"Probably the best statistical graphic ever drawn, this map by Charles Joseph Minard portrays the losses suffered by Napoleon's army in the Russian campaign of 1812. Beginning at the Polish-Russian border, the thick band shows the size of the army at each position. The path of Napoleon's retreat from Moscow in the bitterly cold winter is depicted by the dark lower band, which is tied to temperature and time scales."





Overall toll 700k to 1 million lost lives.

100,000 soldiers reached Moscow.

10,000 survived the return.

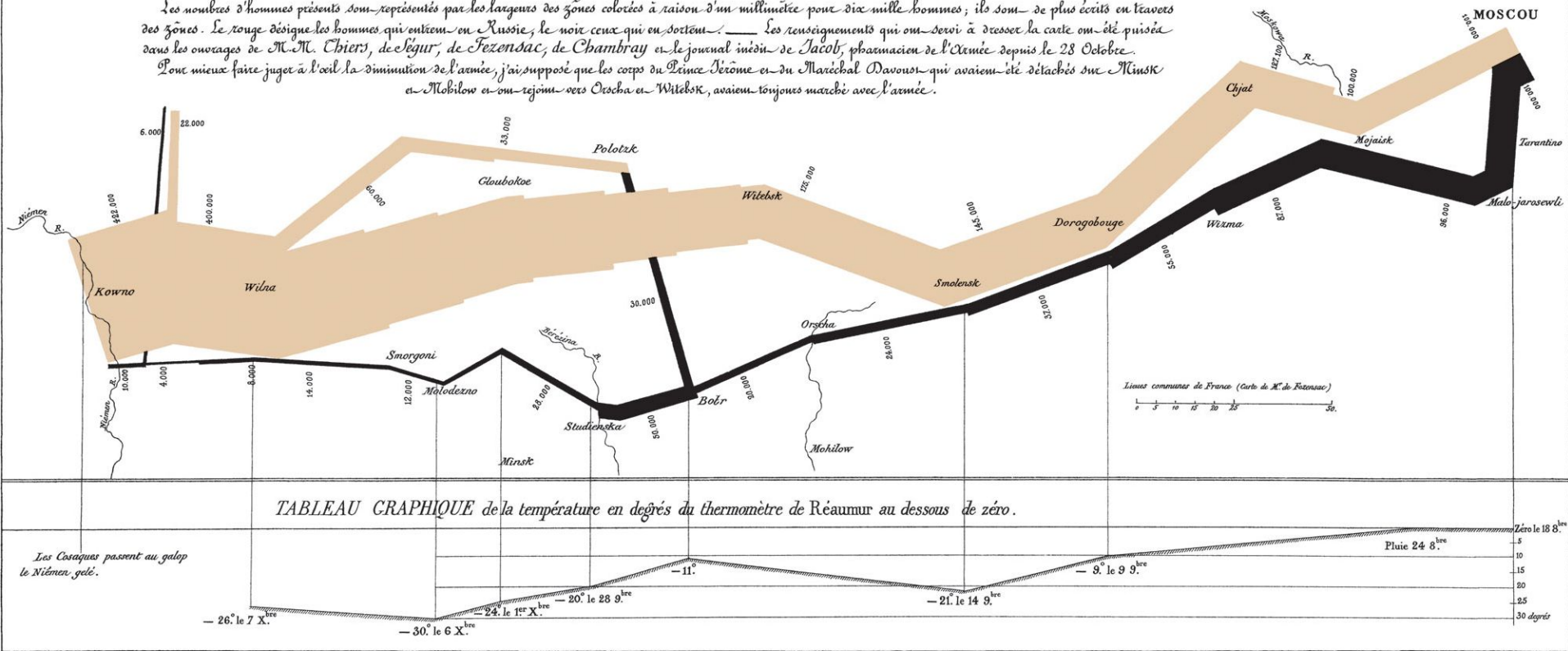
The map was the work of Charles Joseph Minard (1781-1870), a French civil engineer who was an inspector-general of bridges and roads, but whose most remembered legacy is in the field of statistical graphics, producing this and other maps in his retirement.

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

Pressé 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 Légué, de Fexendac, 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 Mobilov en ont rejoint vers Orscha et Witebsk, avaient toujours marché avec l'armée.



Principle 1: Show comparisons, contrasts and differences

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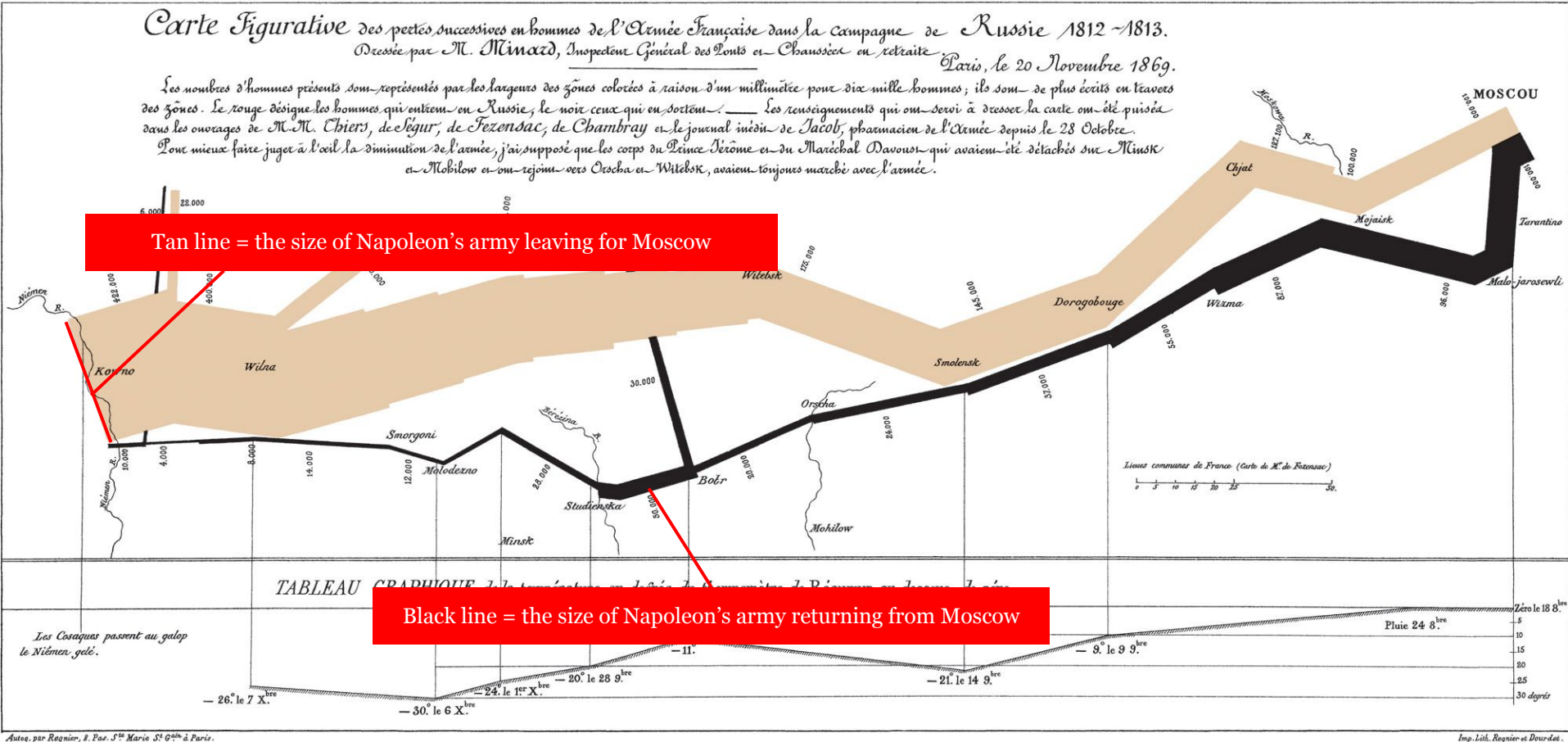
Révisée par M. Minard, Inspecteur Général des Ponts et Chaussées en retraite. Paris, le 20 Novembre 1869.

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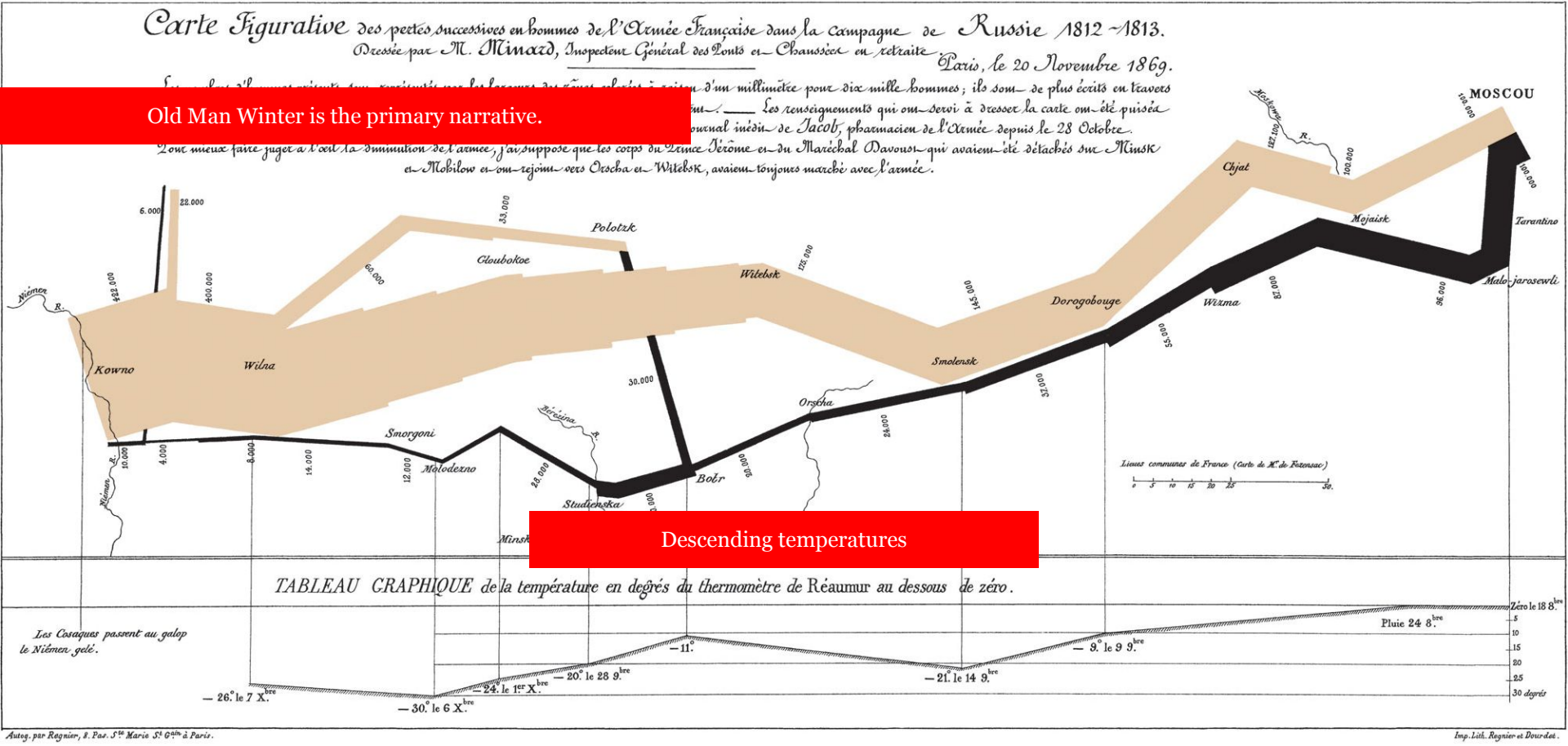
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Tan line = the size of Napoleon's army leaving for Moscow

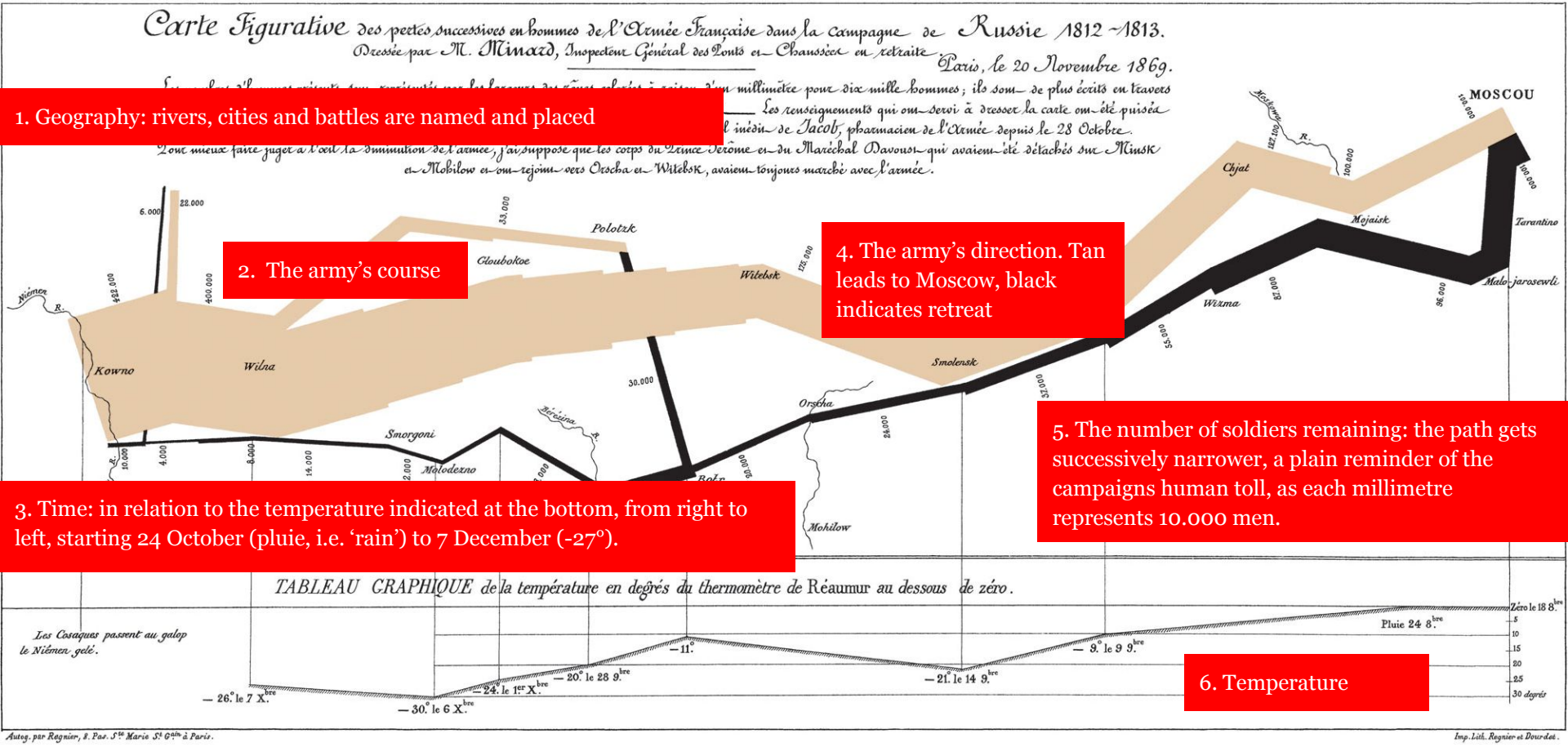
Black line = the size of Napoleon's army returning from Moscow



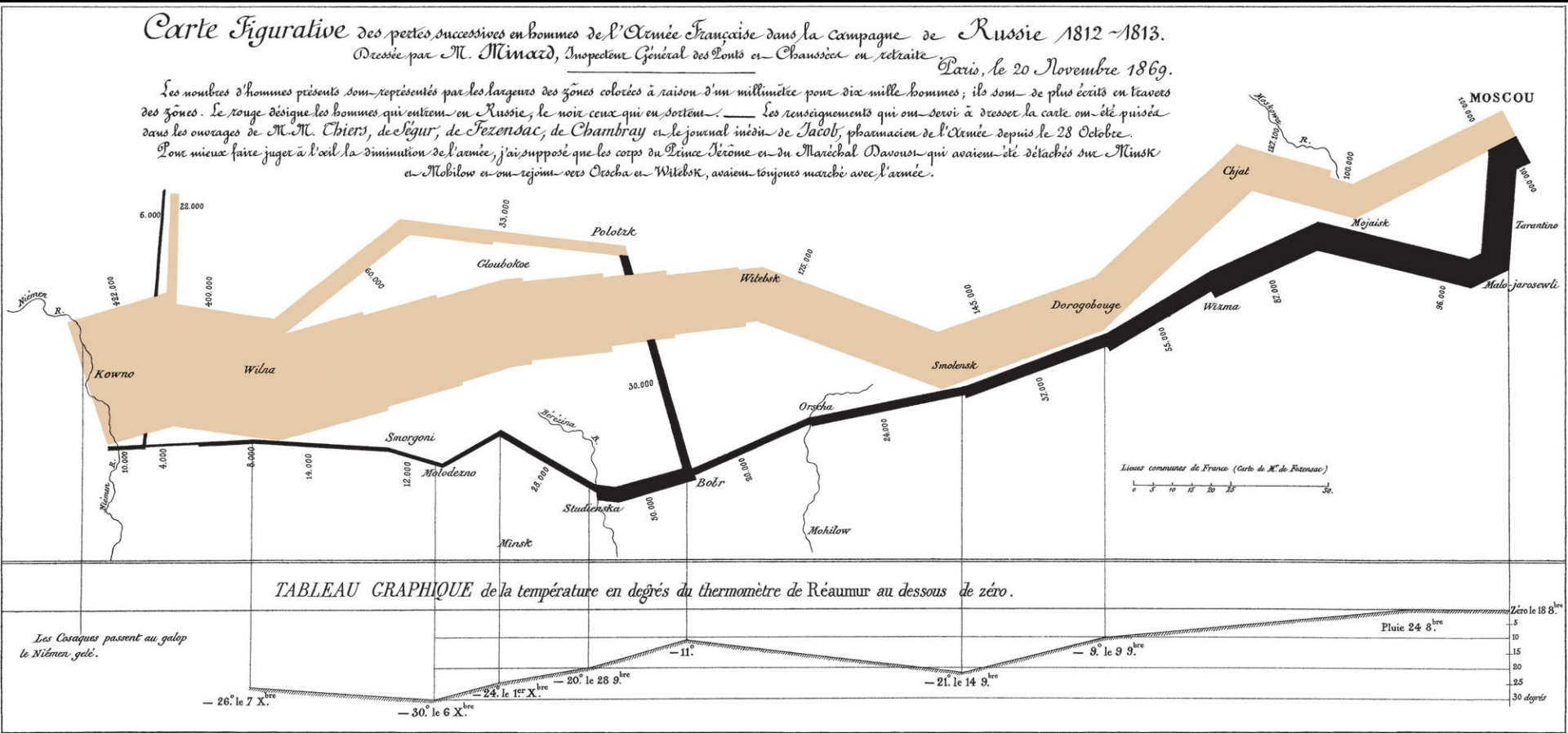
Principle 2: Show causality, mechanism, explanation, systematic structure



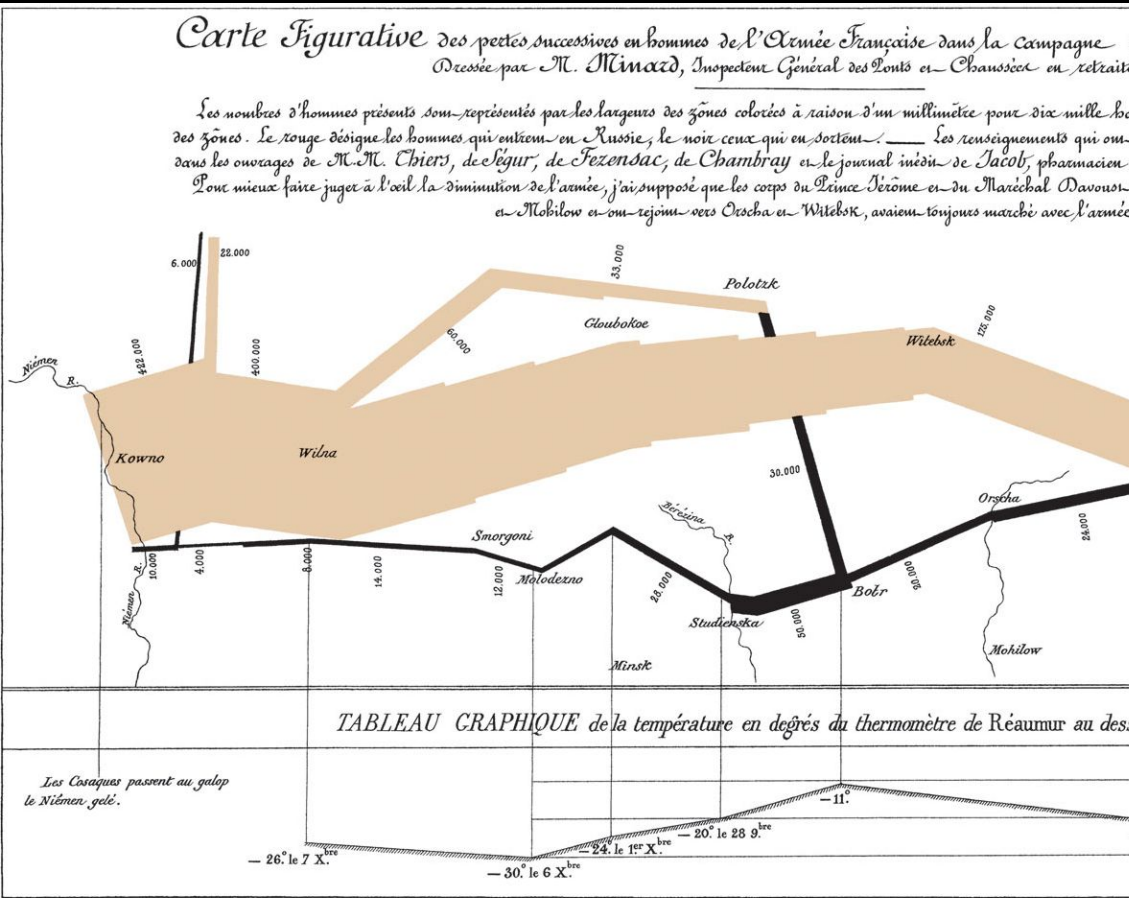
Principle 3: Show multivariate data; that is, show more than 1 or 2 variables



Principle 4: Completely integrate words, numbers, images, diagrams



Principle 5: Thoroughly describe the evidence. Provide a detailed title, indicate the sponsors and authors, document the data sources, show complete measurement scales, point out relevant issues.



This is a translation of the legend at the top of the map:

Figurative chart of the successive losses in men by the French army in the Russian campaign 1812-1813. Drawn up by Mr Minard, inspector-general of bridges and roads (retired). Paris, 20 November 1869. The number of men present is symbolised by the broadness of the coloured zones at a rate of one millimetre for ten thousand men; furthermore, those numbers are written across the zones. The red signifies the men who entered Russia, the black those who got out of it. The data used to draw up this chart were found in the works of Messrs. Thiers, de Ségur, de Fezensac, de Chambray and the unpublished journal of Jacob, pharmacist of the French army since 28 October. To better represent the diminution of the army, I've pretended that the army corps of Prince Jérôme and of Marshall Davousz which were detached at Minsk and Mobilow and rejoined the main force at Orscha and Witebsk, had always marched together with the army.

Principle 6: Analytical presentations ultimately stand or fall depending on the quality, relevance, and integrity of their content.

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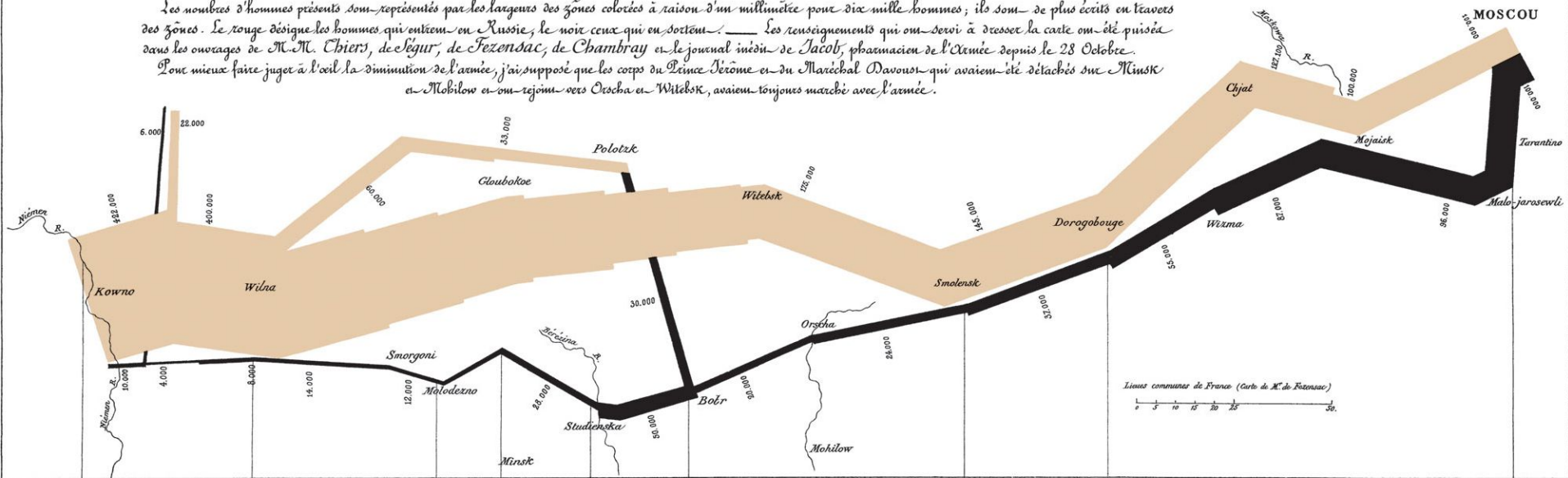
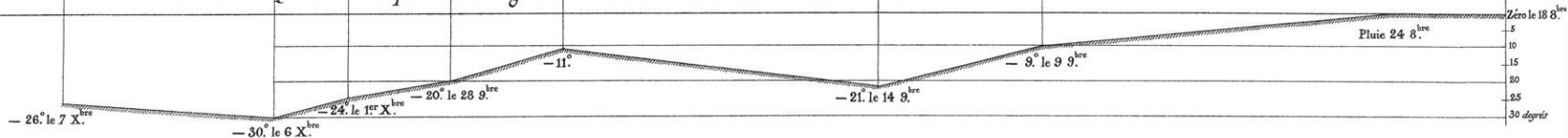


TABLEAU GRAPHIQUE de la température en degrés du thermomètre de Réaumur au dessous de zéro.



Les Cosaques passent au galop le Niémen gelé.

What does Tufte do well?

He knows his material.

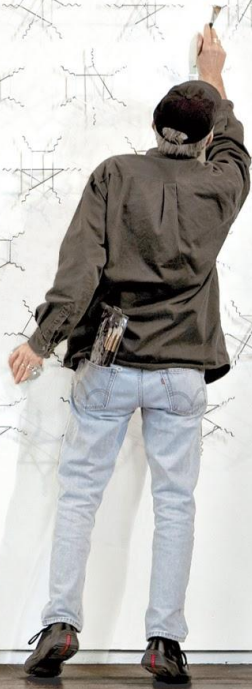
He has a deep library of content.

Well researched.

Demonstrated themes/principles across diverse sets of images.

Repetition. His books are larger expressions of small multiples.

His books are beautiful. They function as works of art.



Criticism from others....

Lots of discussion around Tufte's book, *[The Cognitive Style of PowerPoint: Pitching Out Corrupts Within.](#)*

[His criticism of PowerPoint is unwarranted.](#) Or rather, the things he is critical of can be addressed in a well designed presentation.

He uses a presentation format to present his opposition to PowerPoint presentations.

Tufte typically presents his theories to large audiences (400+) in a one-way format without soliciting audience input, while espousing the need to engage audiences.

His recommendation of tools include LaTeX, which may still be the academic choice for writing papers with lots of math, but which may not be practical for business users.



My thoughts...

I appreciate

He has the space to speak directly about what matters to him.

He functions as a designer, an academic, an artist and a curator.

His work isn't easily described so it forces discourse. The opacity of his presentation demands the kind of attention he appreciates in data visualizations.

He values people who are willing to put in the work and learn.

It is difficult to find examples of information graphics that he has produced

He doesn't have a clear practice of developing the content he talks about.

His relationship to the content seems largely that of the academic and collector.

Inconsistent application of his own principles

When discussing work he critiques individual pieces but doesn't apply his 6 principles uniformly.

It appears his personal taste often overrides adherence to his principles.

Intellectual elitism

His model celebrates and caters to people who already think like him and share his values.

The work he most admires requires study. He rarely discusses how to reach the mainstream or user/reader patterns.

He largely ignores online/interactive data visualizations.

His mantra that [PowerPoint is evil](#) breaks his own rule that one must 'respect your audience.'

How does this subject connect to other readings and discussions within the course?

He's the closest thing the mainstream has to an advocate for clear information design.

He has produced a body of well-researched work.

He's a contemporary figure actively influencing the language of the form.

As a figure of debate he helps advance discourse.

His collected work is basically a visual catalog of well-considered reference material.

Questions

Is it reasonable to expect every data visualization apply all 6 of Tufte's principles?

What does he think about online/interactive data visualizations?

Where do you think functional/daily (sports tickers, news graphs, etc) data visualizations fit within Tufte's world view?

What do you think about PowerPoint: is the software the limitation or the operator? Is his reaction against PowerPoint warranted?

How do you facilitate the greatest change?

Giving academics structures and tools to teach.

Speaking directly to the masses.

EDWARD ROLF TUFTE

“Edward Rolf Tufte ([/ˈtʌfti/](#); ^[2] born March 14, 1942) is an American [statistician](#) and [professor emeritus](#) of [political science](#), [statistics](#), and [computer science](#) at [Yale University](#). He is noted for his writings on [information design](#) and as a pioneer in the field of [data visuaization](#)

“Tufte's writing is important in such fields as [information design](#) and [visual literacy](#), which deal with the visual communication of information. He coined the word [chartjunk](#) to refer to useless, non-informative, or information-obscuring elements of quantitative information displays. Tufte's other key concepts include what he calls the lie factor, the data-ink ratio, and the data density of a graphic.

“He uses the term "data-ink ratio" to argue against using excessive decoration in visual displays of quantitative information.”

BOOKS

[The Visual Display of Quantitative Information](#)

[Envisioning Information](#)

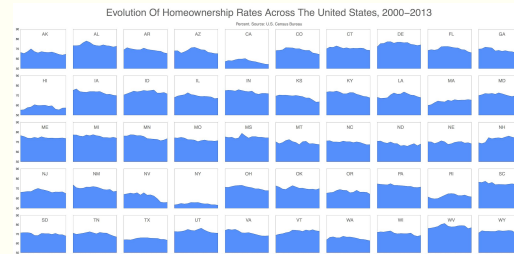
[Beautiful Evidence](#)

[Visual Explanations: Images and Quantities, Evidence and Narrative](#)

[Visual and Statistical Thinking: Displays of Evidence for Making Decisions](#)

[The Cognitive Style of PowerPoint: Pitching Out Corrupts Within, Second Edition](#)

SMALL MULTIPLE



SPARKLINE

Intense word-sized graphics. Although Tufte is said to have invented [sparklines](#), in actuality he invented only the name and popularized it as technique. A sparkline is a very small line chart, typically drawn without axes or coordinates.

