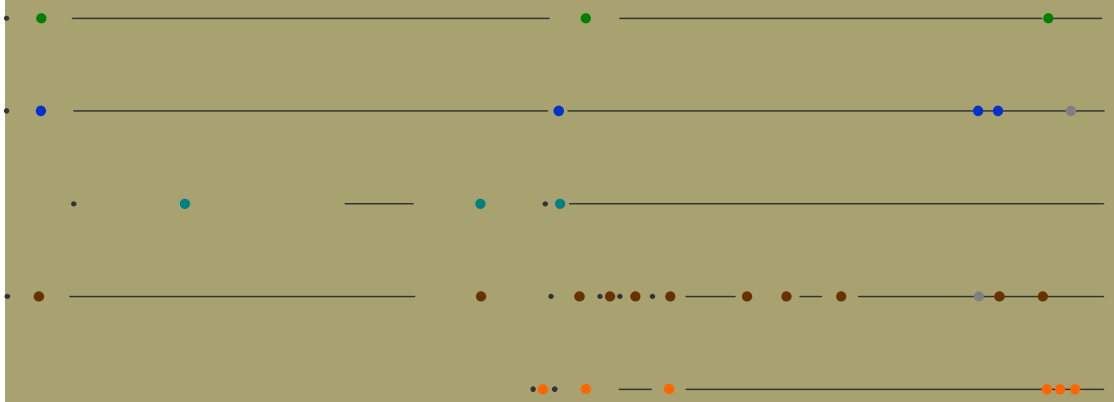
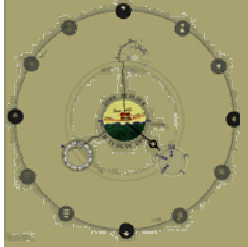
Et pourquoi visualiser si on peut représenter ?

J.Y Blaise, CNRS



This will not be about my own work

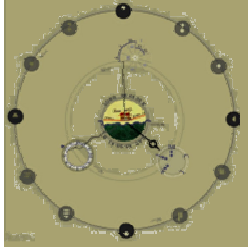
Allegory Antonio de Pereda (1654)
http://www.wikigallery.org/wiki/painting_70307/Antonio-de-Pereda/Allegory-c.-1654



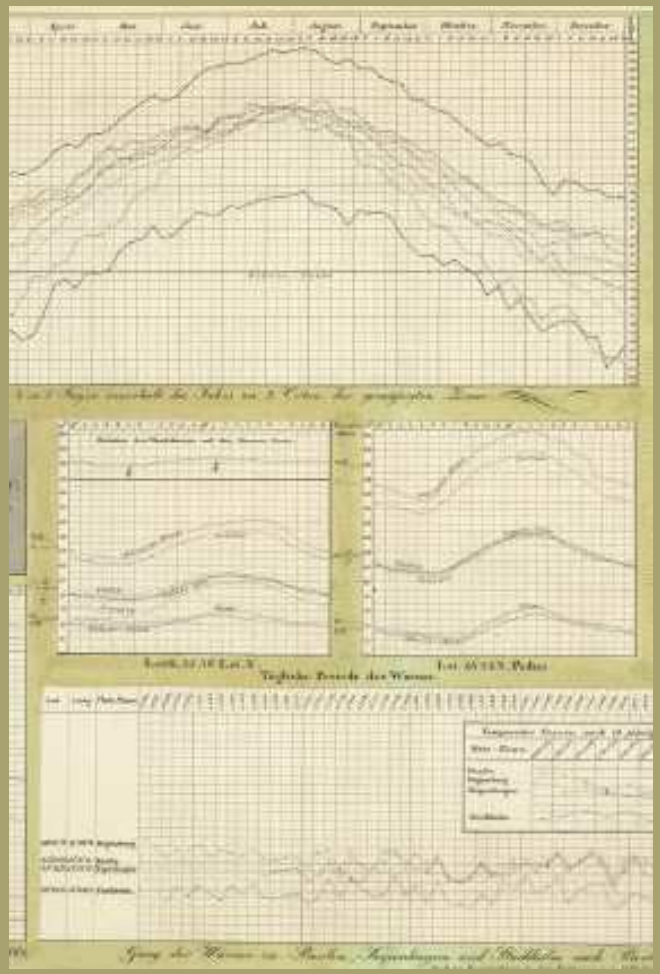
Et pourquoi visualiser si on peut représenter ?

J.Y Blaise, CNRS

Modelling and visualising spatial dynamics :
Reasoning on long time spans and uncertainty



Et pourquoi visualiser si on peut représenter ?



Objective : illustrate through a (subjective) gallery of milestones in what *infovis* techniques, methods and concepts can be fruitfully applied and/or questioned in the context of the MoDyS thematic school

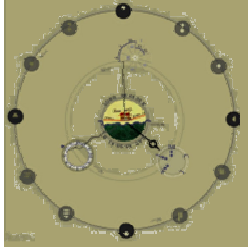
– i.e. when dealing with ill-defined information sets, time, uncertainties, etc.

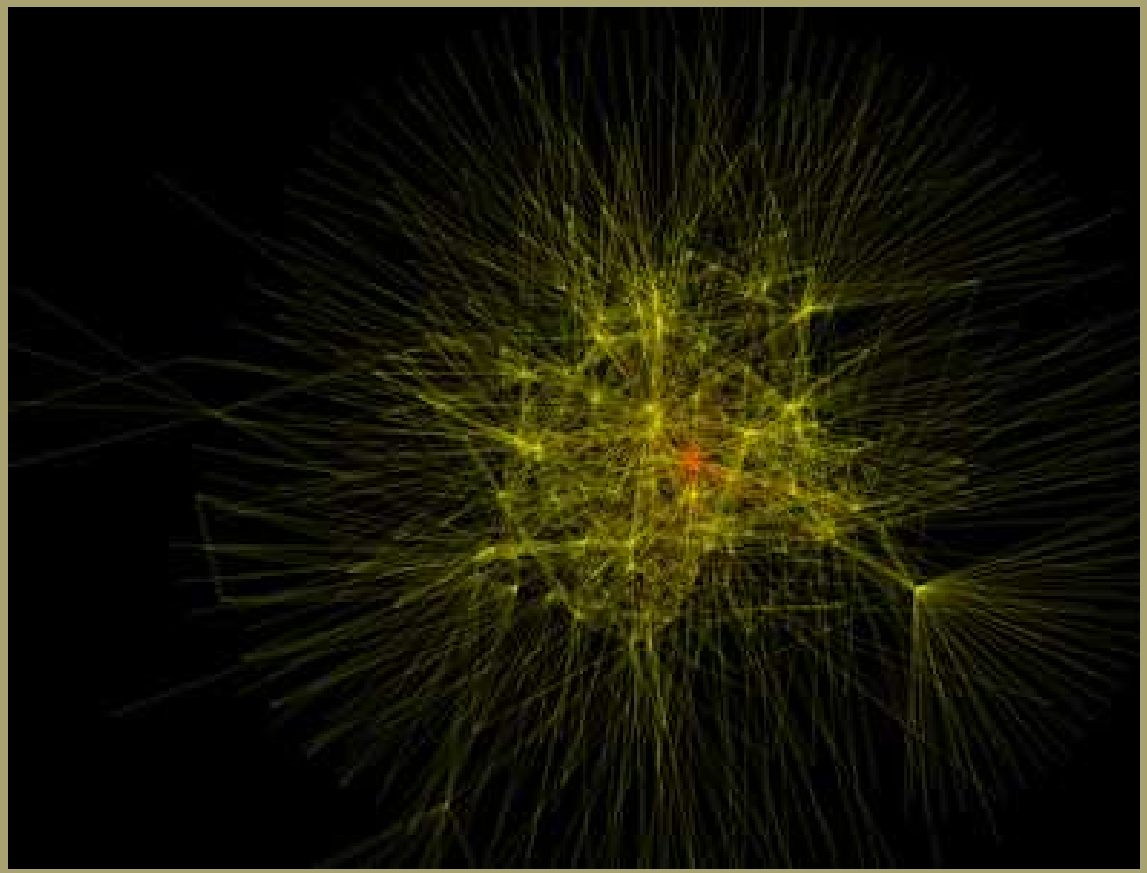
This is not an overview of infovis or visual analytics as such – far from it

This is not a comprehensive analysis of their legacy (see M.Friendly)

Some epistemological remarks

1838 print by Heinrich Berghaus (1797-1884)
http://www.infovis.info/visuals/Gallery_of_Data_Visualization/Historical_Milestones/1800+/charts_worldtemps_1838.png



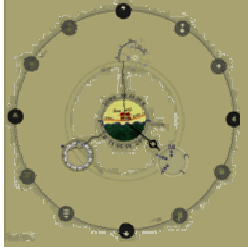


I shall not picture *infovis* as a box packed with magic wands.

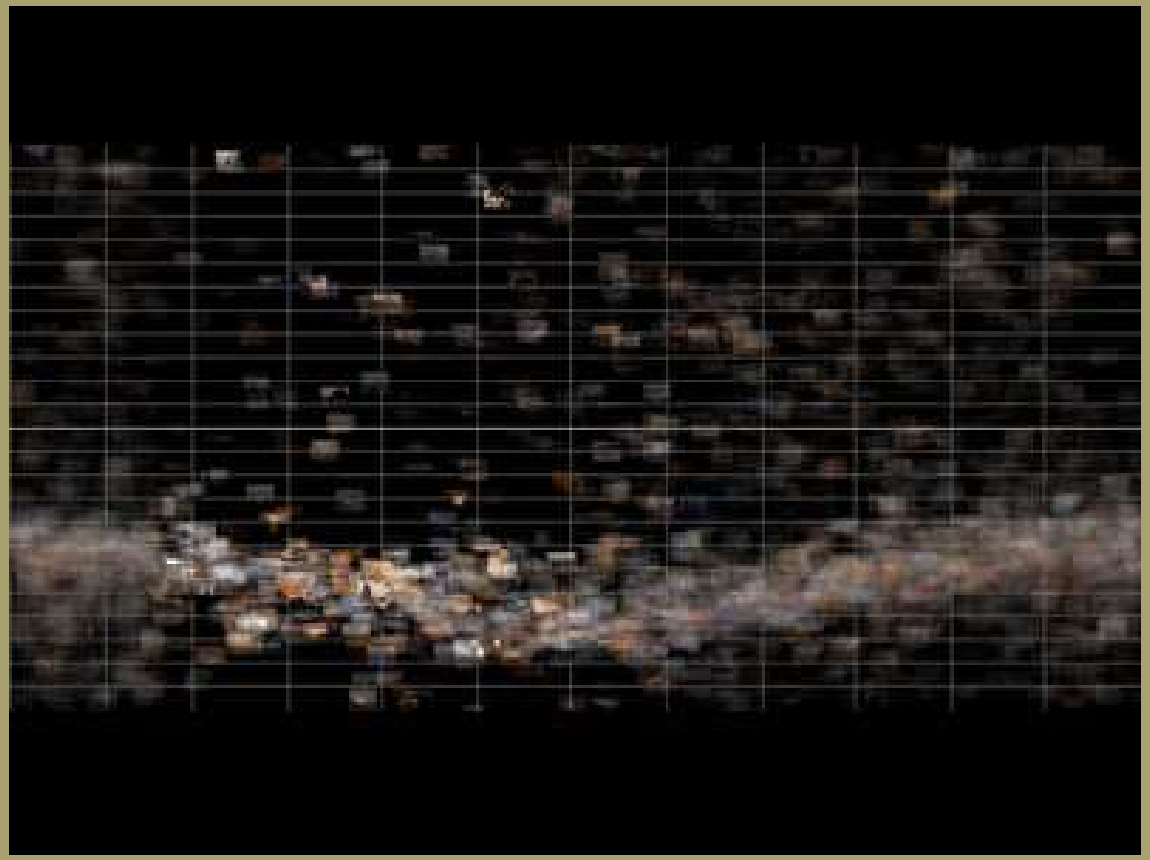
There is a good deal of technology behind contemporary achievements in *infovis* and *visual analytics*.

Yet computation as well as interaction and evaluation aspects will be left aside.

Timothy O'Brien / visualization of his 1st and 2nd level of connections on the O'Reilly Connection social networking site.
Timothy M. O'Brien (2005)http://www.infovis.info/visuals/visualcomplexity/entry52image1.jpg



Et pourquoi visualiser si on peut représenter ?

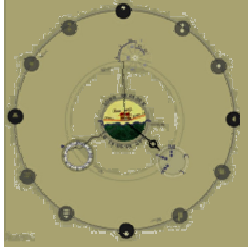


I shall not picture *infovis* as a box packed with magic wands.

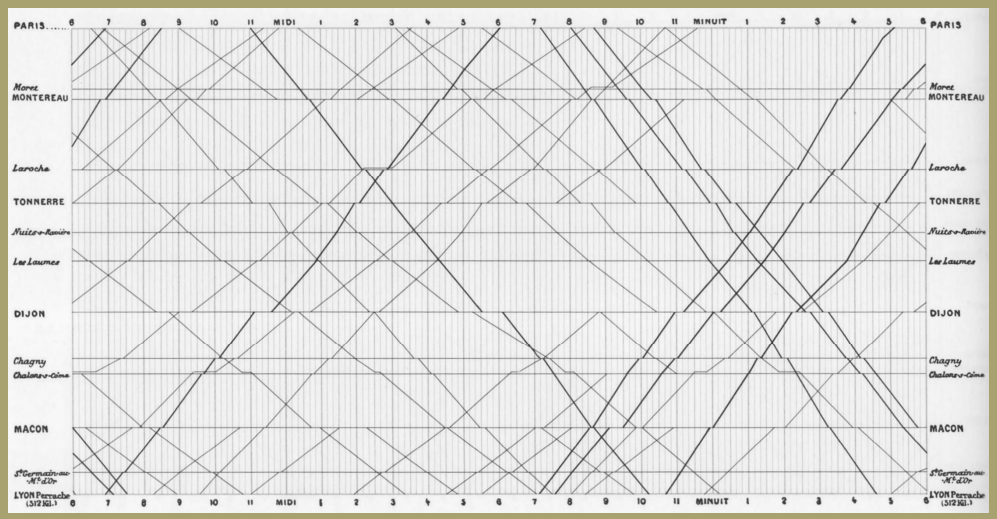
There is a good deal of technology behind contemporary achievements in *infovis* and *visual analytics*.

Yet computation as well as interaction and evaluation aspects will be left aside. Mass of data needed will also remain unaddressed.

This diagram shows 15000 photos tagged with the word "sunset", taken throughout 2004. Their horizontal positions represent the day of the year the photo was taken. January is on the left, December is on the right. The vertical bars are the boundaries between months. The vertical position represents the time of day the photo was taken, according to the EXIF data. The horizontal lines are hours, with the thick line in the middle representing 12 noon.
Jim Bumgardner (2005) http://www.infovis.info/visuals/visualcomplexity/entry87image1.jpg



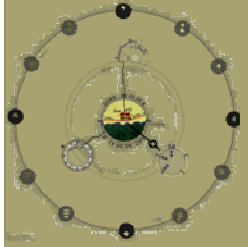
Et pourquoi visualiser si on peut représenter ?



Instead, an interdisciplinary question: in what can such abstract graphics (or more precisely in what can processes / practices involved in the the making of such graphics) help us analyse dynamics of change?

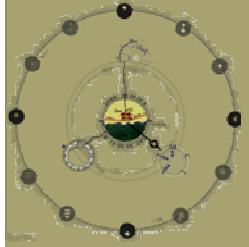
In other words, this is more about modelling issues & visual thinking than about *infovis*

Train schedule E.J. Marey 1885
E.R Tufte The visual display of quantitative information ,
Graphic Press, Cheshire 2001

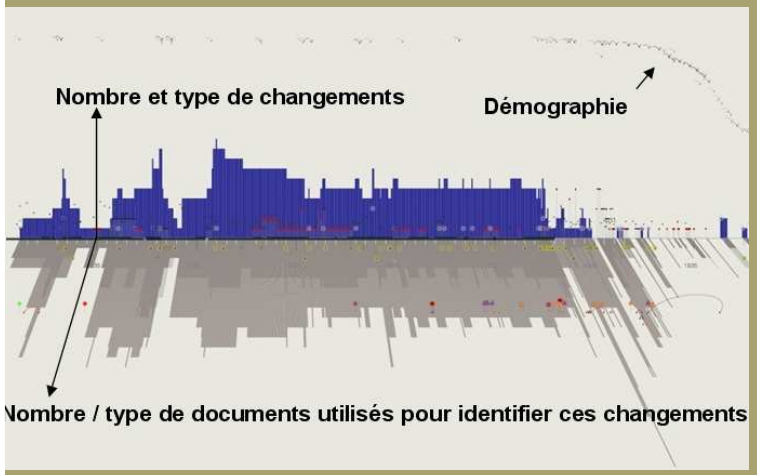


Et pourquoi visualiser si on peut représenter ?

To start with, why should we differentiate representation from visualisation?



Et pourquoi visualiser si on peut représenter ?

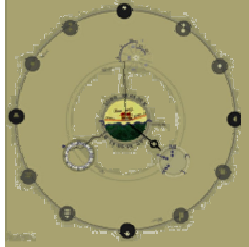


Representation : displaying results of a cognitive process, using means ranging form verbalisation to graphics

Visualisation : give ourselves means to carry out a cognitive process, and eventually to position a given item inside an information space that may shed a new light on it.

Représenter, *i.e.* présenter le résultat d'un processus cognitif, quel que soit son caractère (depuis la description d'un individu jusqu'à celle d'un modèle conceptuel), sous des formes allant de la verbalisation au graphique.

Visualiser, *i.e.* se doter d'outils visuels à caractère abstrait pour faciliter ce processus cognitif, et pour replacer l'observation d'un individu dans un espace informatif en ré-éclairant l'étude.



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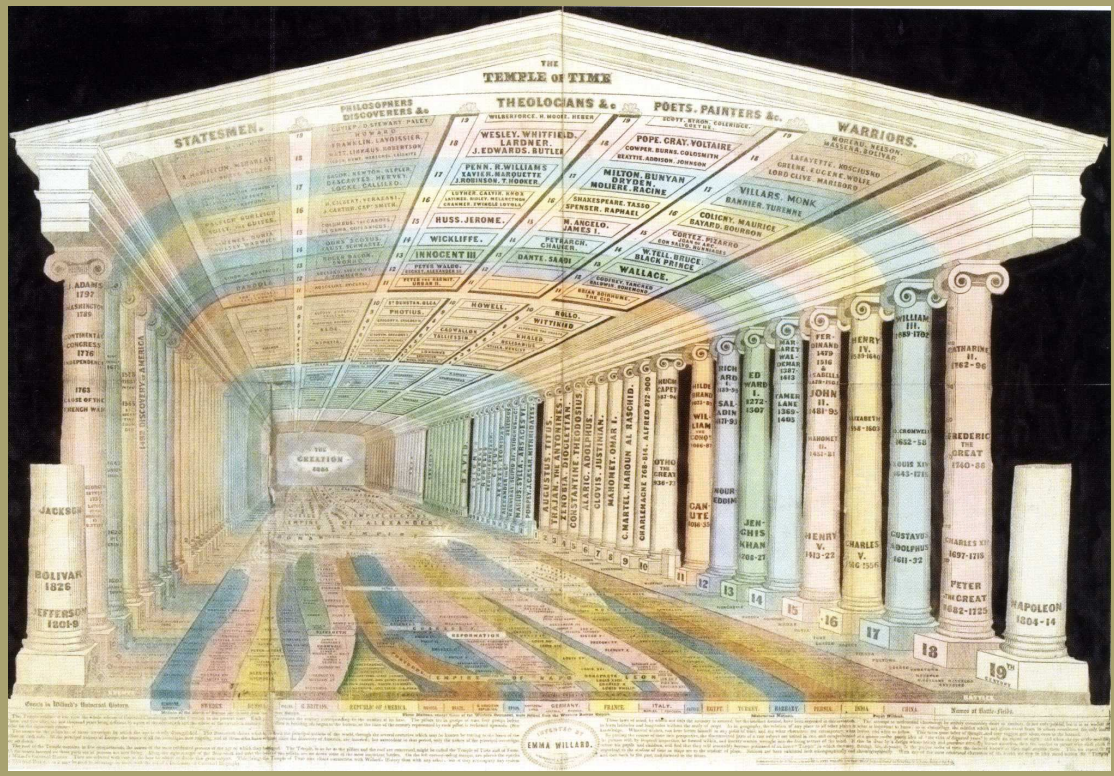
Capitol in Douggha UMR MAP / De Luca et al.
www.map.archi.fr



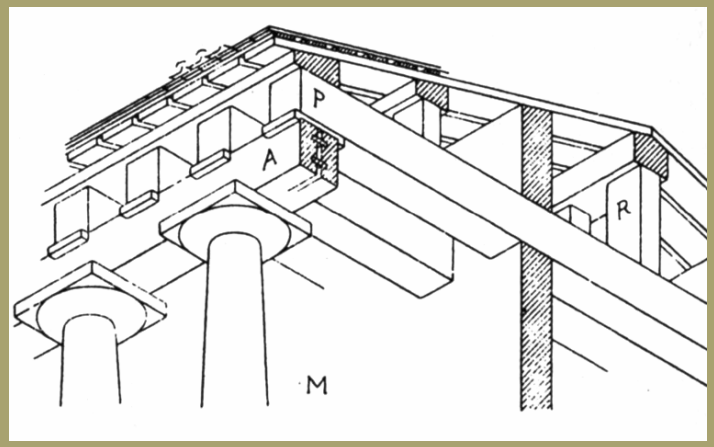
Emma Willard's Temple of Time : a three-dimensional projection of historical chronography created in 1846
http://www.datavis.ca/gallery/timelines.php

Et pourquoi visualiser si on peut représenter ?

Representation

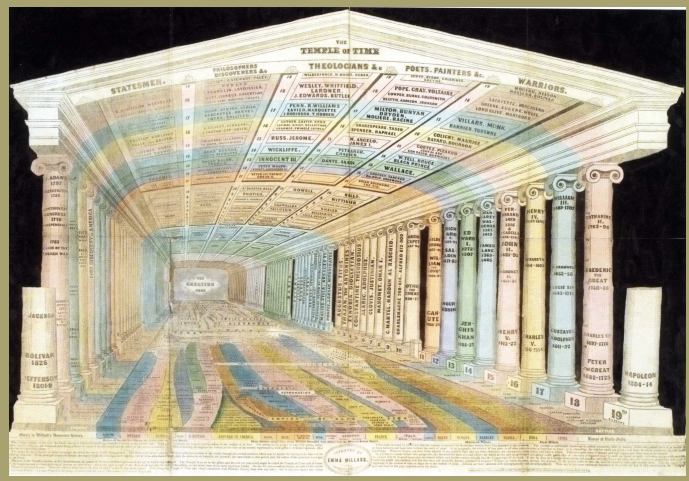
Capitol in Douggha UMR MAP / De Luca et al.
www.map.archi.fr

~ visualisation ?



A.Choisy
Histoire de l'Architecture, 1899

Information Visualisation



Emma Willard's Temple of Time : a three-dimensional projection of historical chronography created in 1846
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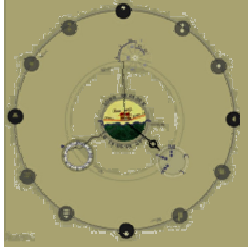
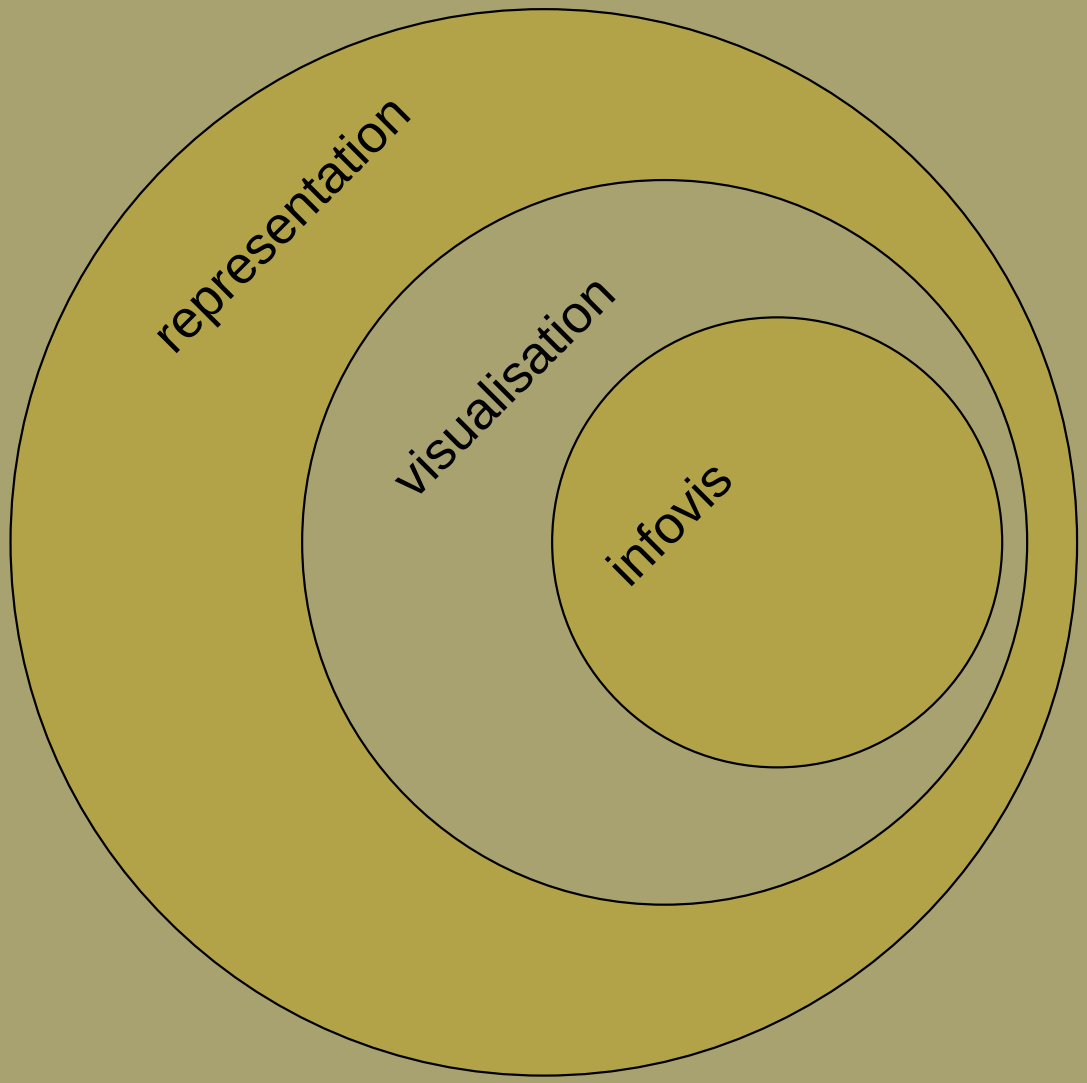
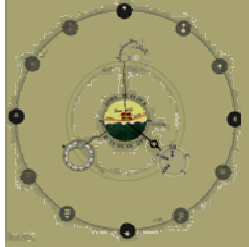


Et pourquoi visualiser si on peut représenter ?

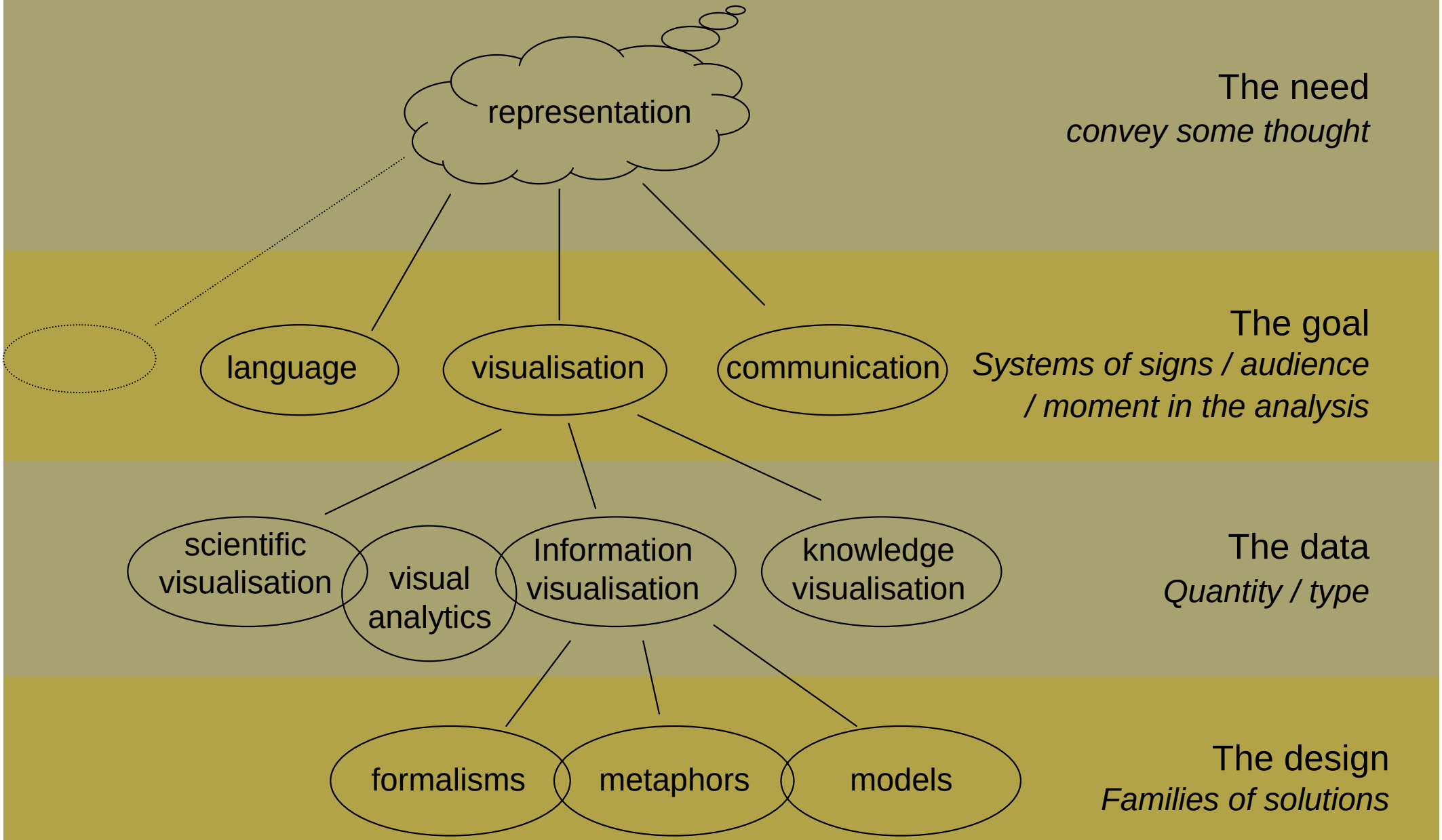


Relations could be represented like this



Et pourquoi visualiser si on peut représenter ?

But are better represented like that

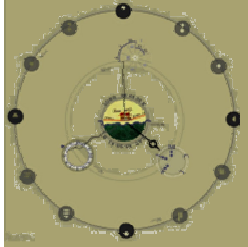


The need
convey some thought

The goal
Systems of signs / audience / moment in the analysis

The data
Quantity / type

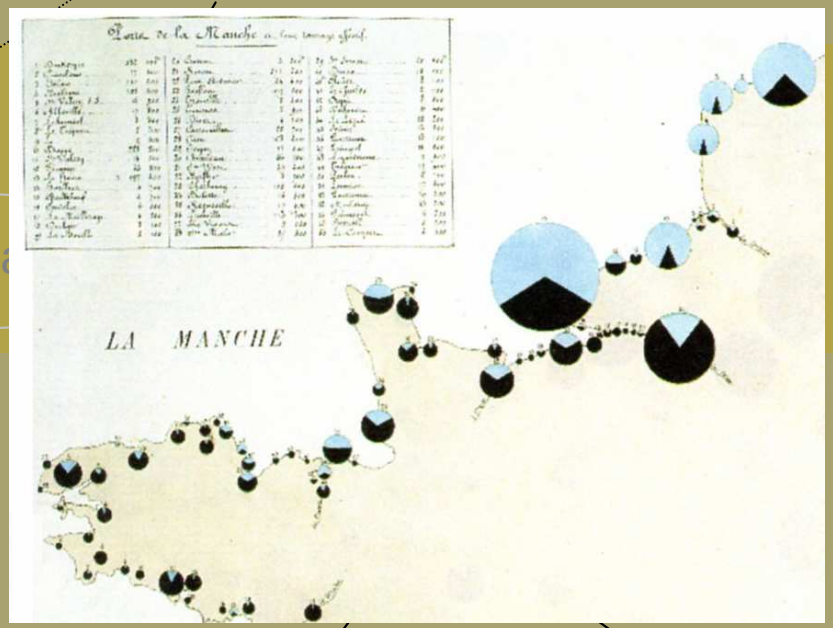
The design
Families of solutions



Et pourquoi visualiser si on peut représenter ?

representation

langua



Carte figurative
Charles-Joseph Minard, 1844

formalisms

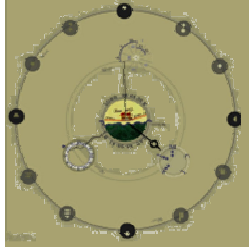
metaphors

models

The need
convey some thought

The goal
Systems of signs / audience / moment in the analysis

The design
Families of solutions
« répertoire des moyens »



Et pourquoi visualiser si on peut représenter ?

representation

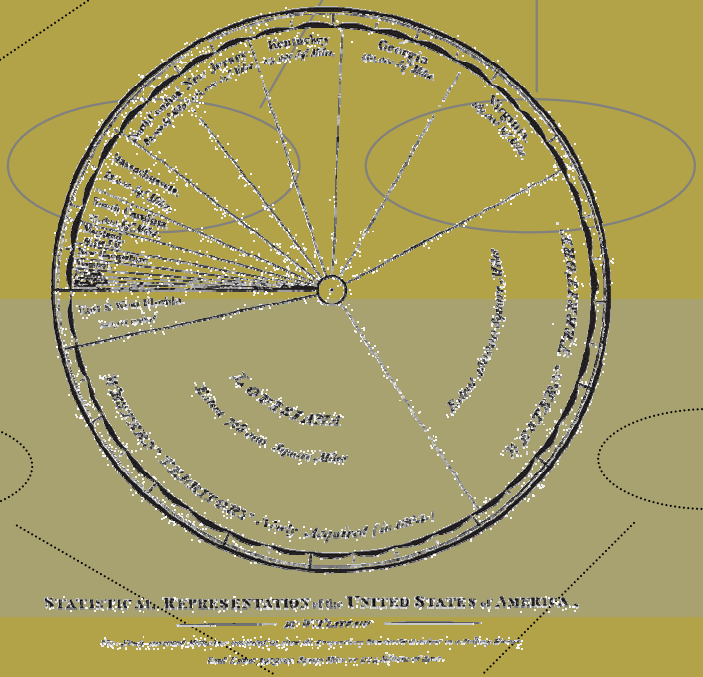
The need

convey some thought

communication

The goal

Systems of signs / audience / moment in the analysis



Pie chart

William Playfair 1801

formalisms

metaphors

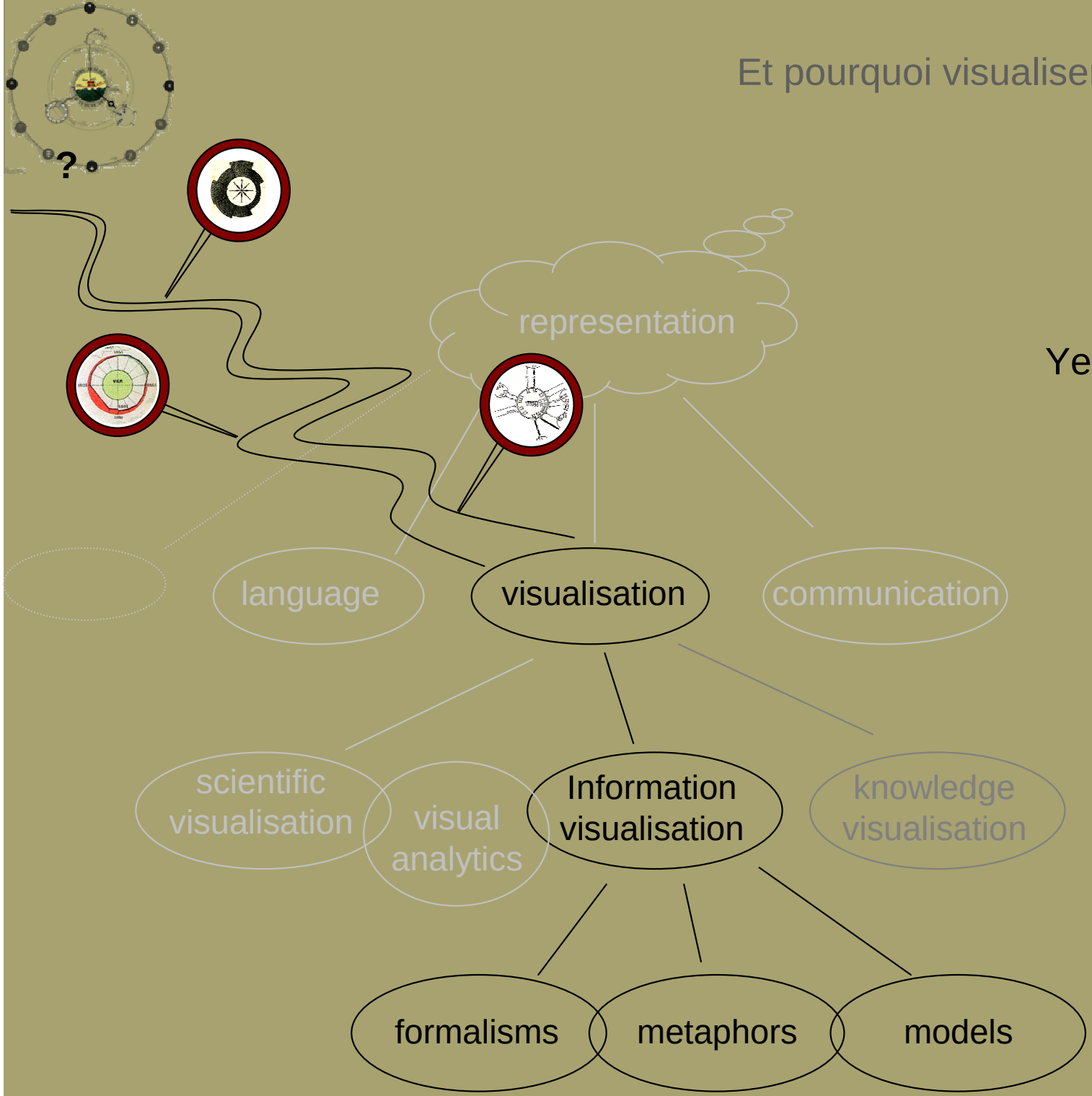
models

The design

Families of solutions

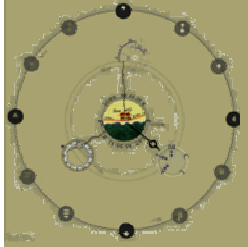
« répertoire des moyens »

Et pourquoi visualiser si on peut représenter ?

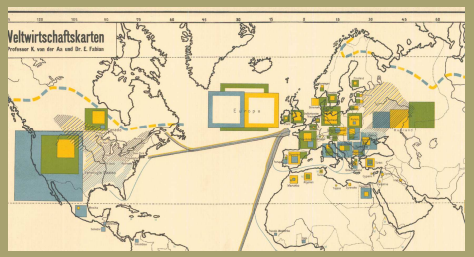


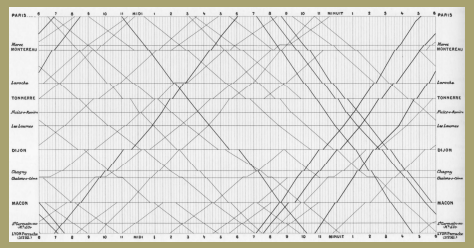
Yet another topic I will not mention: differences between infovis, knowledge visualisation, visual analytics, etc.

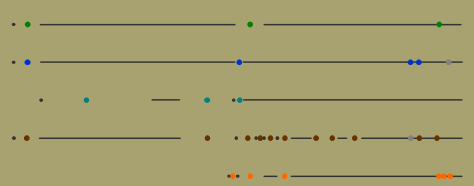
What we will be mentioning here is a common legacy, with a focus on “before the computer-age” examples



Et pourquoi visualiser si on peut représenter ?





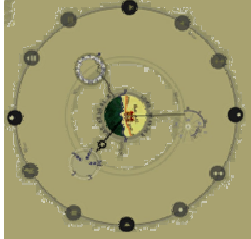


outline

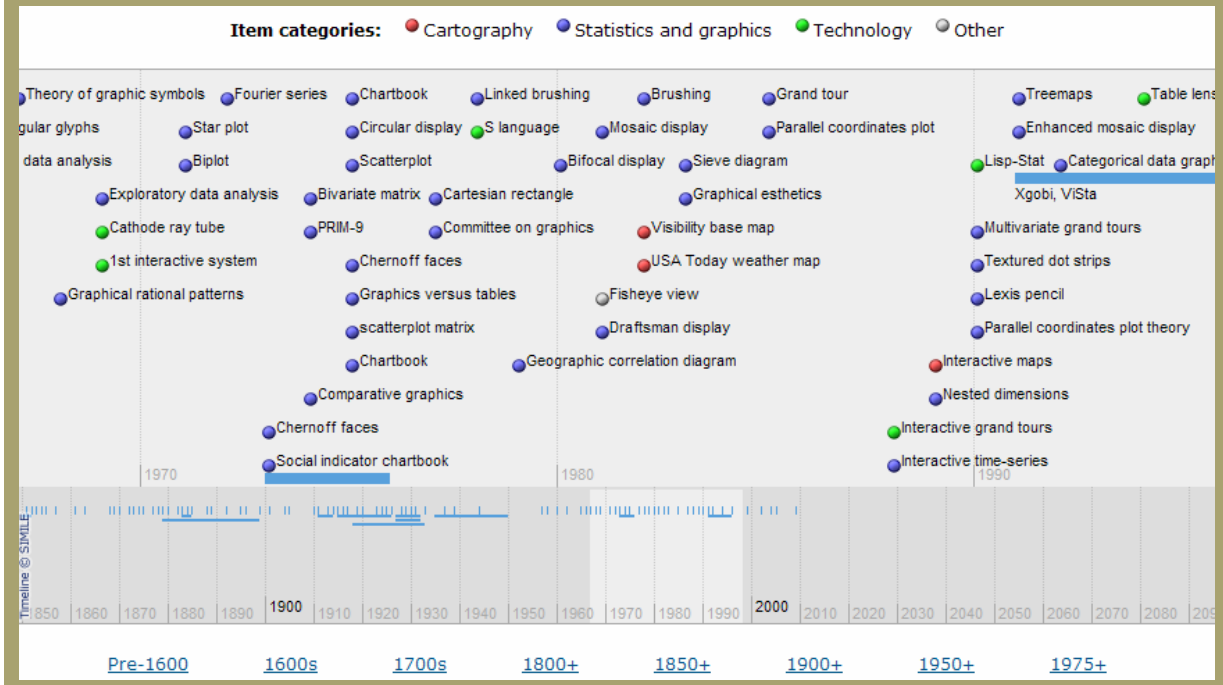
1. The legacy : a short introduction, built on M.Friendly's vision (cartography + statistics)

2. The legacy (2) : when time matters / alternative visions of time-oriented data

3. And now what? Some recommandations, applied to real cases.

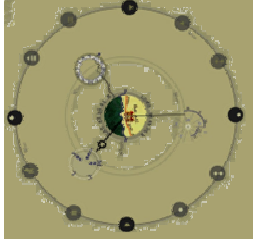


The legacy : cartography & statistics



According to Michael Friendly, infovis inherits from both cartography and statistics

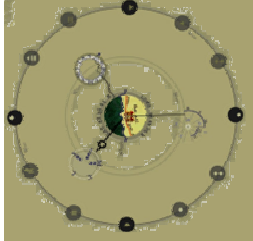
Let’s find out whether this could be true…



The legacy : cartography & statistics

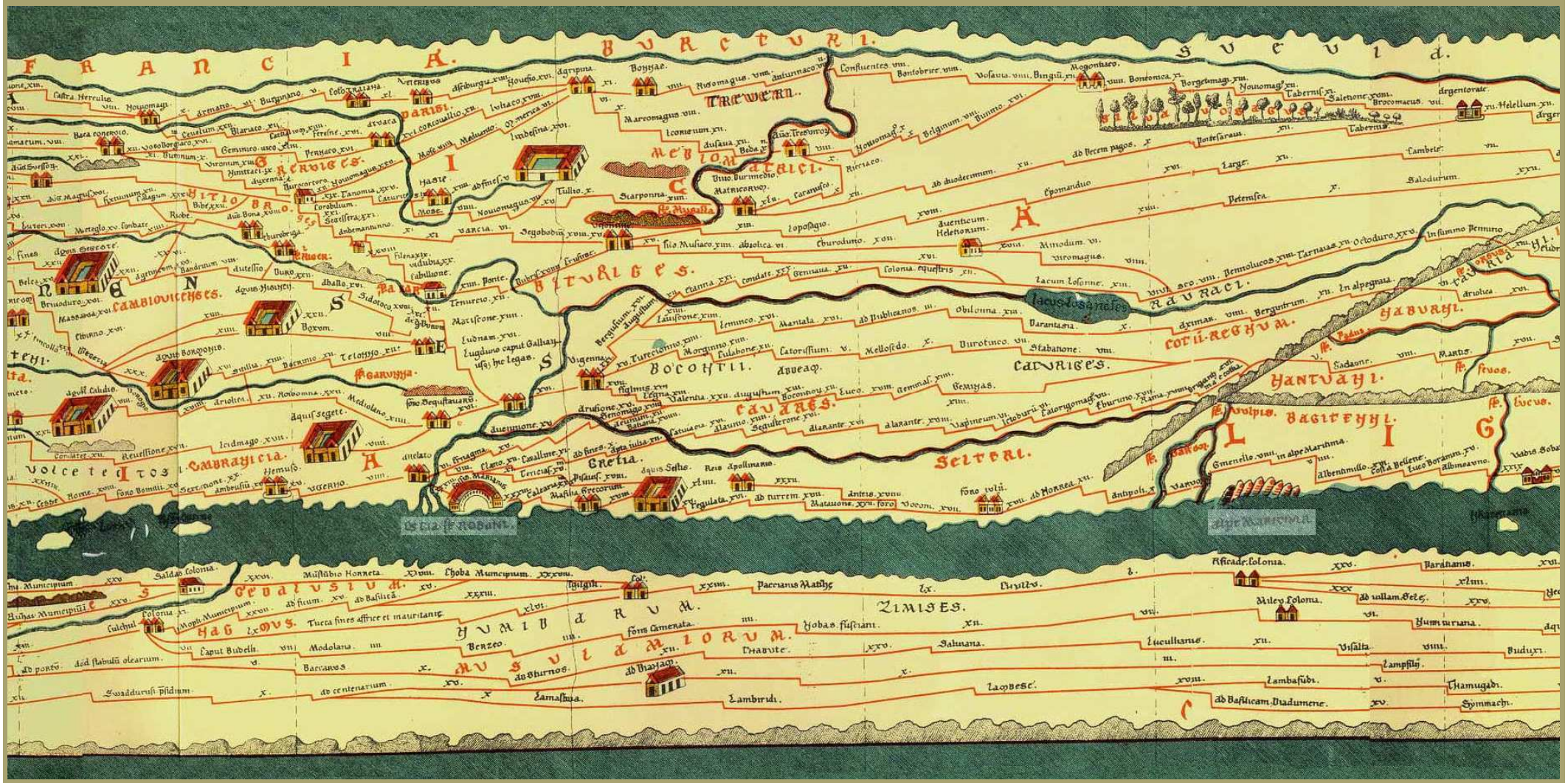
The map of Bedolina (2000 : 1000 B.C)
Land divisions with fields, paths, houses and inhabitants.

B. Holtzmann (Ed)L'art de l'antiquité 1. Les origines de l'Europe
Editions de la Réunion de musées nationaux, Editions Gallimard 1995]



The legacy : cartography & statistics

Mediaeval (~) maps: localise through glyphs, and abstraction (to a certain extent)



The legacy : cartography & statistics

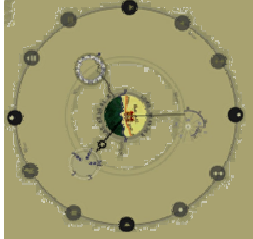
Mediaeval maps: localise and quantify through glyphs, and abstraction (to a certain extent)

Ill. 3. — Coin inférieur gauche : les villages de la vallée de l'Aveyron. Les limites de la baronnie sont superposées à la couture qui traverse le parchemin à la verticale

This does not show the territory – rivers, castles and houses. It shows information about the territory.

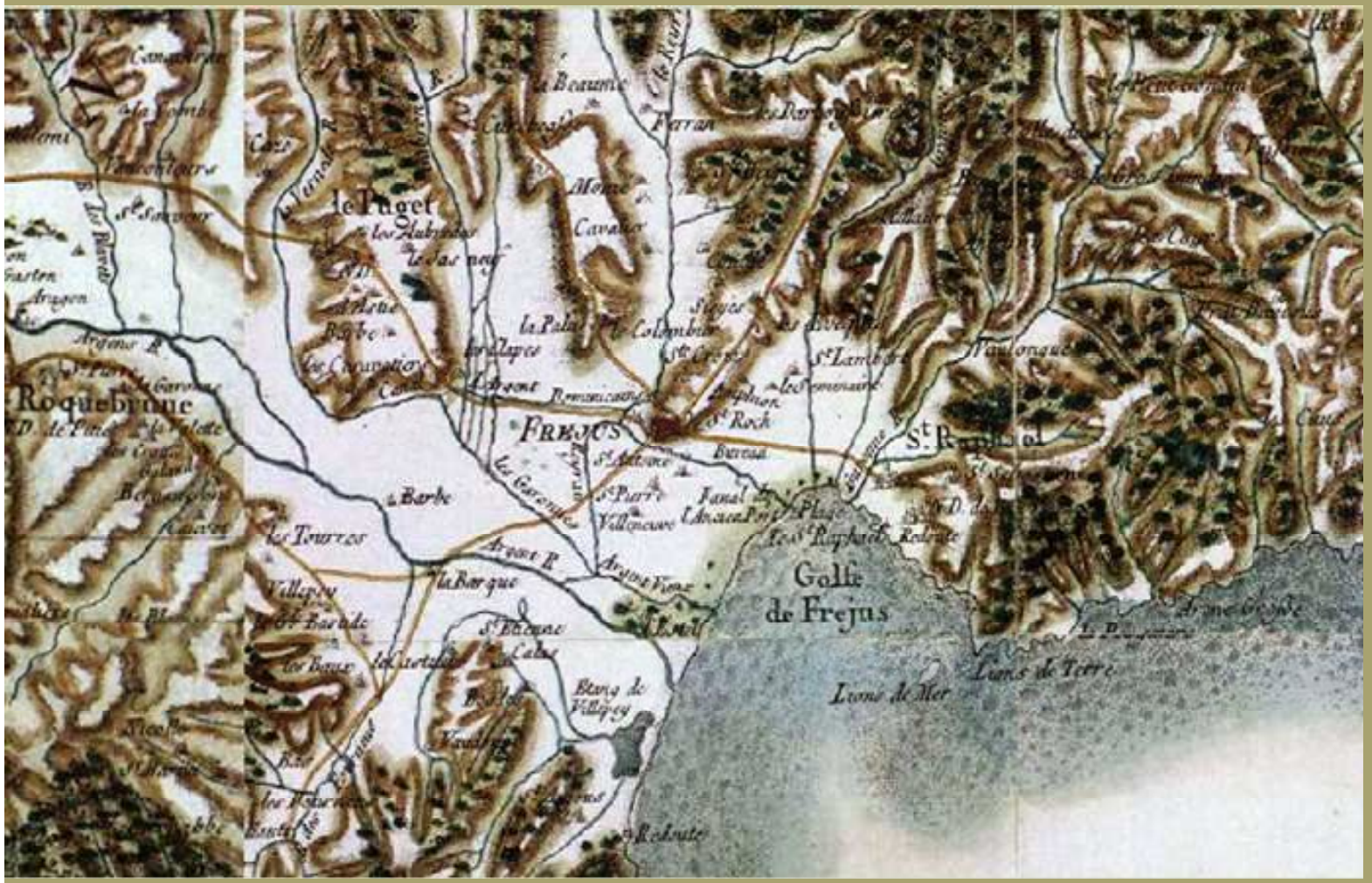
XIVth century onwards: figurative views, Villages and hamlets represented with their churches, castles, housing (800 edifices), to serve as evidence before the law.

Source : http://www.cairn.info/resume.php?ID_ARTICLE=RHIS_093_0621
Entre carte, image et pièce juridique : la vue figurée de la baronnie de Sévérac-le-Château (1504)
Juliette Dumasy



The legacy : cartography & statistics

A move towards more exactness (not necessarily towards more information)



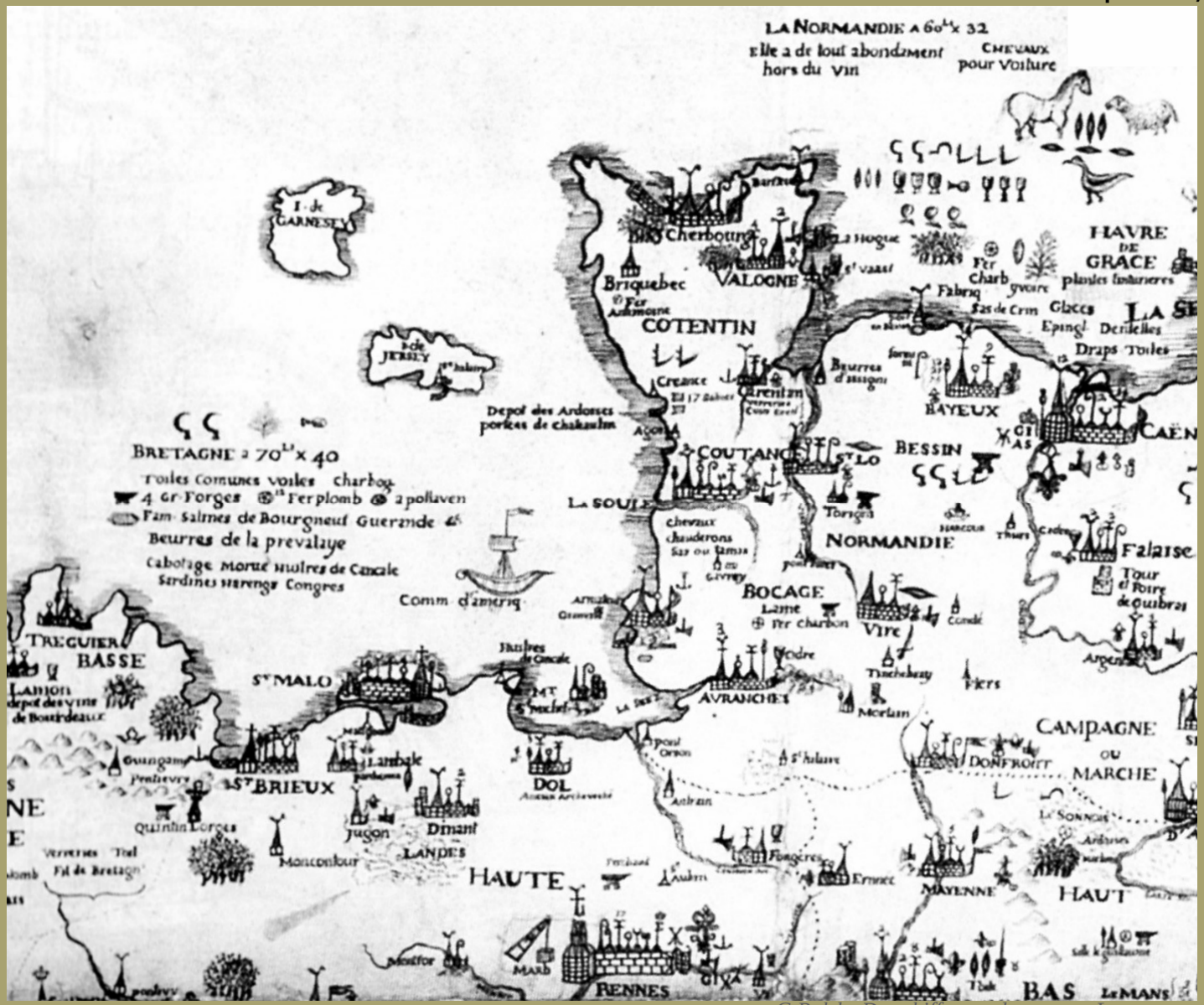
Carte de Cassini

Surveys between 1756 and 1789
Published between 1756 et 1815.

http://fr.wikipedia.org/wiki/Fr%C3%A9jus

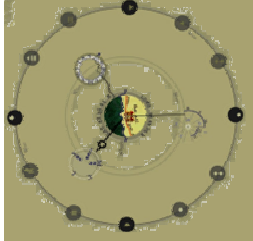
The legacy : cartography & statistics

A move towards more exactness (not necessarily towards more information) with exceptions, though



A XVIIth c. anonymous map showing the agricultural, mining and manufacturing activities of each of France's Provinces

G.Palsky Des chiffres et des cartes. La cartographie quantitative au XIXe siècle CTHS 1996 p36

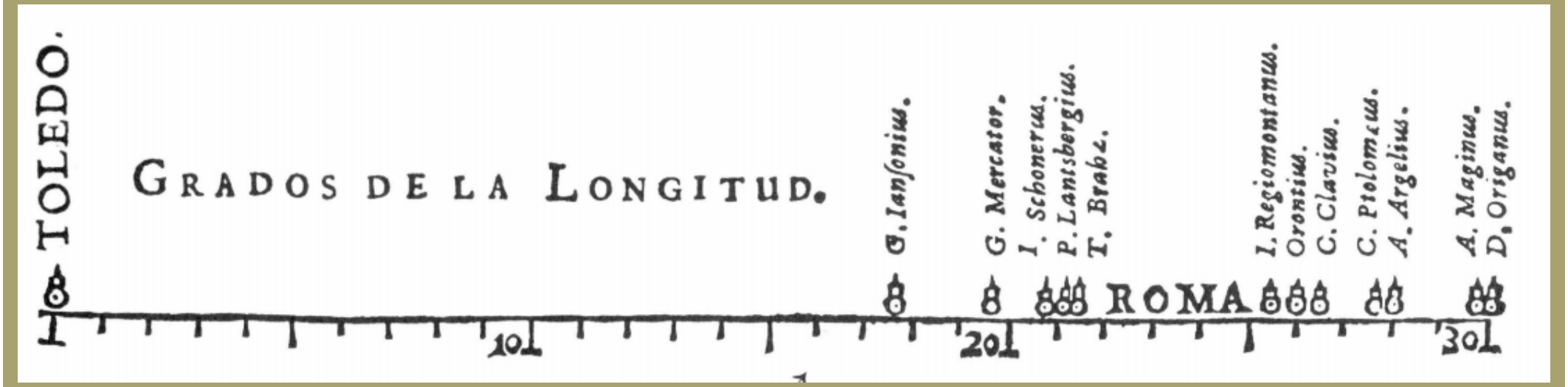


The legacy : cartography & statistics

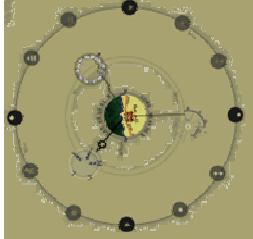
The first visual representation of statistical data

12 knows estimates of the difference in longitude between Toledo and Rome

(1644 , M.F Van Langren)



** M. Friendly A brief history of data visualisation*
http://www.datavis.ca/papers/hbook.pdf



The legacy : cartography & statistics

A move towards (yet more) abstraction

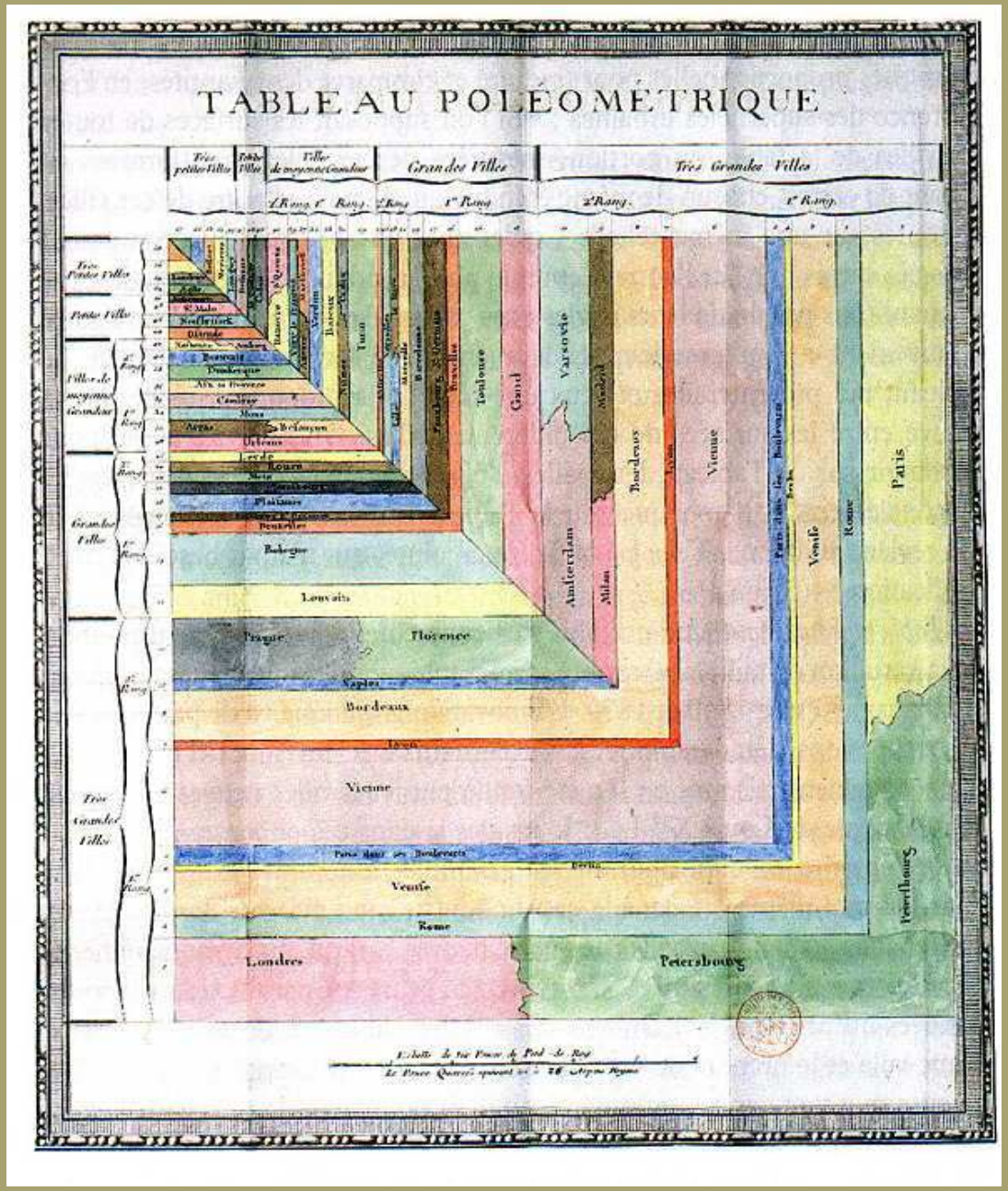


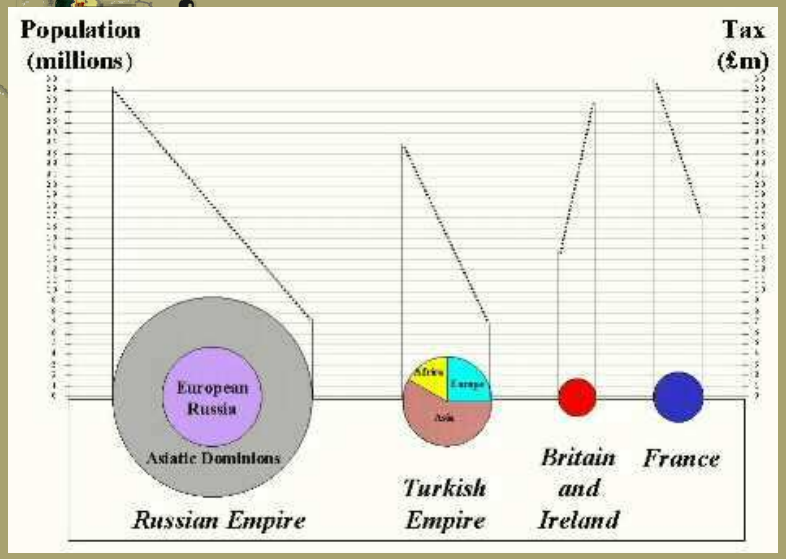
Tableau poléométrique
Charles de Fourcroy 1782

Use of geometric, proportional figures (squares) to compare demographic quantities by superposition, an early ``tableau graphique"-

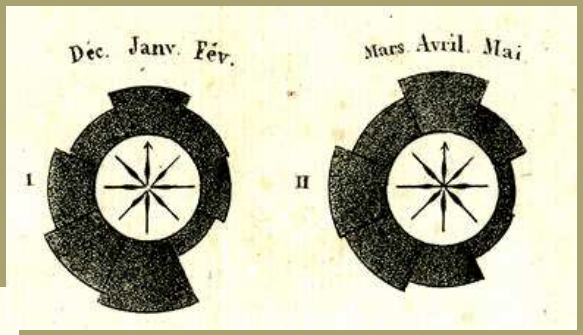
http://euclid.psych.yorku.ca/SCS/Gallery/images/palsky/defourcroy3.jpg

The legacy : cartography & statistics

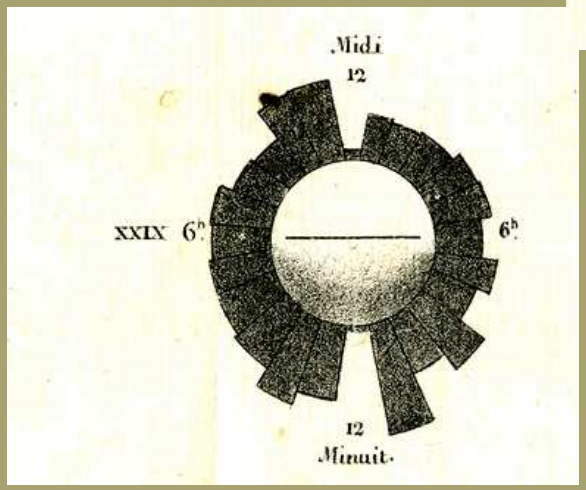
And many other inventions during the XIXth century

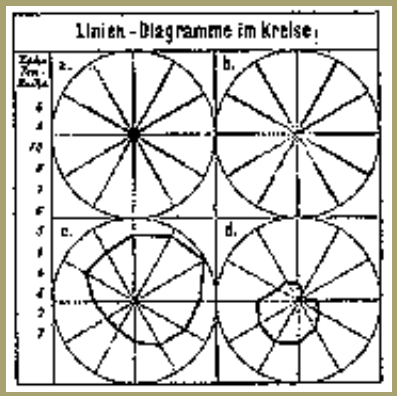


Statistical chart
William Playfair 1801
http://www.datavis.ca

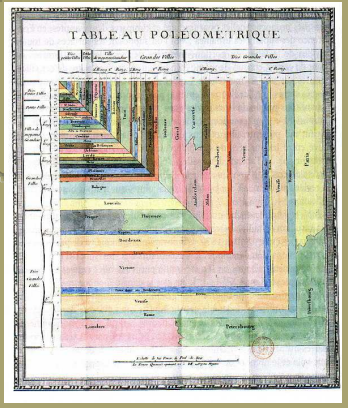


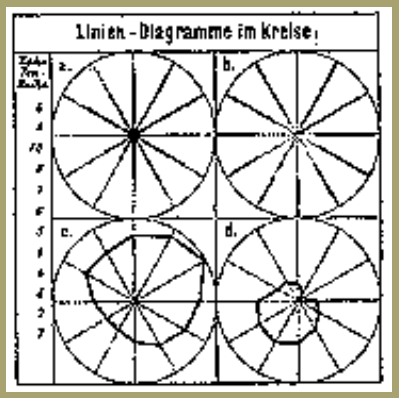
Polar-area charts
André Michel Guerry 1829
Polar-area charts (predating those by Florence Nightingale, showing frequency of events for cyclic phenomena
http://www.datavis.ca





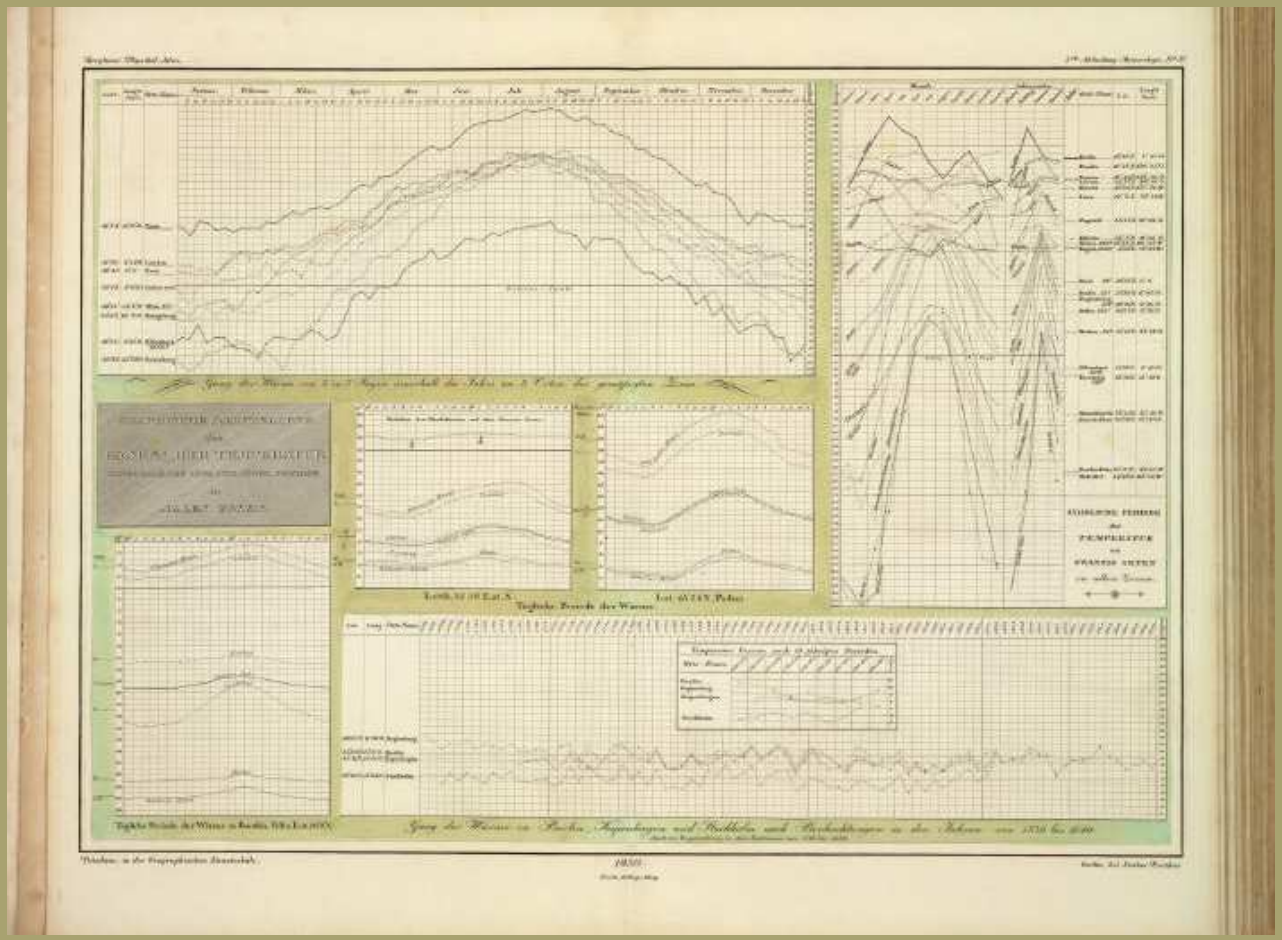
Star plot
Georg von Mayr, 1877
http://datavis.ca/milestones//admin/uploads/images/vonmayr2.gif





The legacy : cartography & statistics

Rectangle, circles, and now lines

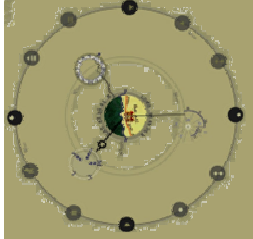


1838 print by Heinrich Berghaus (1797-1884), Germany

Physical atlas of the distribution of plants, animals, climate, etc., one of the most extensive and detailed thematic atlases; most of the maps contained tables, graphs, pictorial profiles of distributions over altitude, and other visual accompanyments.

Berghaus, H. (1838). Physikalischer Atlas . Gotha: Justus Perthes. 2 vols., published 1845-48.

http://*www.infovis.info/visuals/Gallery_of_Data_Visualization/Historical_Milestones/1800+/charts_worldtemps_1838.png*



The legacy : cartography & statistics

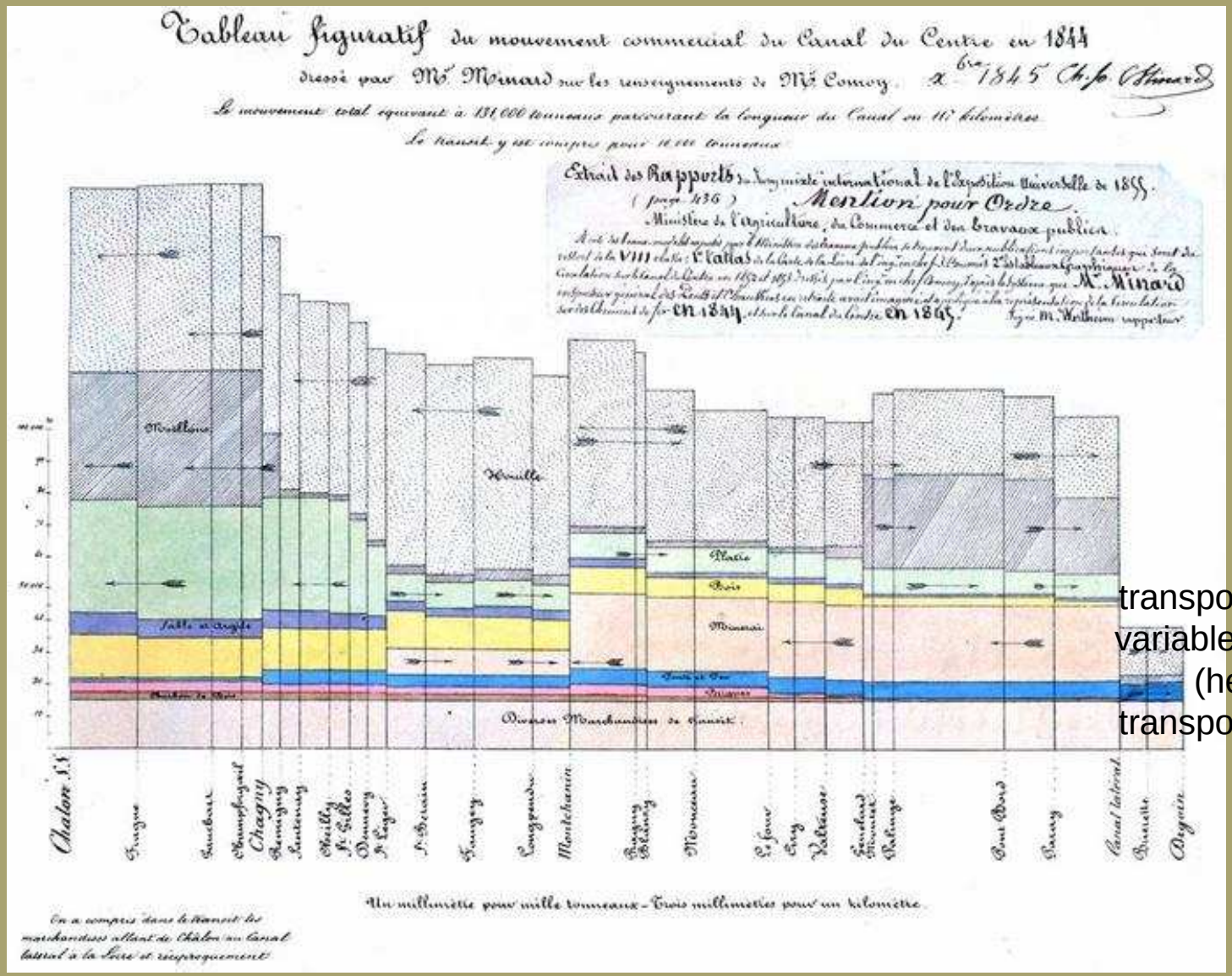
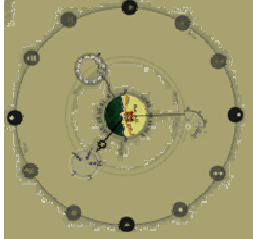


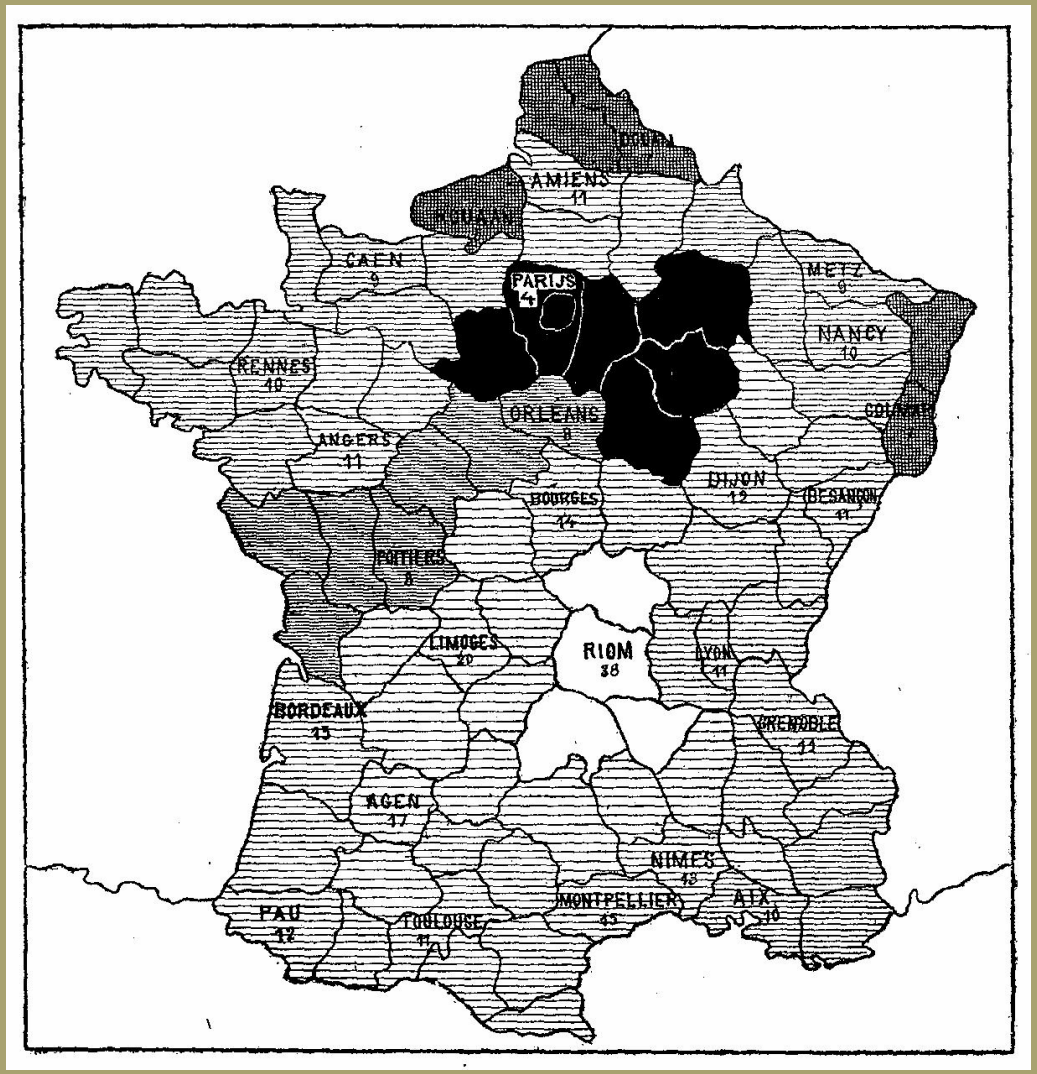
Tableau figuratif
Charles-Joseph Minard, 1844

``Tableau-graphique'' showing transportation of commercial traffic by variable-width (distance), divided bars (height ~ amount), area ~ cost of transport [An early form of the mosaic plot.]-

http://euclid.psych.yorku.ca/SCS/Gallery/milestone/sec5.html



The legacy : cartography & statistics

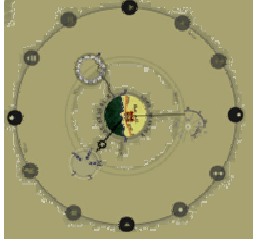


And now both cartography and statistics

Cartogram, map with shadings from black to white (distribution and intensity of illiteracy in France), the first (unclassed) choropleth map, and perhaps the first modern statistical map.

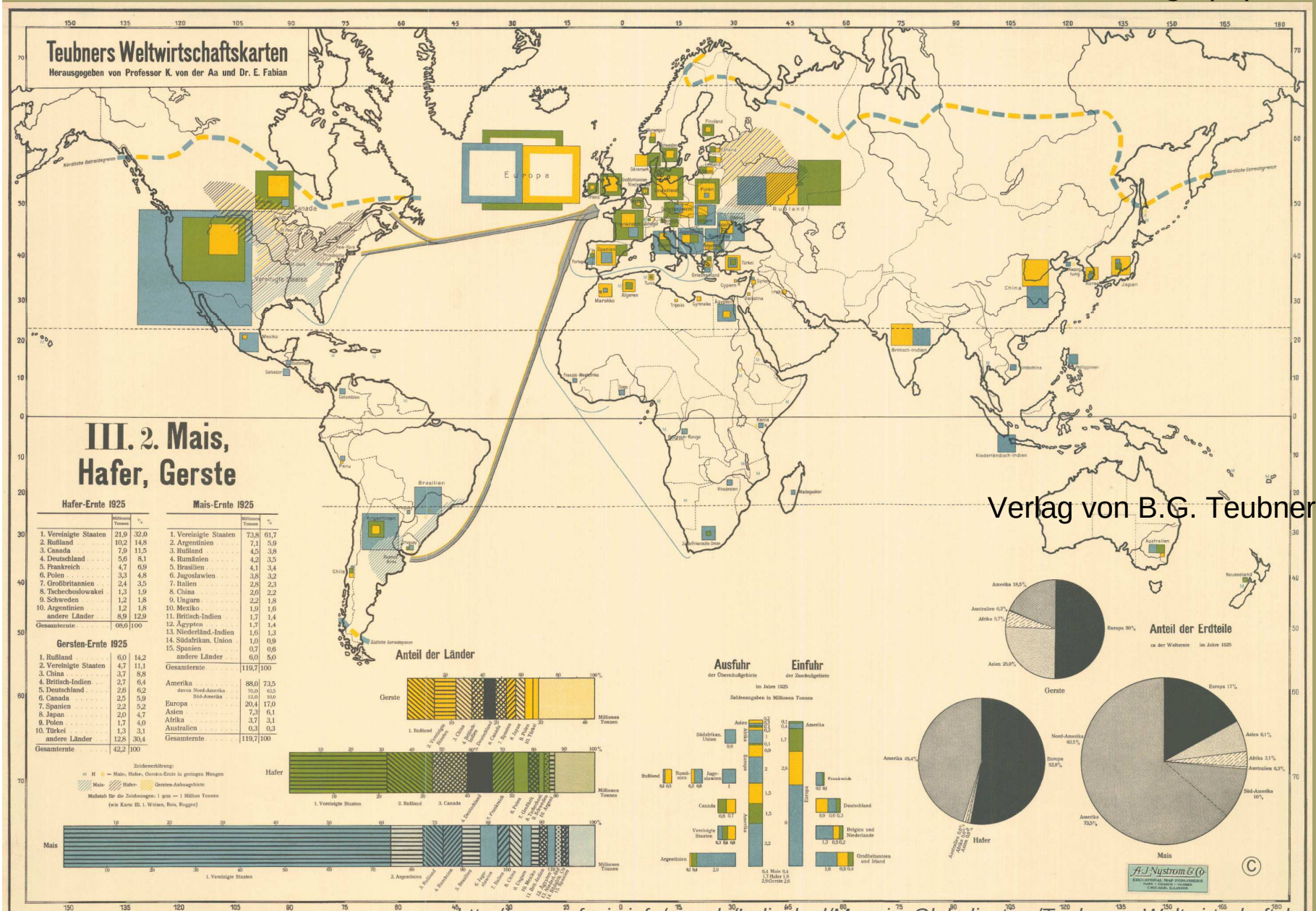
Dupin, C. (1826). Carte figurative de l'instruction populaire de la France . Jobard. BNF: Ge C 6588

http://www.infovis.info/index.php?words=dupin

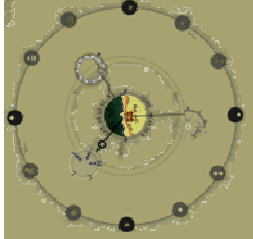


The legacy : cartography & statistics

And now both cartography and statistics

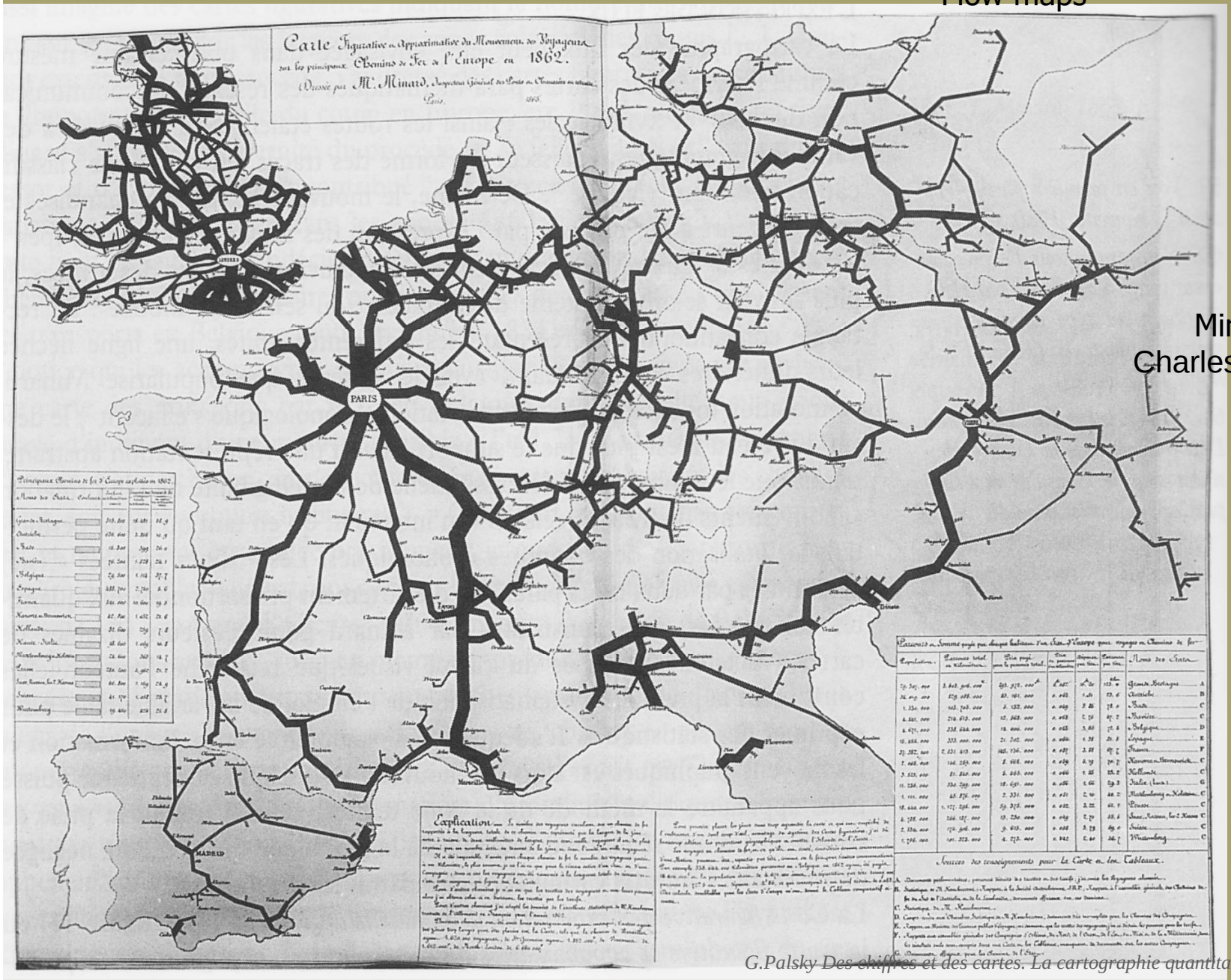


http://www.infovis.info/visuals/Individual/MappingGlobalization/Teubners_Weltwirtschaftskarten_III_2.jpg



The legacy : cartography & statistics

Flow maps

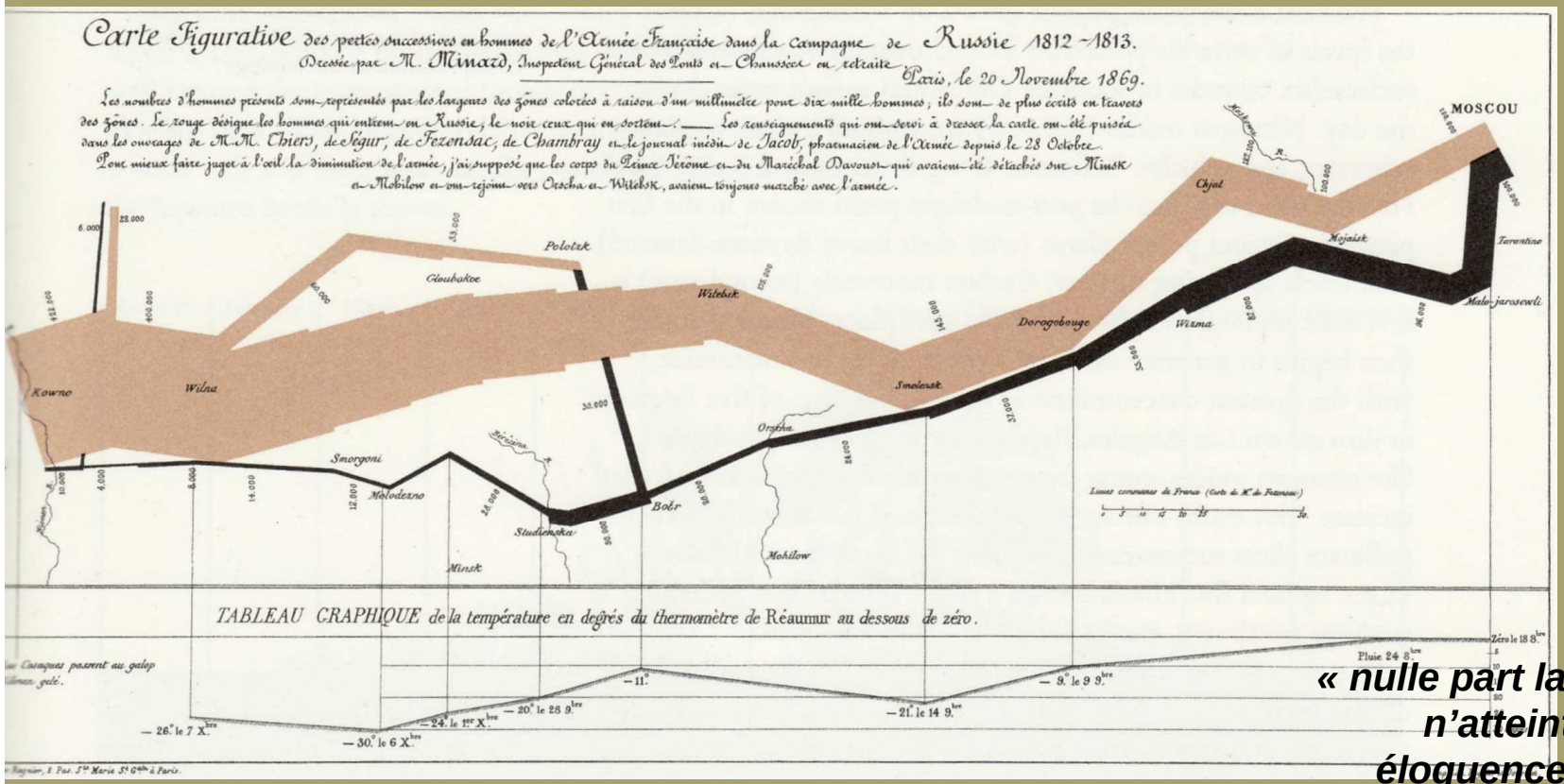


Minard's figurative maps.
Charles-Joseph Minard, 1865

G.Palsky Des chiffres et des cartes. La cartographie quantitative au XIXe siècle CTHS 1996

The legacy (2) : when time matters

One step beyond towards (and Minard again) : flow maps showing quantities over time



Charles-Joseph Minard, 1869

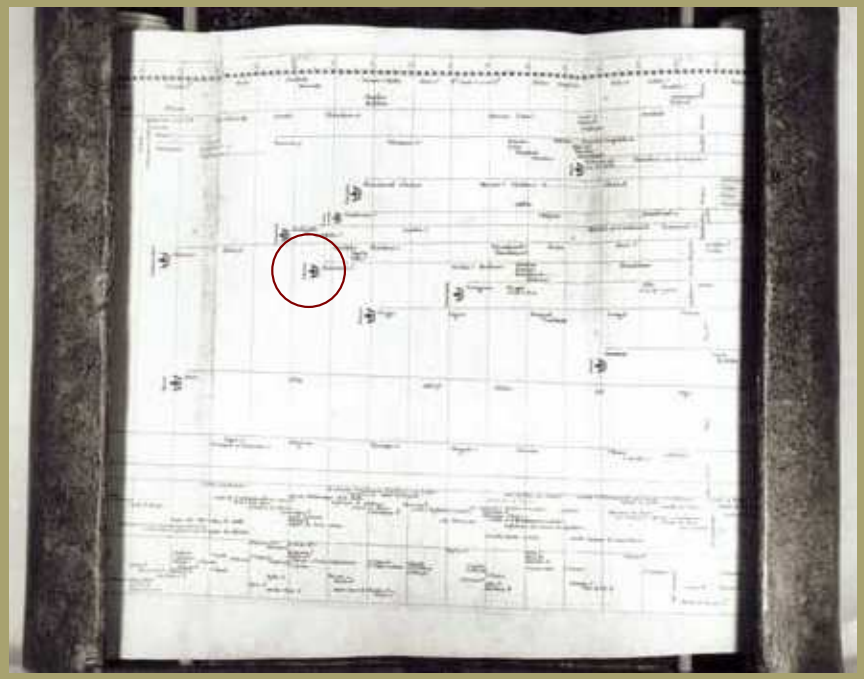
Defies the pen of the historian by its brutal eloquence

« nulle part la marche des armées n'atteint ce degré de brutale éloquence qui semble défier la plume de historien»
E.J Marey La méthode graphique dans les sciences expérimentales, 1878

In this second part again, a quick and subjective overview of some key Time – oriented data visualisation

E.R Tufte, Beautiful Evidence Graphics Press Cheshire 2006, p126

The legacy (2) : when time matters



t

Back to the origin of time-oriented data visualisation: timelines

Time represented as a continuum, read from left to right,

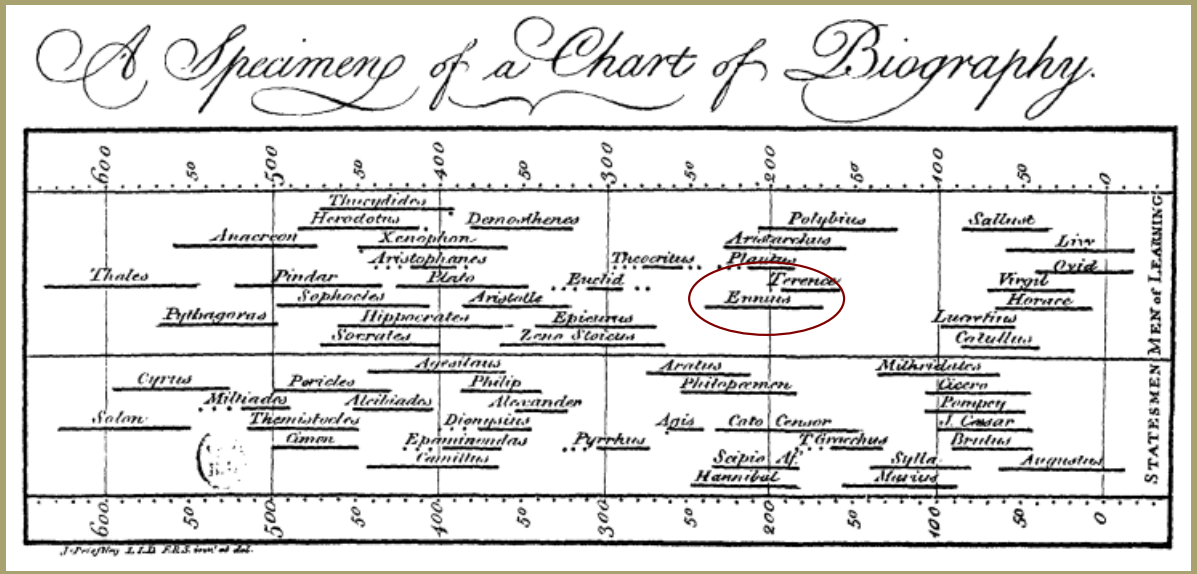
symbols added to type the information (here character / profession).

Durations represented by bars.

Carte chronologique

Jacques Barbeu-Dubourg 1753
http://www.mediamatic.net/142472/en/carte-chronologique-by-jacques-barbeu-dubourg-1753

An annotated timeline of history (from Creation) on a 54-foot scroll, including names and descriptive events, grouped thematically, with symbols denoting character (martyr, tyrant, heretic, noble, upright, etc.) and profession (painter, theologian, musician, monk, etc.)-

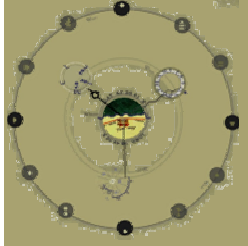


Historical timeline

Joseph Priestley, 1765
http://euclid.psych.yorku.ca/SCS/Gallery/images/priestley.gif

Life spans of 2,000 famous people, 1200 B.C. to 1750 A.D.), quantitative comparison by means of bars

From www.datavis.ca

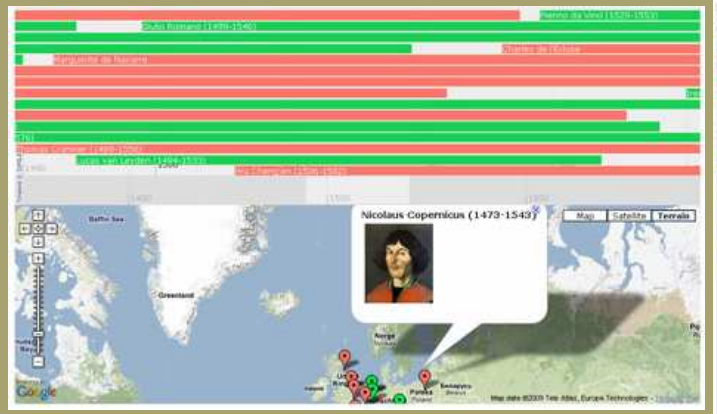


The legacy (2) : when time matters

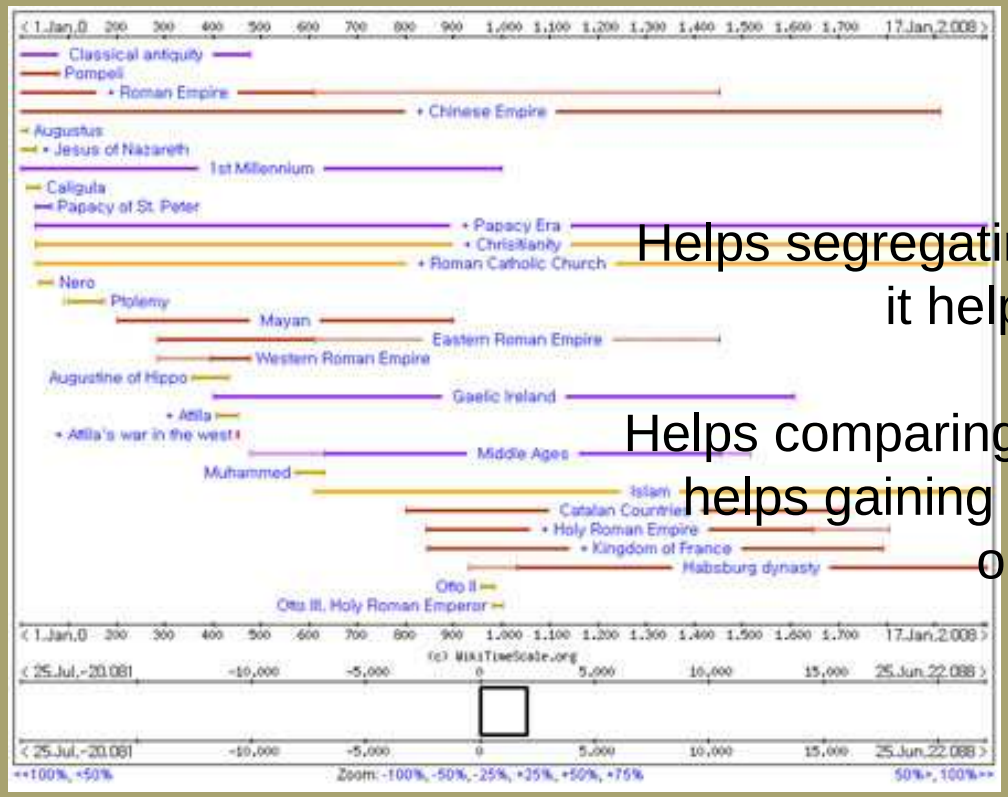
Back to the origin of time-oriented data visualisation: timelines

A still dominant vision of time.

Google TimeMap



Simile



Helps segregating more than it helps comparing

Helps comparing more than it helps gaining a global view on a collection

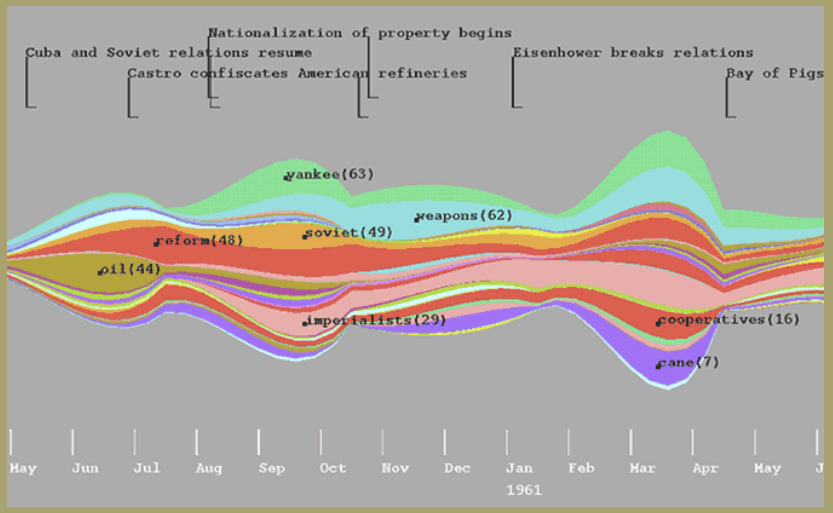
WikiTimeScale

http://www.computus.org/journal/?p=8

http://www.computus.org/journal/?p=7

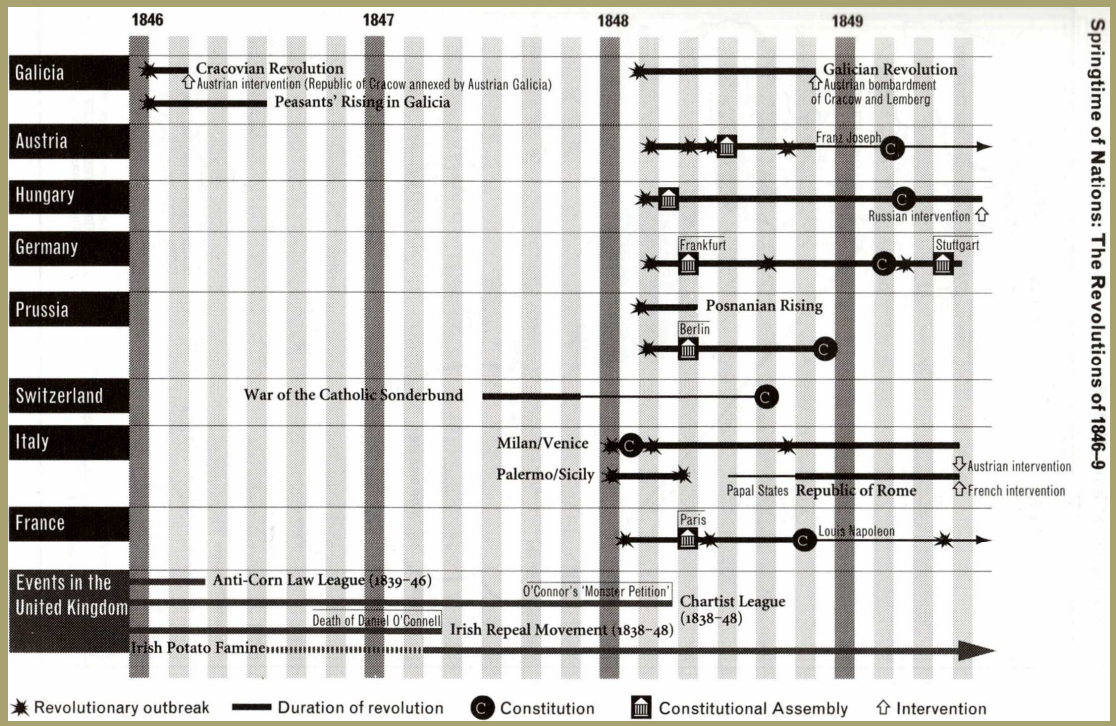
http://www.computus.org/journal/?p=1206

The legacy (2) : when time matters



1. Timelines, timecharts, and related :

Adding quantities / combining time points and time intervals



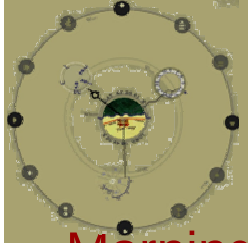
Theme river

http://vis.pnnl.gov/research_themeriver.stm
Voir aussi :
http://www.ifs.tuwien.ac.at/~silvia/wien/vu-infovis/references/havre-ieeeinfovis00.pdf

The ThemeRiver™ visualization helps users identify time-related patterns, trends, and relationships across a large collection of documents.

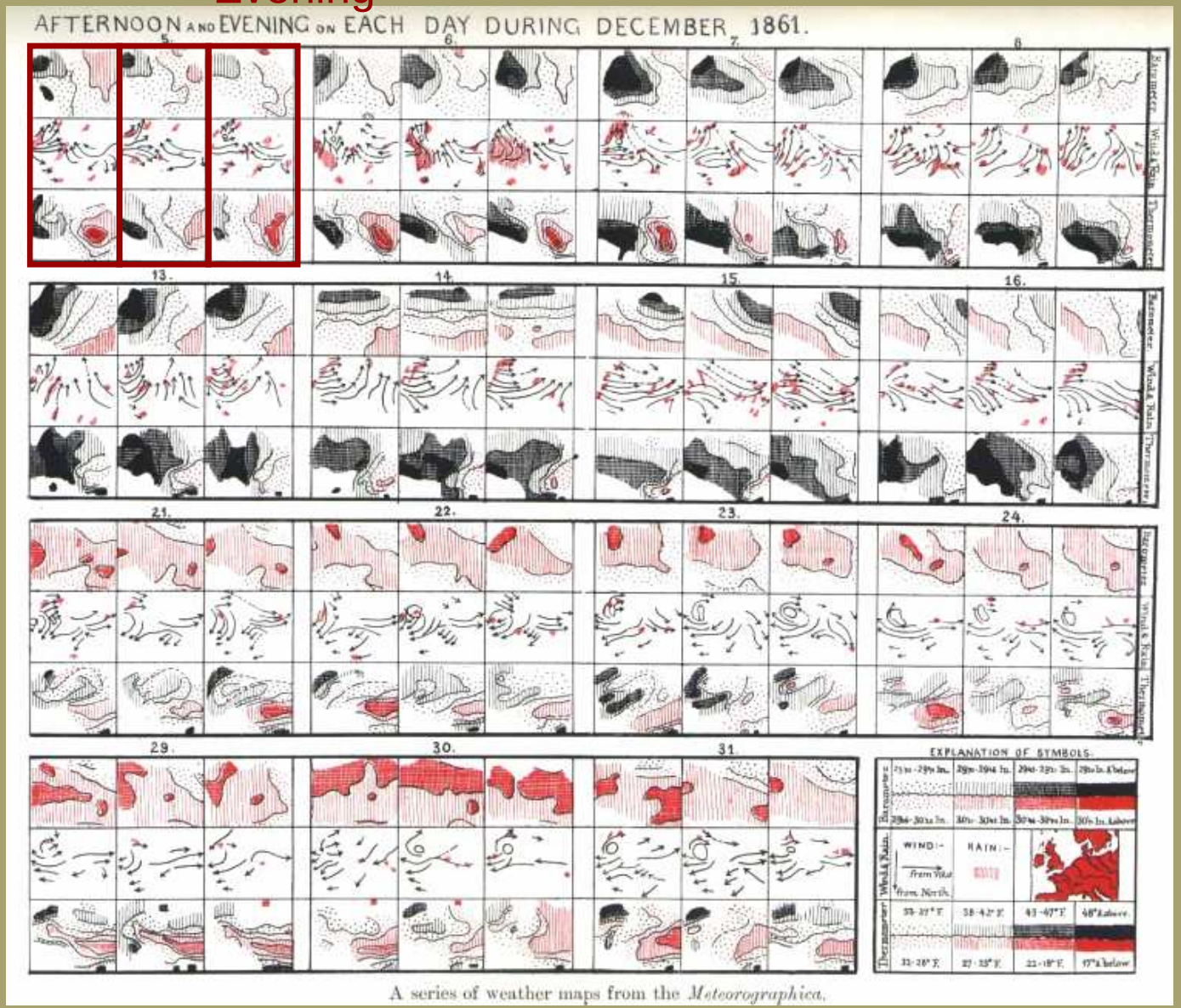
Multivariate historical timeline

N.Davies, Europe: A history, Pimlico 1997



Morning
Afternoon
Evening

The legacy (2) : when time matters



2. Galton's multivariate weather charts :

Time seen as discrete – introduces granularity

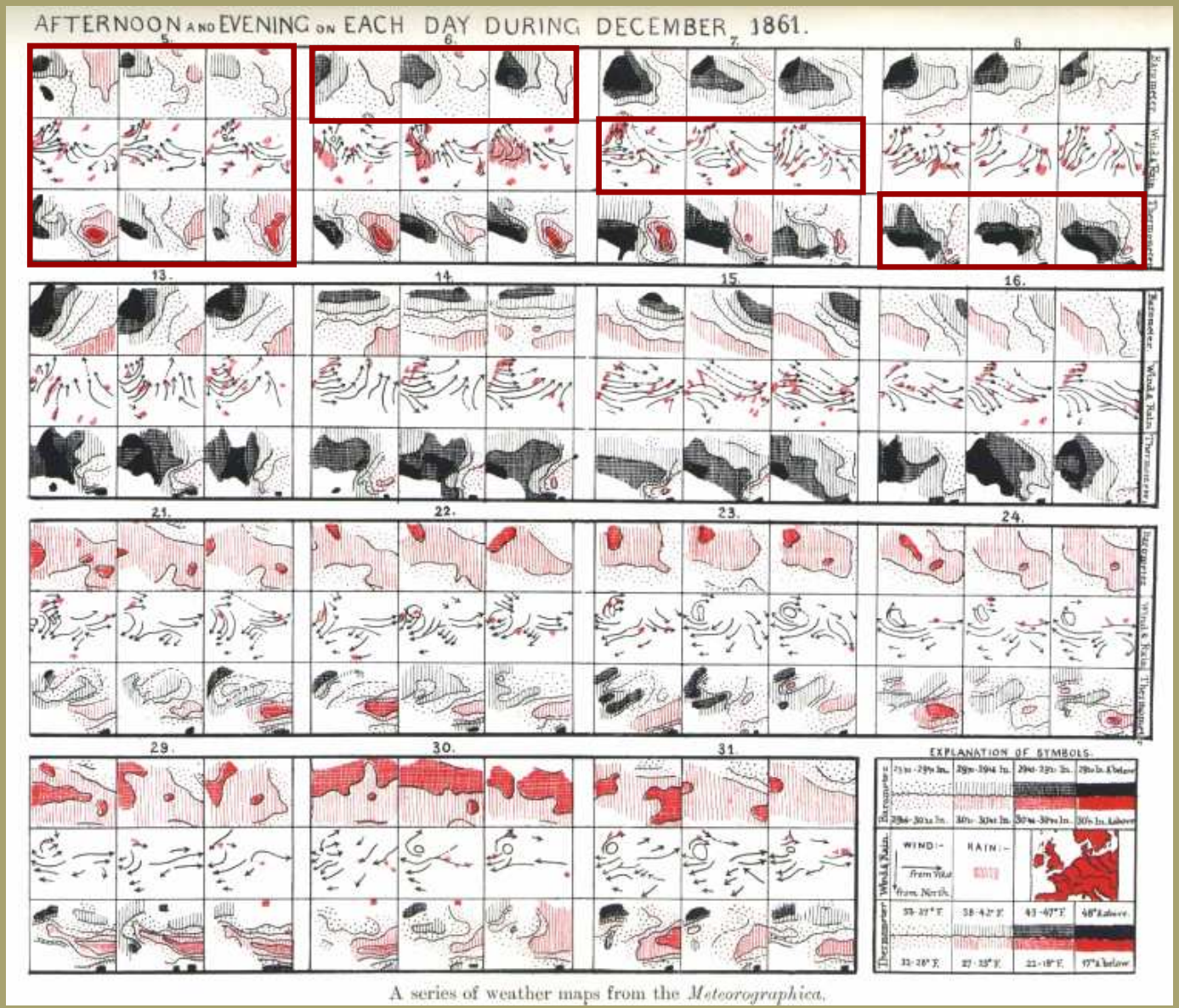
Small multiples

Francis Galton, pub. 1863.
in M.Friendly, A Brief History of Data Visualization

Multivariate weather charts, arrages as small multiples

The legacy (2) : when time matters

Day



Barometric pressure

Wind and rain

Temperature

Small multiples

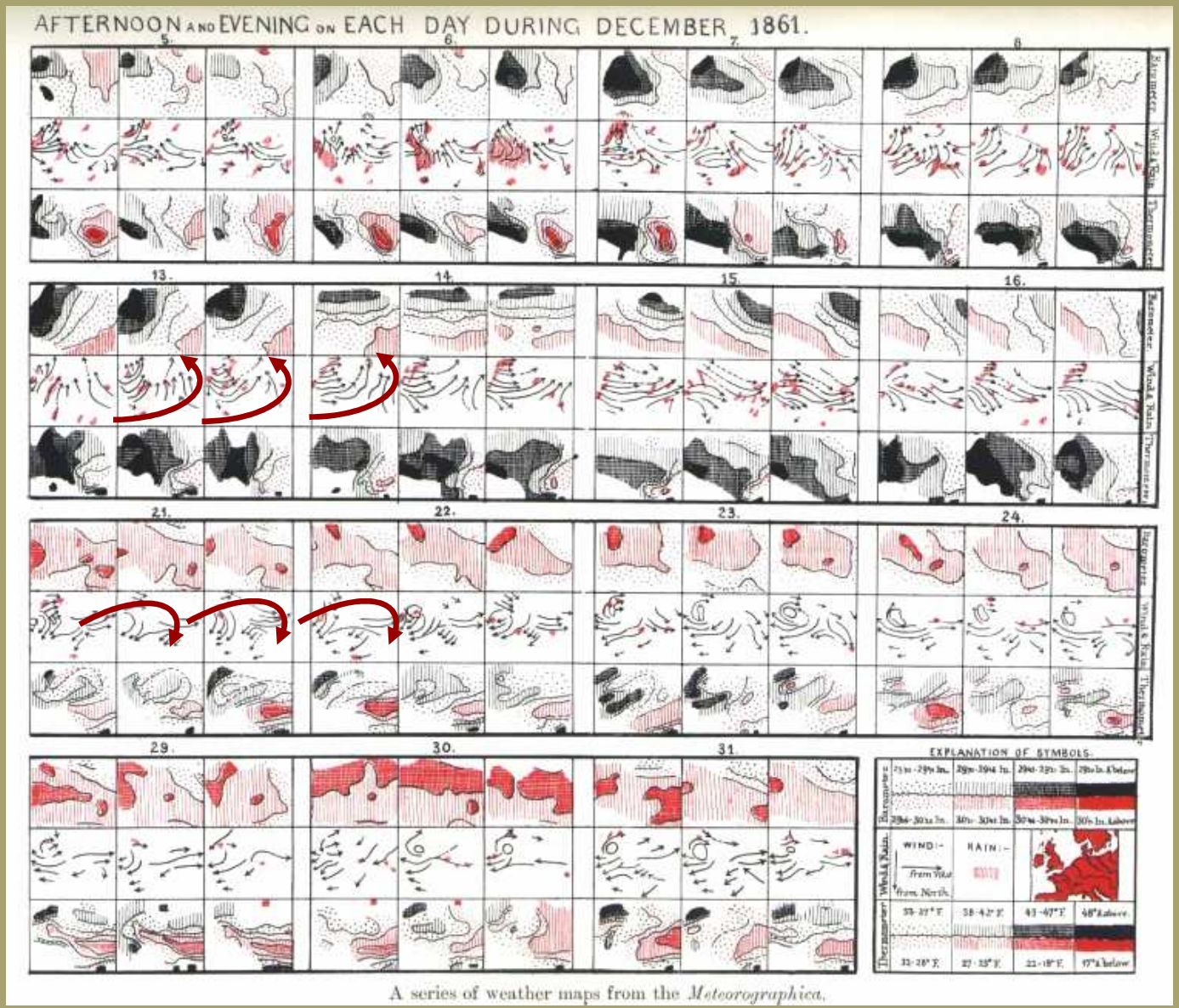
Francis Galton, pub. 1863.
in M.Friendly, A Brief History of Data Visualization

Multivariate weather charts, arrages as small multiples

The legacy (2) : when time matters

Analysis of weather patterns accross Europe (Galton, pub. 1863).

Low pressures (black, first part of the month) : CCW wind direction.
High pressures : CW wind direction.



"anti-cyclonic" (anticlockwise) pattern of winds around low-pressure regions, combined with clockwise rotations around high-pressure zones.

Small multiples

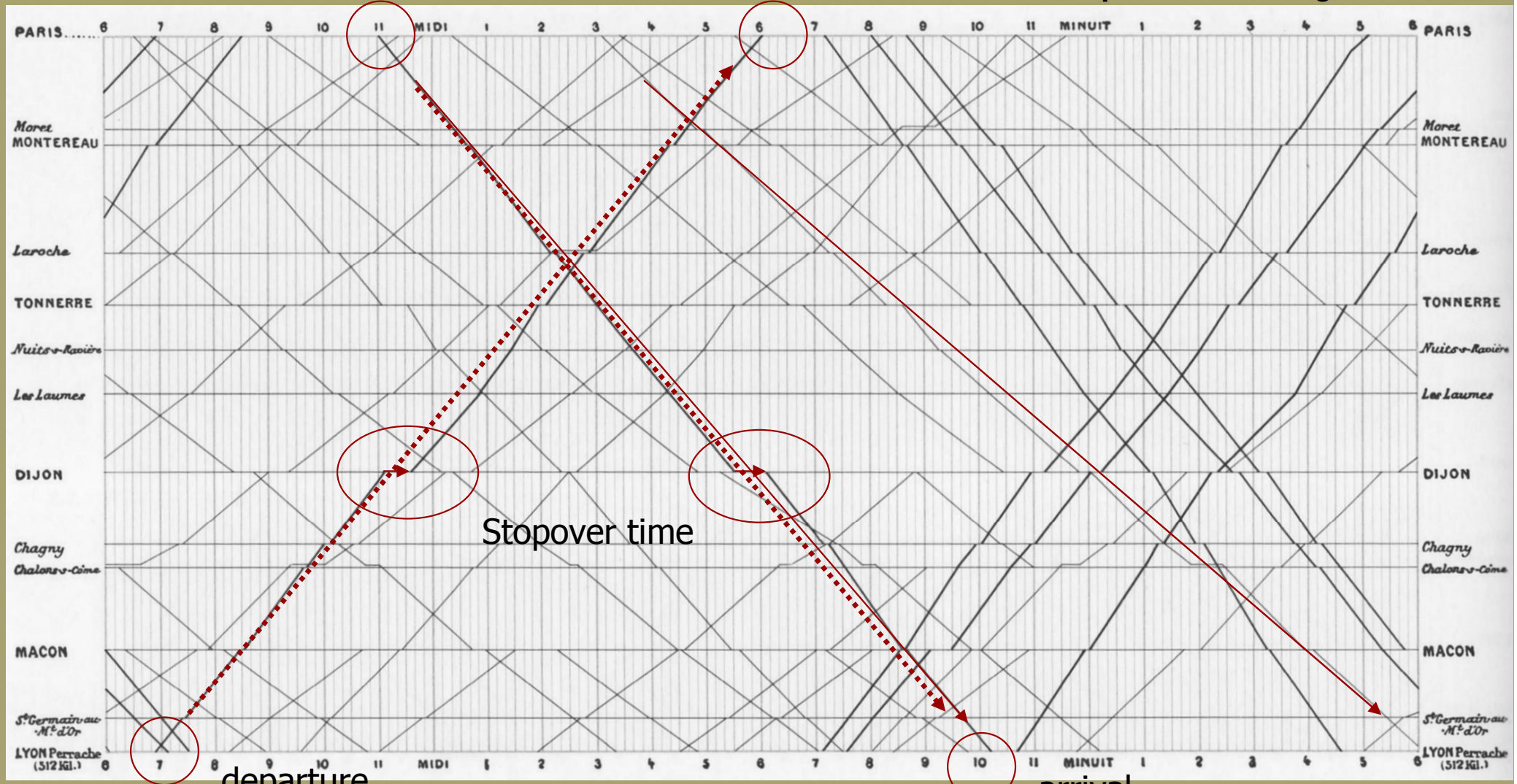
Francis Galton, pub. 1863.
in M.Friendly, A Brief History of Data Visualization
Multivariate weather charts, arrages as small multiples

observations on barometric pressure, wind direction, rain and temperature December 1861

The legacy (2) : when time matters

3. Marey's train schedule

Adding speed / frequency / comparative reading

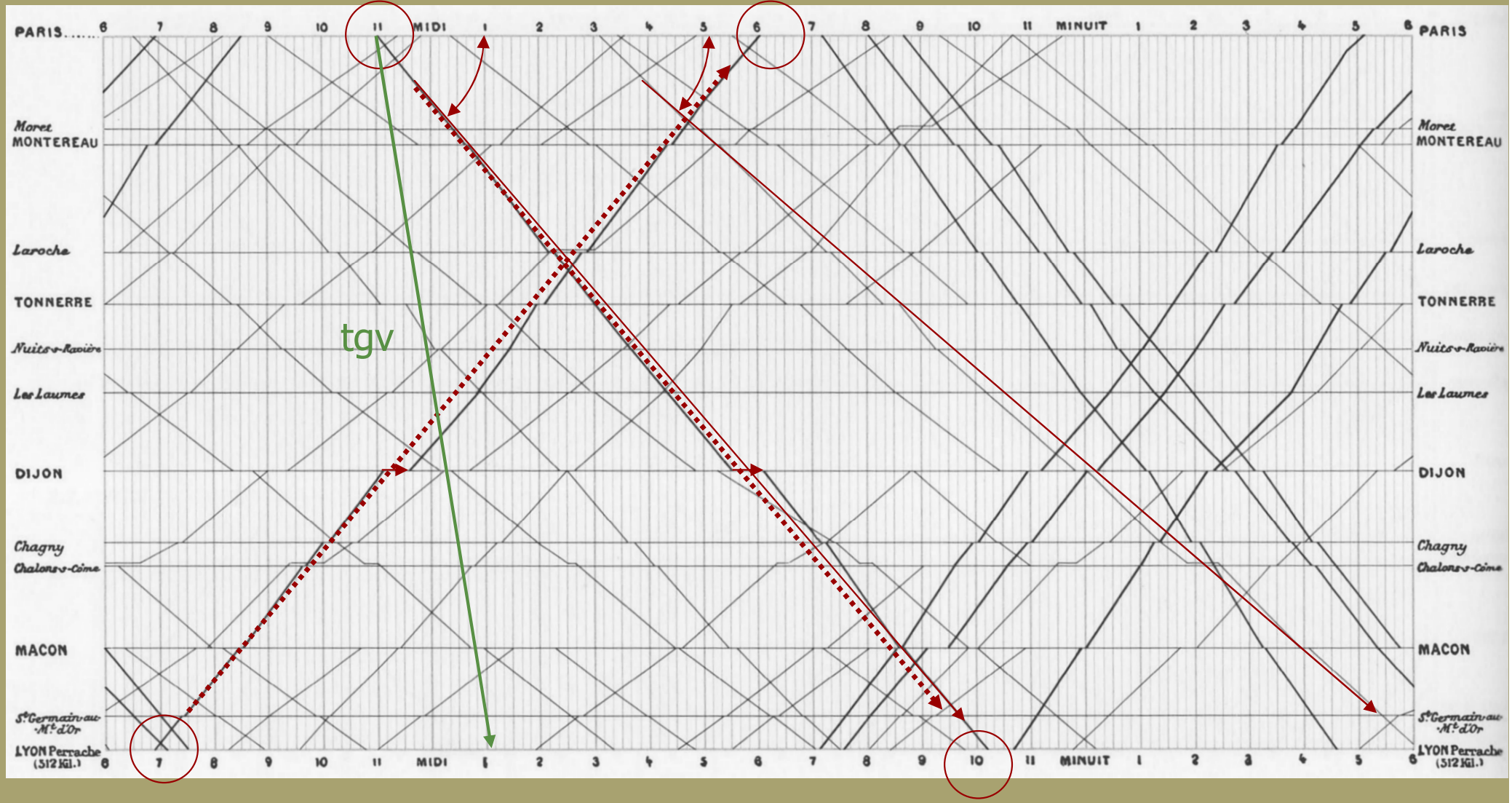


Train schedule
E.J. Marey 1885
E.R Tufte The visual display of quantitative information ,
Graphic Press, Cheshire 2001

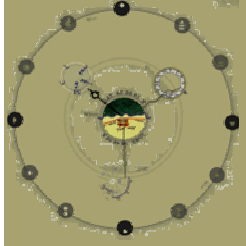
The legacy (2) : when time matters

3. Marey's train schedule

Angle= speed

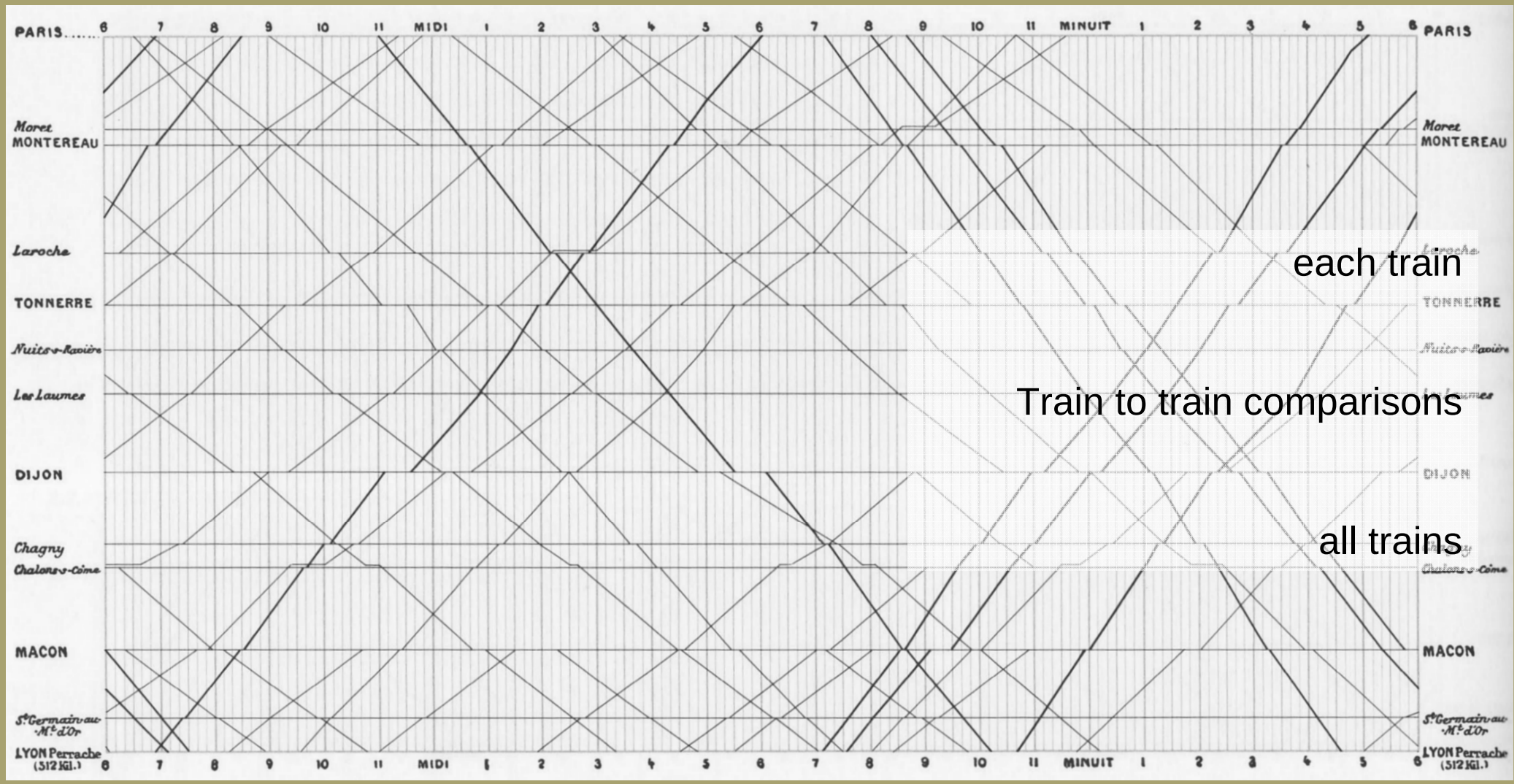


Train schedule
E.J. Marey 1885
E.R Tufte The visual display of quantitative information ,
Graphic Press, Cheshire 2001

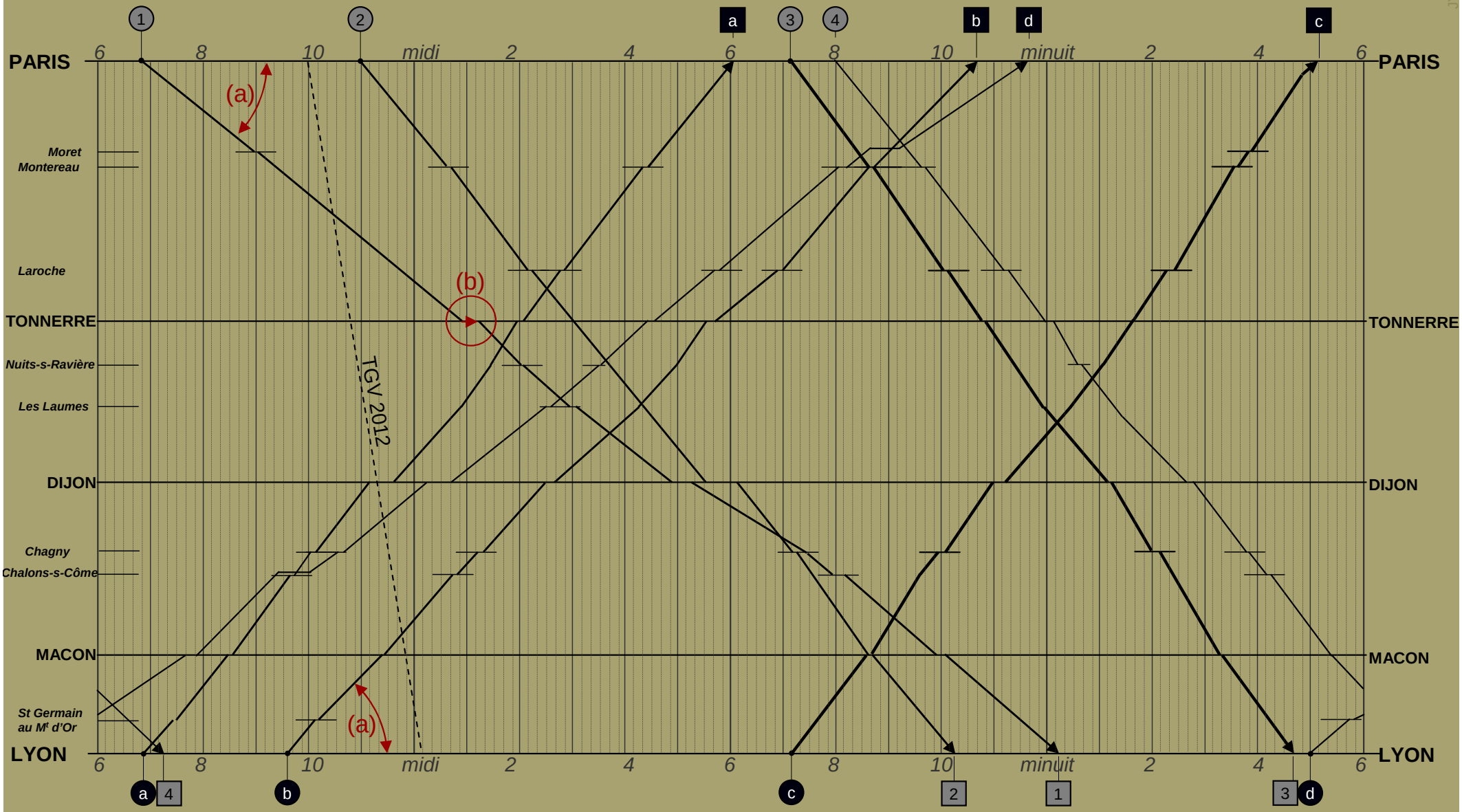


The legacy (2) : when time matters

3. Marey's train schedule



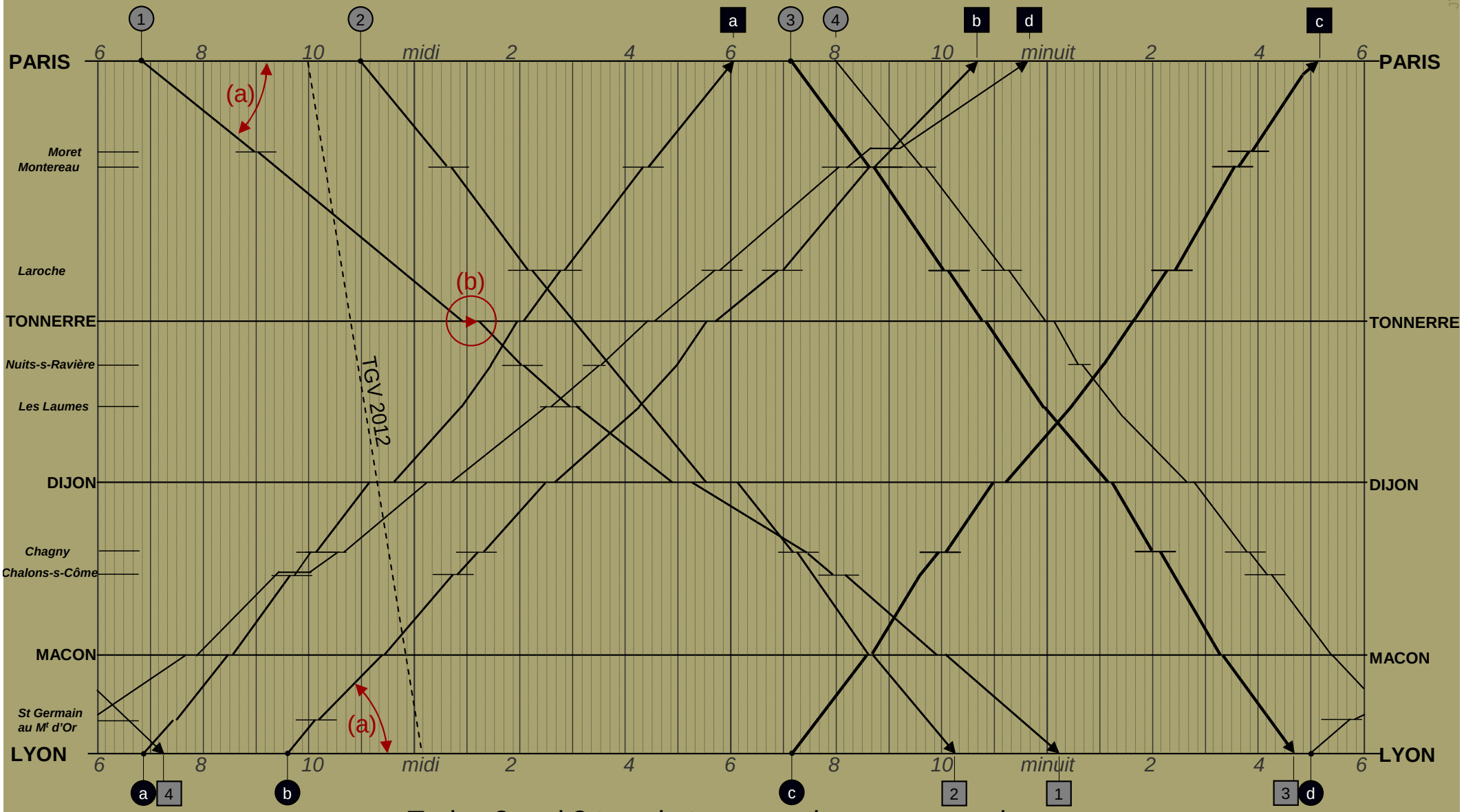
The legacy (2) : when time matters



About each train:

- Durations of stopovers for each train
- Amount of stopovers for each train
- Number of stations on the route
- …

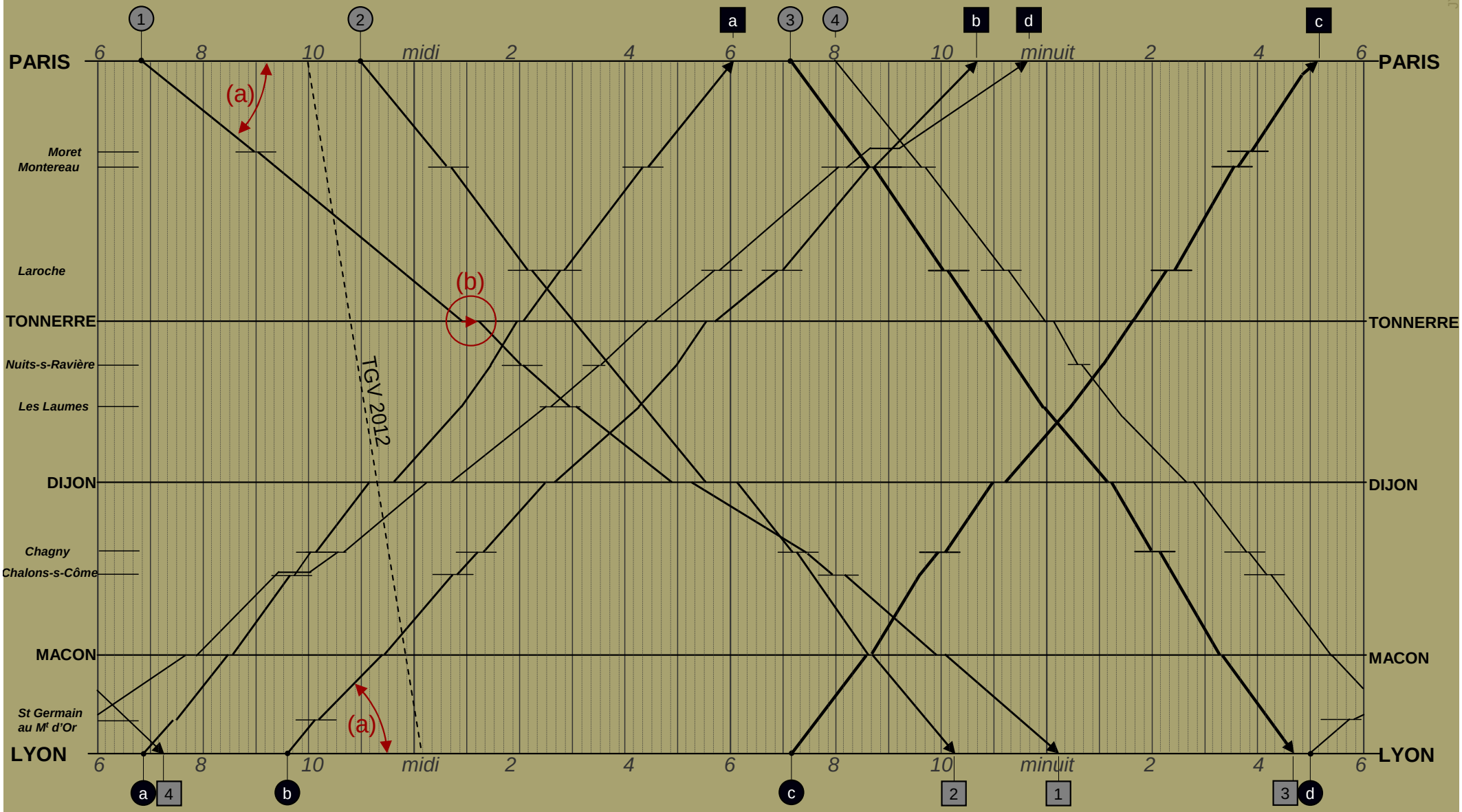
The legacy (2) : when time matters



Train to train comparisons:

Trains 2 and 3 travel at approx. the same speed
Train 1 is the slowest
Until the "*Les Laumes*" station (where can this be, I wonder), trains 3 et 4 travel at approx. the same speed. From then on difference in speed increases.
…

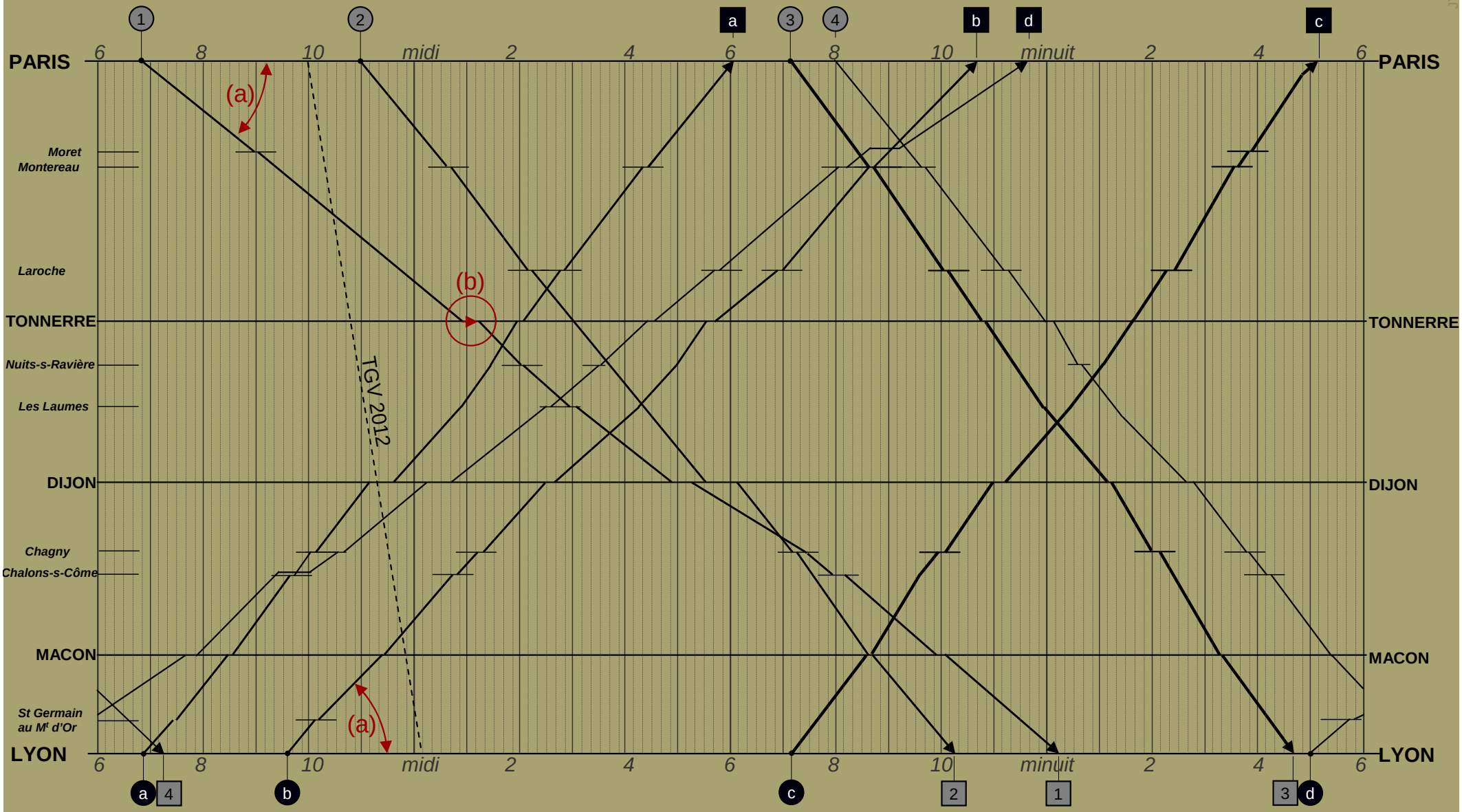
The legacy (2) : when time matters



About all trains :

Influence of the number of stopovers on the travel time
Densities of departure and arrivals throughout the 24 hours.
Night trains / day trains speed comparisons available

The legacy (2) : when time matters



About all trains :

The number of stopovers does not justify differences in speed (train 2 five stopovers, train 3 six stopovers yet train 3 faster than train 2)
The fastest trains (both ways) leave at the same time of day
…

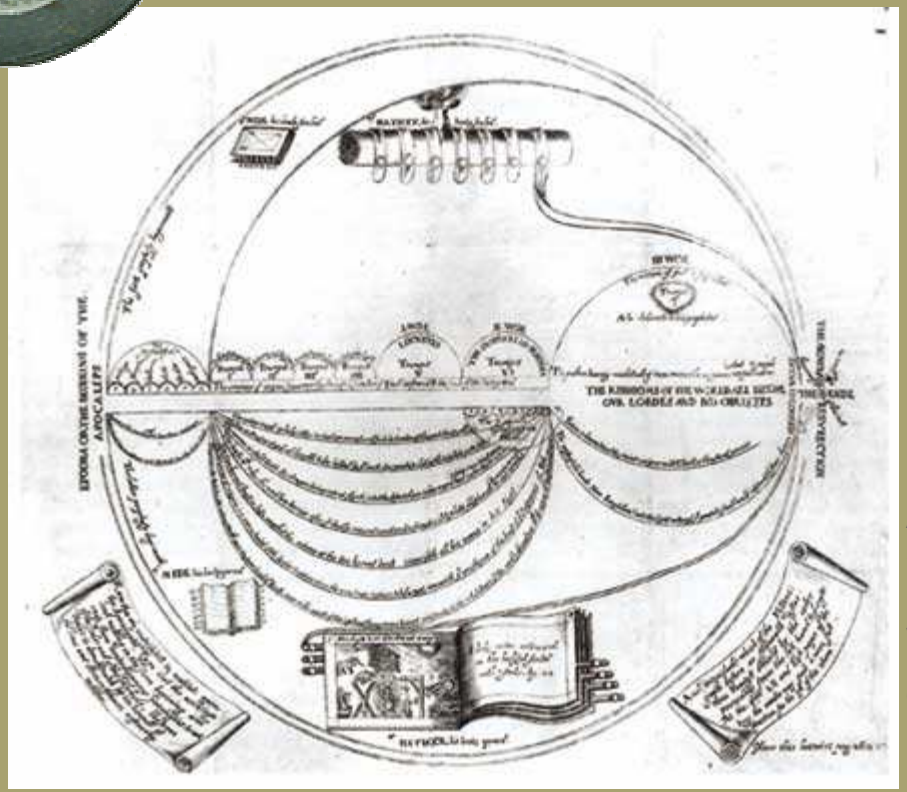
http://en.wikipedia.org/wiki/Ouroboros

The legacy (2) : when time matters

4. Cyclic time : the origin

Depicting periodic behaviours

Cyclic time: an old concept, used in many calendars – cycles may be represented in combination with linear time



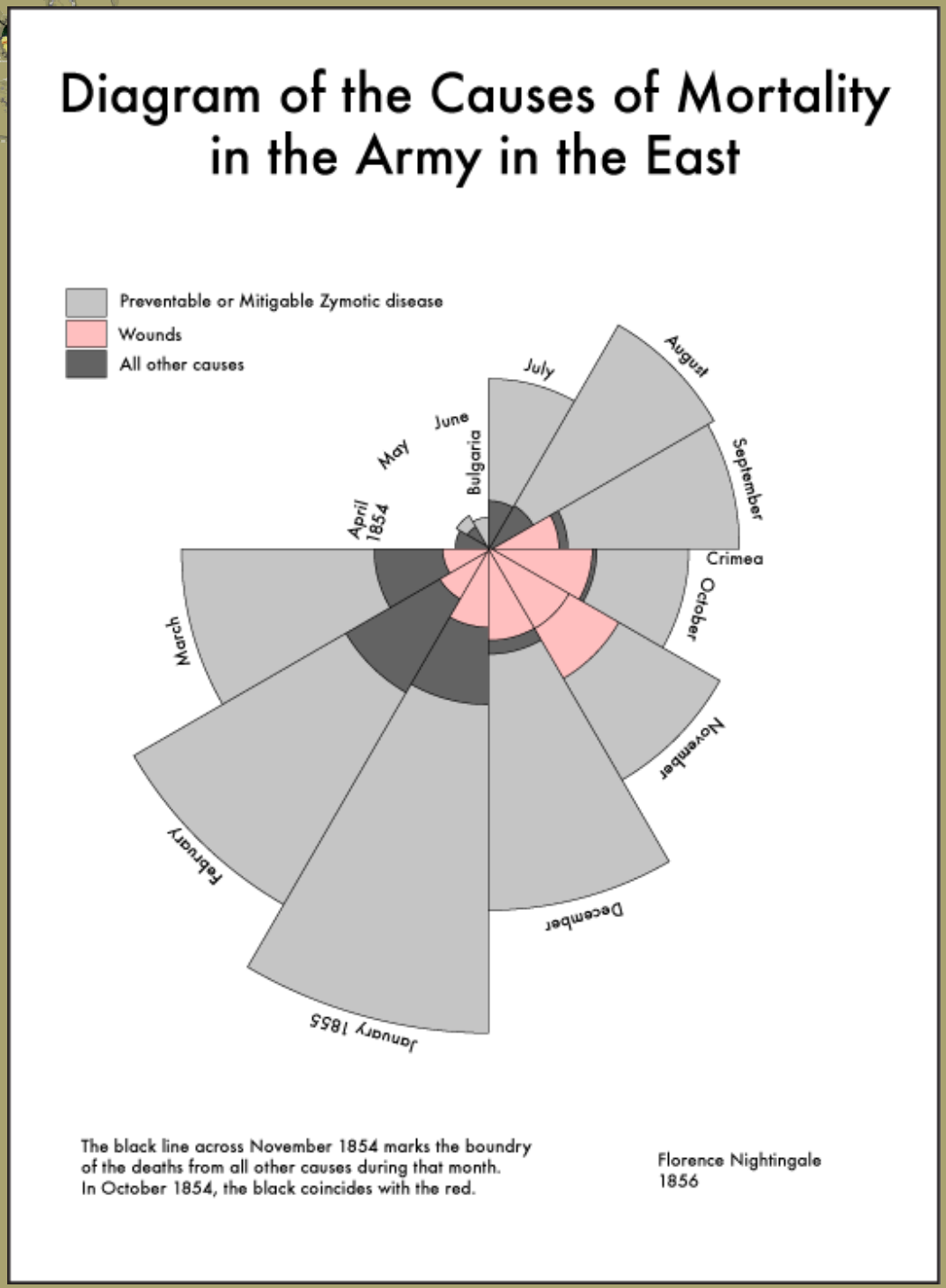
Issue 13 Futures Spring 2004
A Timeline of Timelines
Sasha Archibald and Daniel Rosenberg
1627
Joseph Mede's *Key of the Revelation* from Latin into English in 164, maps the end of history onto a complex graphical figure combining cyclical and linear forms.

http://www.cabinetmagazine.org/issues/13/timelines.php

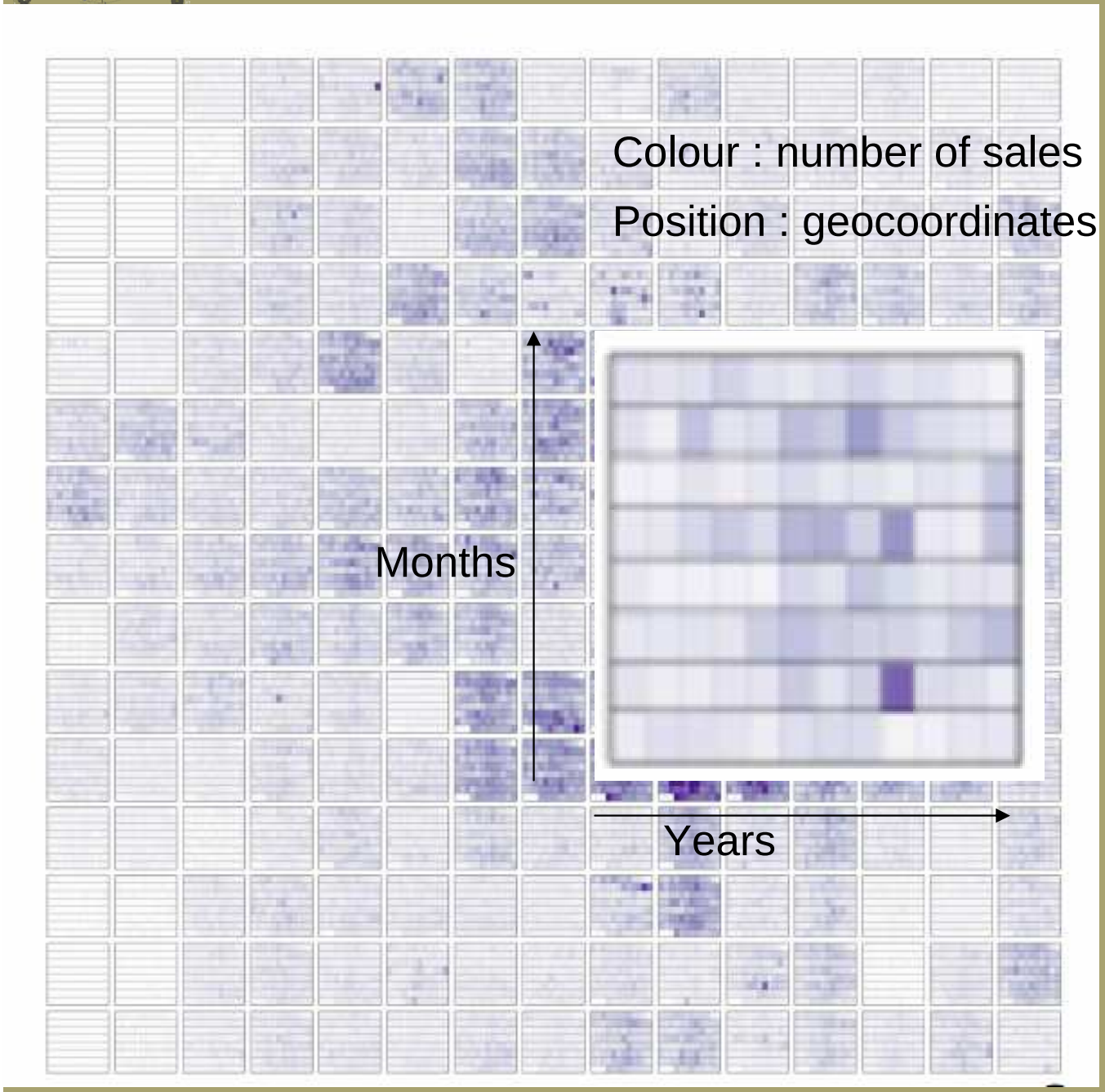
The legacy (2) : when time matters

4. Cyclic time : the origin

Depicting periodic behaviours



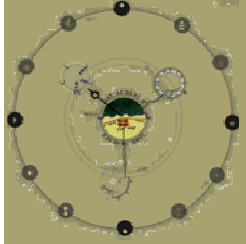
http://melbourneblogger.blogspot.fr/2011/02/florence-nightingale-dedicated-but-no.html



4. Cyclic time : treemap (non-polar) visualisation

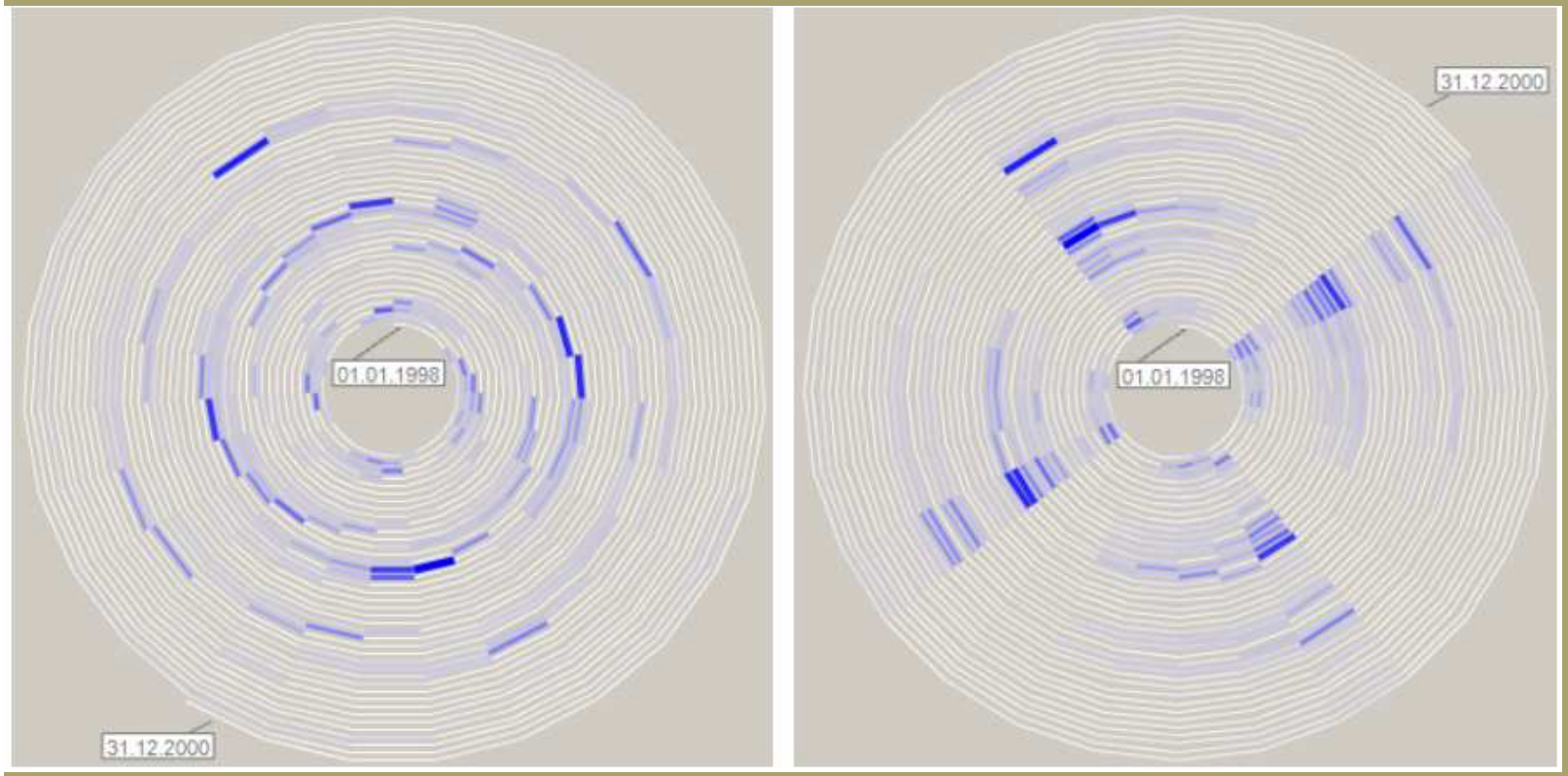
Depicting periodic behaviours

The Role of Layout and Order in Treemaps for Showing Spatial and Temporal Variation in House Prices
Aidan Slingsby, Jason Dykes, Jo Wood, Andrew Crooks
http://www.gicentre.org/houseprices/slingsby_hamburg.pdf



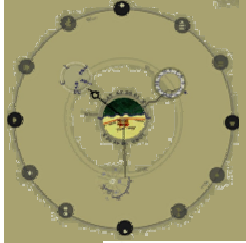
The legacy (2) : when time matters

4. Cyclic time : Spiral Graph

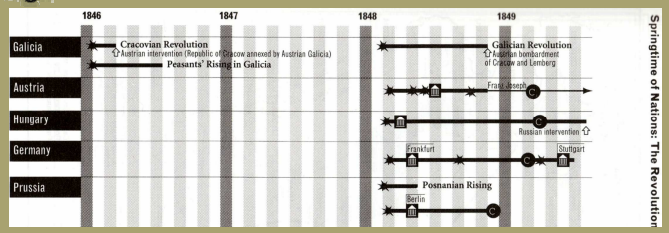


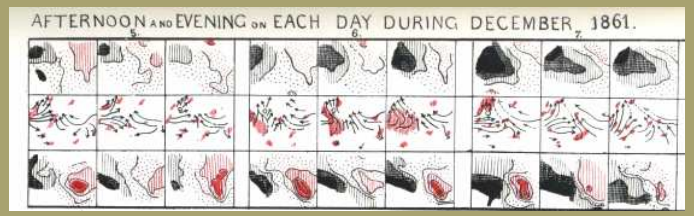
Spiral graph
http://www.informatik.uni-rostock.de/~ct/pub_files/Aigner08TimeVis.pdf
Visual Methods for Analyzing Time-Oriented Data
W.Aigner, S.Miksch, W.Müller, H.Schumann, and C.Tominski
IEEE Transactions on Visualization and Computer Graphics, Vol. 14, No. 1, 2008.

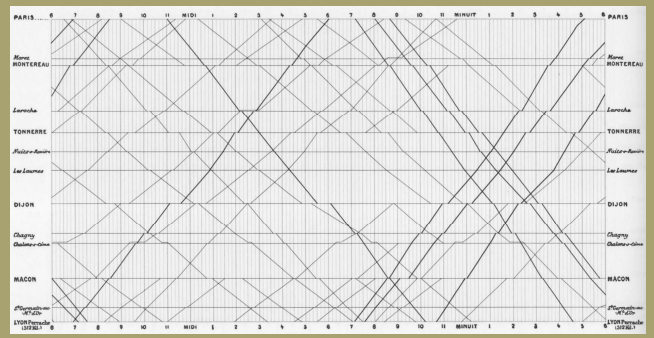
[extracts of original legend] Visual representations of a time-oriented dataset describing the number of influenza cases over a period of three years – left: SpiralGraph encoding 27 days per cycle (improperly parameterized – periodic pattern is hard to see
right: SpiralGraph encoding 28 days per cycle (properly parameterized – periodic pattern stands out).

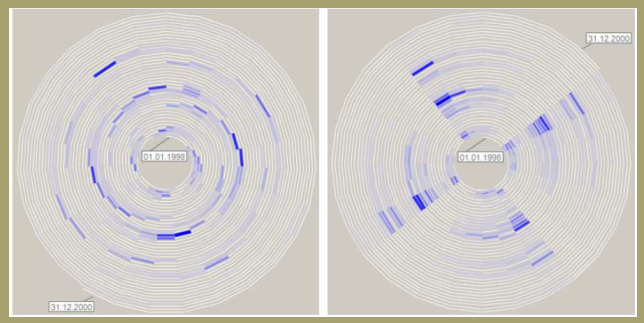


The legacy (2) : when time matters









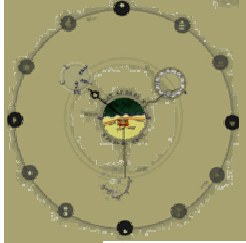
1. Timelines, timecharts, and related :
Linear time, combining time points and time intervals, showing quantities

2. Galton's multivariate weather charts :
Time seen as discrete – introduces granularity

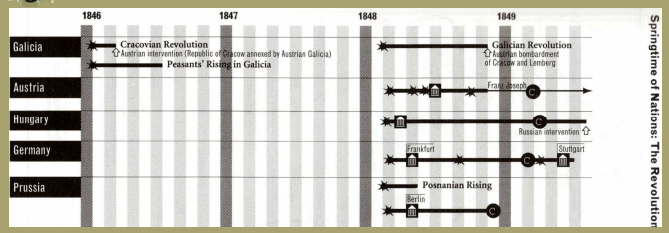
3. Marey's train schedule
Adding speed / frequency / context+ focus reading

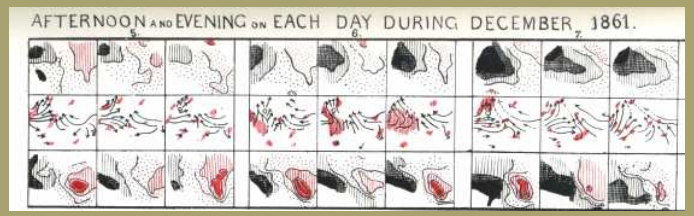
4. Cyclic time
Depicting periodic behaviours

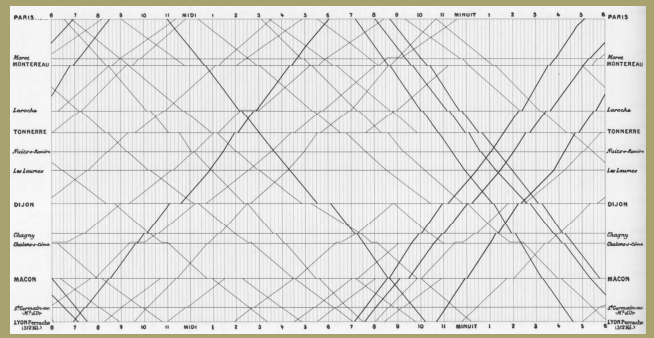
Four fundamentally different designs, because each of these visualisations explores/considers a different aspect of the time variable.

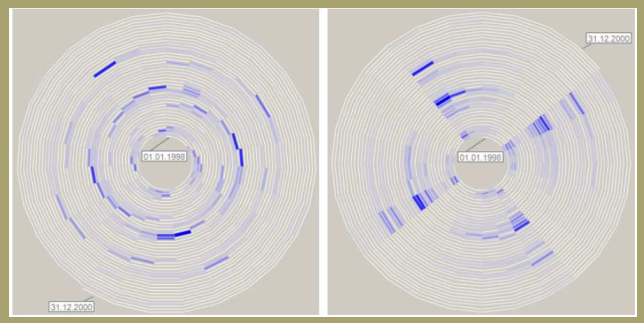


The legacy (2) : when time matters









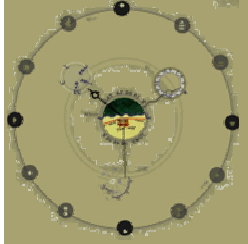
Linear time, time points / time intervals

Discrete time /
Granularity and resolution

Duration / frequency
Anchored / non anchored time

Cycles

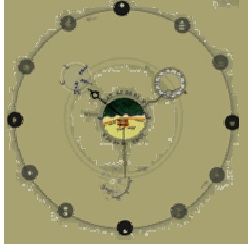
See "*Visualisation of time-oriented data*"
Aigner et al, Springer, 2011



From this legacy at least two observations on the visualisation of time-oriented data:

Because there are alternative visions of time-oriented data, or different aspects of the time variable needing investigation, it is likely that we shall need alternative visualisations

There *are* good solutions : when Tufte redraws Marey he changes … the width of a couple of lines.



The legacy (2) : when time matters

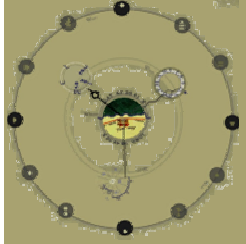
Cartography & statistics > infovis

Maybe in « drawing techniques » or in « graphic variables » ,
but also in the way one should design and use graphics, i.e. a legacy in terms of methods

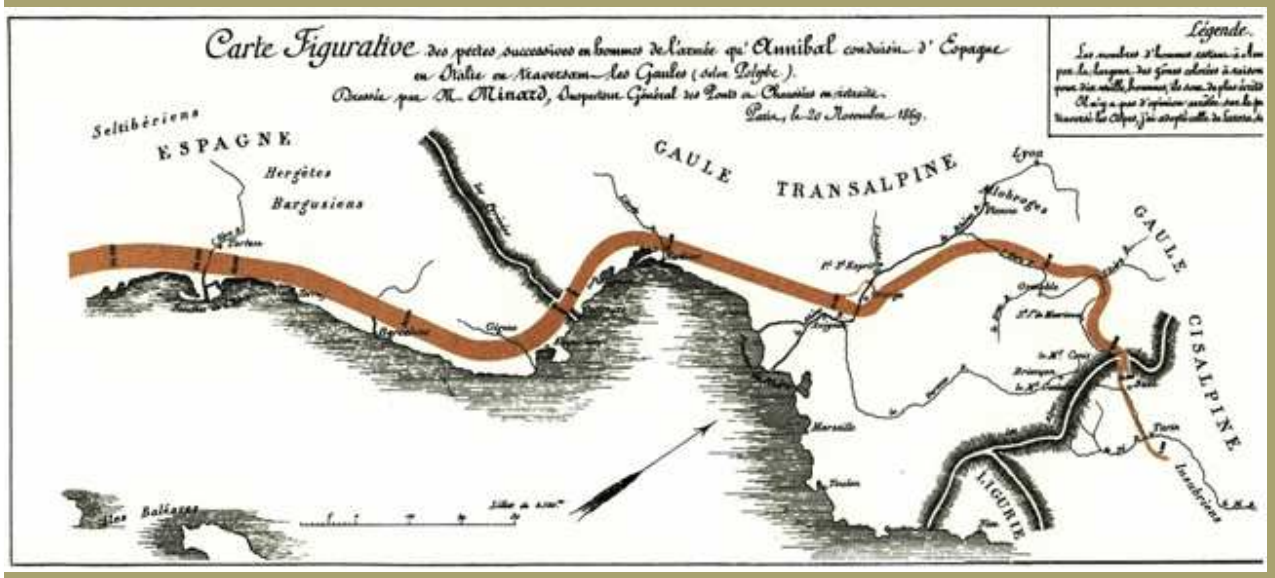
Levasseur – cartographie /statistique graphique (1885)
“il faut disposer [ce qu’on met sur un diagramme] de manière que l’oeil saisisse tout d’abord l’ensemble avec netteté et que l’esprit pénètre ensuite sans effort jusqu’à la notion de détails”

“ One should display [contents] so that the eye first catches the overall picture with clarity, and then so that the mind enters without effort down to details”.

B.Scheidermann – Infovis, turn of the XXIst century
“overview first, details on demand”



The legacy (2) : when time matters



***Graphical excellence** exists.

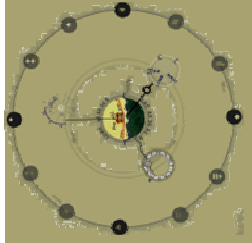
It is **not a matter of technology**. Computer-based tools do not *create* graphical excellence

It often meets Maeda's laws of **simplicity**.

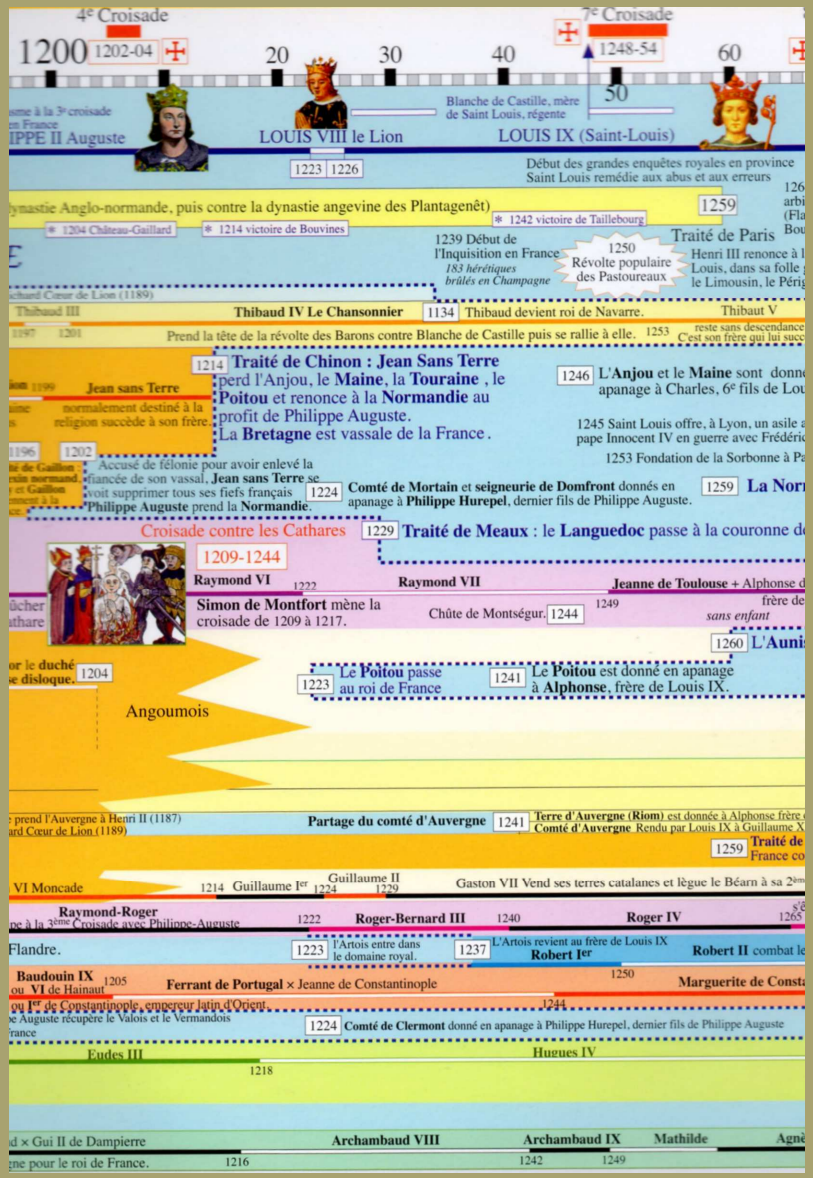
Computer-based solutions offer ***new* opportunities**, that should not stray us from seeking graphical excellence.

** E.R Tufte The visual display of quantitative information* , Graphic Press, Cheshire 2001

J. Maeda. No simplicity without complexity, In G.Schuller, Designing universal knowledge, Lars Muller Publisher 2008



3. And now what? Some recommandations, applied to real cases.



Rule 1 : Enforce comparisons within the eyespan

Chronologie de la France, Maurice Griffe
Editions TSH 2010

** E.R Tufte The visual display of quantitative information ,*
Graphic Press, Cheshire 2001

Chronologie

Ve–XIIe siècle

Ve siècle — Construction de l'église Notre-Dame, du baptistère, du vestibule et du palais.

Haut Moyen Âge — Construction de l'église Saint-Étienne.

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Troisième quart du XVe siècle — Remaniement des bâtiments sud et ouest du palais épiscopal.

XVIe–XVIIIe siècle

1525-1564 — Aménagement de l'entrée actuelle de la cathédrale ; réfection de la sacristie ; reconstruction et agrandissement du bâtiment sud et construction du grand escalier du palais épiscopal.

Première moitié du XVIIe siècle — Agrandissement du bâtiment sud et construction des nouvelles galeries du palais épiscopal.

1654 — Construction des tombeaux des Camelin.

XIXe–XXe siècle

1823-1828 — Démolition des bâtiments ouest et sud du palais épiscopal et construction des bâtiments actuels ; reprise partielle du mur sud de la cathédrale (parement en pierre de taille, fenêtres) par Esprit Bernard Lantoin, architecte départemental.

1855 — Construction d'une tribune dans la première travée de la nef Notre-Dame pour l'orgue commandé à Cavaillé-Coll par Henri Revoil, architecte diocésain.

1856-1860 — Rénovation du décor de la chapelle du palais.

1903-1904 — Projet de restauration par Jules Camille Formigé, architecte en chef des monuments historiques, du cloître alors occupé et défiguré par des maisons ; exécution ajournée jusqu'à l'acquisition des parcelles concernées.

1920-1921 — Restauration de l'aile orientale du palais épiscopal et de la tour du chevet par Jules Formigé, fils du précédent et lui-même architecte en chef des monuments historiques.

1921-1931 — Restauration du cloître et des bâtiments situés au nord et à l'ouest par Jules Formigé.

1923-1932 — Restauration du baptistère par Jules Formigé.

1945 — Réparation des dommages provoqués par les bombardements du débarquement à la voûte du porche, à la galerie occidentale du cloître et aux toitures par Paul Colas, architecte en chef des monuments historiques.

1952 — Restauration du clocher touché par la foudre par Paul Colas.

1961-1962 — Décapage des murs et des voûtes de la cathédrale ; démolition des tribunes, déplacement et restauration des stalles par Paul Colas.

1967 — Restauration des arcades et du plafond de la galerie orientale du cloître par Paul Colas.

1979 — Destruction de l'îlot de maisons situé au nord de la sacristie et fouilles du terrain par Paul-Albert Février et Michel Fixot.

1986 — Restauration de la flèche du clocher par Jean-Claude Yarmola, architecte en chef des monuments historiques.

1987 — Déplacement de l'autel de Mgr de Beausset par Jean-Claude Yarmola et fouilles du chœur de Saint-Étienne et de la troisième travée de Notre-Dame par Paul-Albert Février et Michel Fixot.

1987-1988 — Fouille de la place Formigé par Paul-Albert Février, Michel Fixot et Lucien Rivet ; rénovation de la place et de la façade de l'hôtel de ville par Martial Fahrner, architecte des Bâtiments de France.

La Cathédrale Saint Léonce et le groupe épiscopal de Fréjus, collection cathédrales de France, Editions du Patrimoine / CMN, 2004, M.Fixot et E.Sauze.

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Not easy comparing left and right page, reading densities of points and intervals,, differences in terms of intervals, granularity, doubts, etc…

maisons ; exécution ajournée jusqu'à l'acquisition des parcelles concernées.

1986 — Restauration de la flèche du clocher par Jean-Claude Yarmola, architecte en chef

Could some simple visualisation help shedding a new light on this data

de ville par Martial Fahrner, architecte des Bâtiments de France.

La Cathédrale Saint Léonce et le groupe épiscopal de Fréjus, collection cathédrales de France. Editions du Patrimoine / CMN, 2004, M.Fixot et E.Sauze.

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Clues about various parts of the episcopal group

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Clues about various parts of the episcopal group

Clues verbalised in different ways

Early middle ages According to wikipedia:

Le haut Moyen Âge débute à la fin du Ve siècle [réf. nécessaire] et s'écoule jusqu'à la fin du IXe siècle.

Last quarter of the XIIth century : 24? 25 ? 26?

Indication are different, and both leave space for interpretation

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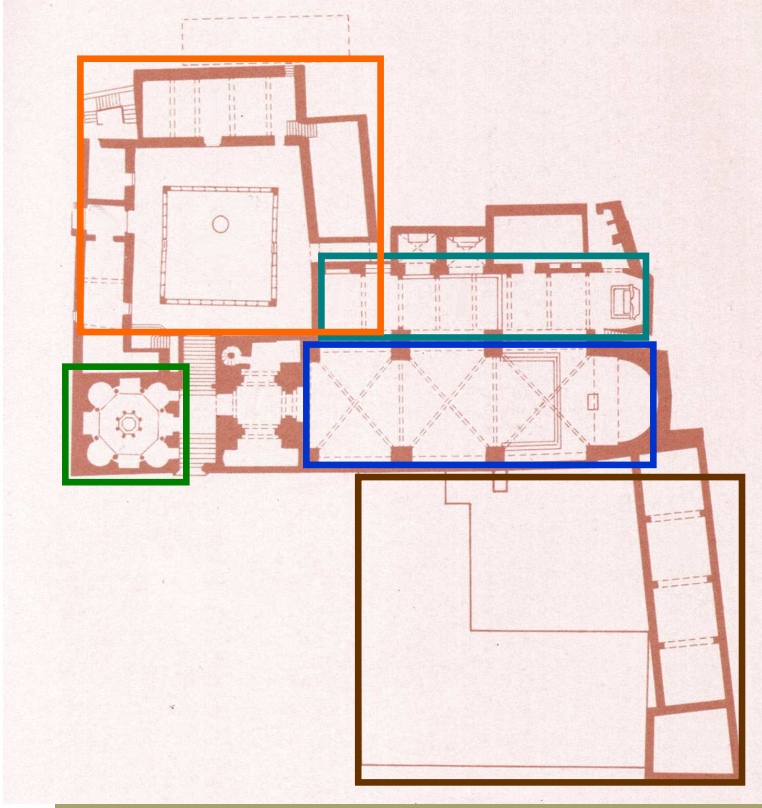
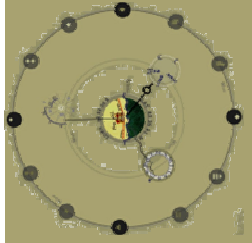
Clues about various parts of the episcopal group



Not that many clues, not that many parts : the simpler the better.

La Cathédrale Saint Léonce et le groupe épiscopal de Fréjus, Editions du Patrimoine / CMN, 2004, M.Fixot et E.Sauze.



3. And now what (2)

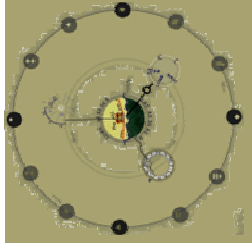
Now some encoding

dating

Transformation
Object getting smaller

Data's own temporality
(event vs. process or transf.)

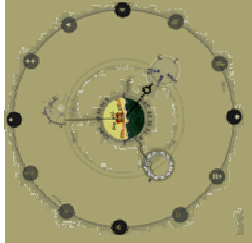
Rule 2 graphic representations relating to numbers should be directly proportional to the quantities represented;



3. And now what (2)

year

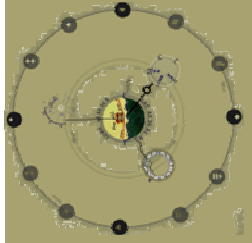
Granularity (as observed in the text)



3. And now what (2)

¼ century

Granularity (as observed in the text)



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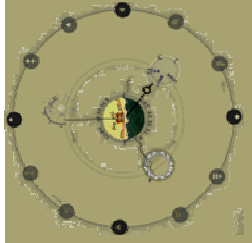
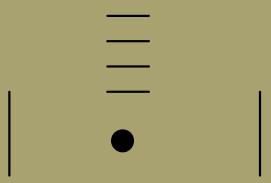
½ century

Granularity (as observed in the text)



3. And now what (2)

century



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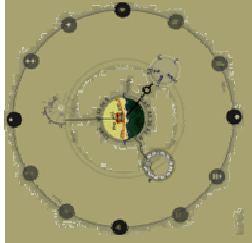
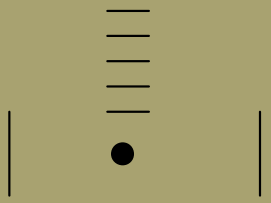


3. And now what (2)

period



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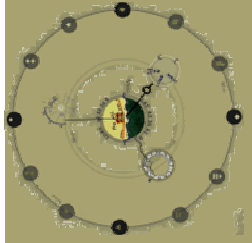
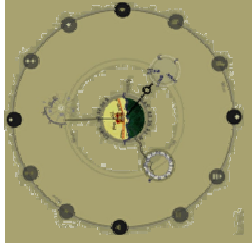


3. And now what (2)

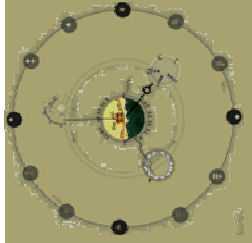
Open intervals

La Cathédrale Saint Léonce et le groupe épiscopal de Fréjus,
Editions du Patrimoine / CMN, 2004, M.Fixot et E.Sauze.



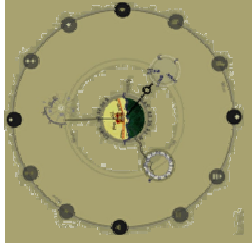
3. And now what (2)

Between a and b



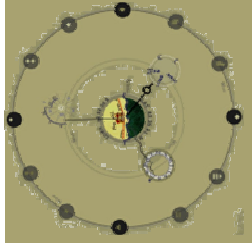
3. And now what (2)

Beginning of / end of



3. And now what (2)

Around / approximately (etc.)



3. And now what (2)

Dating, trend, duration

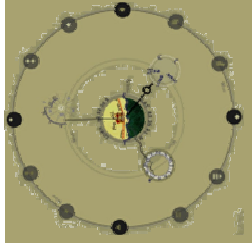
Granularity

Open intervals

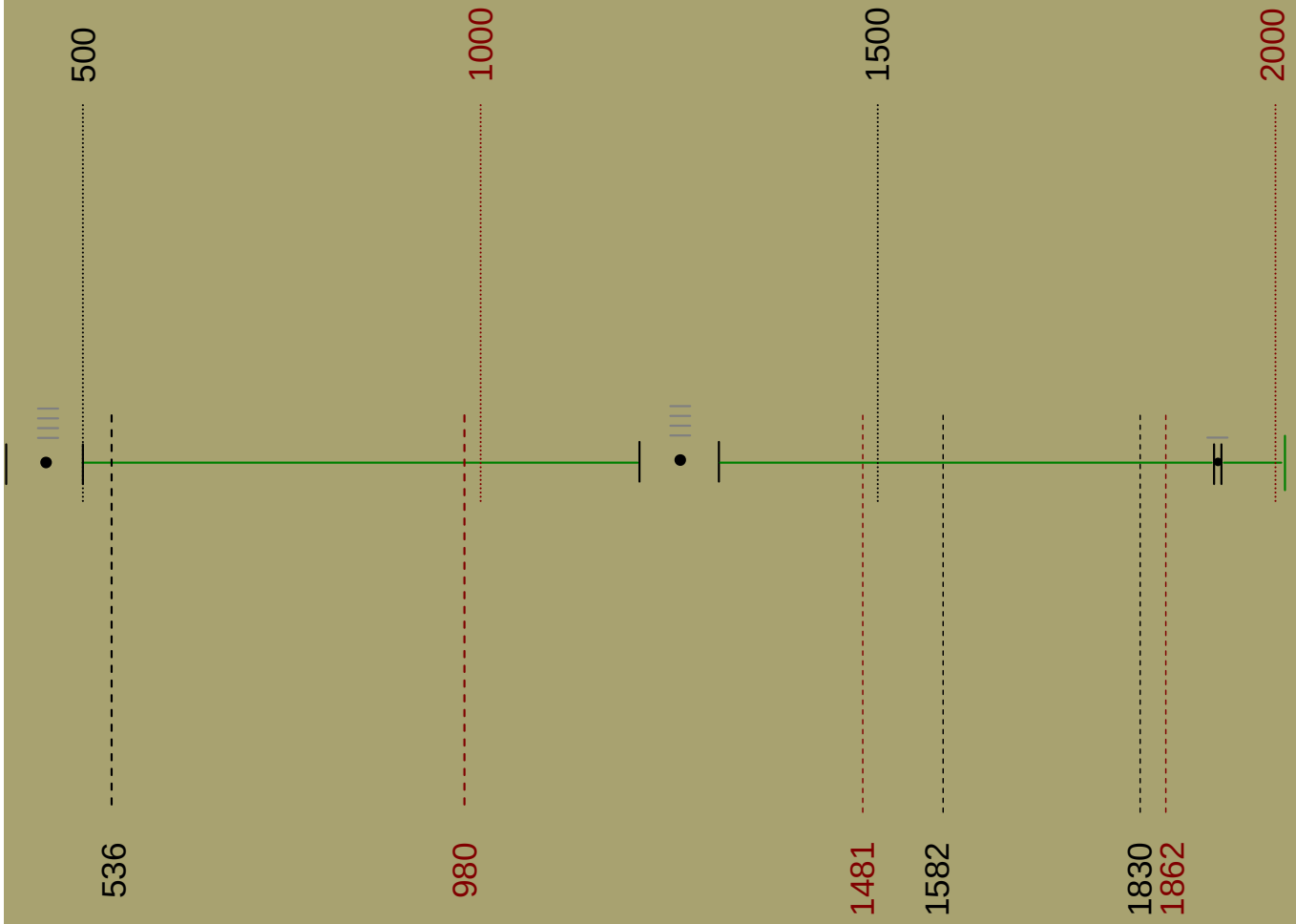
Between a and b

Beginning of / end of

Around / approximately (etc.)



3. And now what (2)



Rule 3 do not show data out of context.

Dating, trend, duration

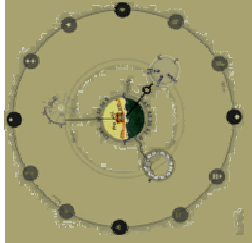
Granularity

Open intervals

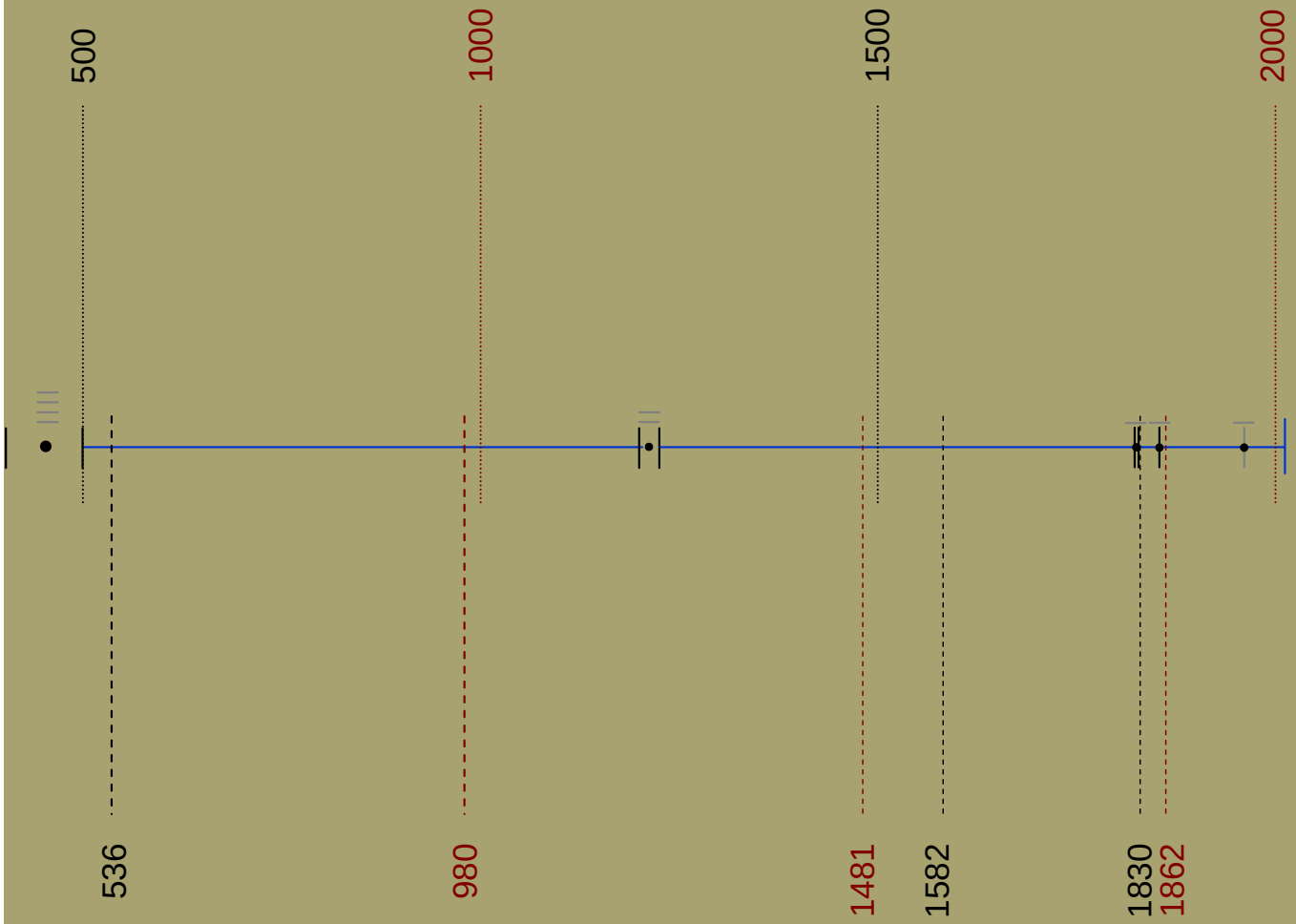
Between a and b

Beginning of / end of

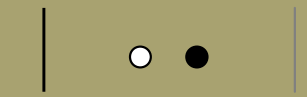
Around / approximately (etc.)



3. And now what (2)



Rule 1 : Enforce comparisons within the eyespan



Dating, trend, duration

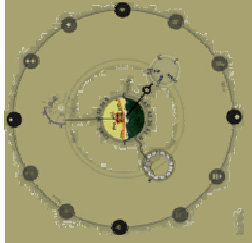
Granularity

Open intervals

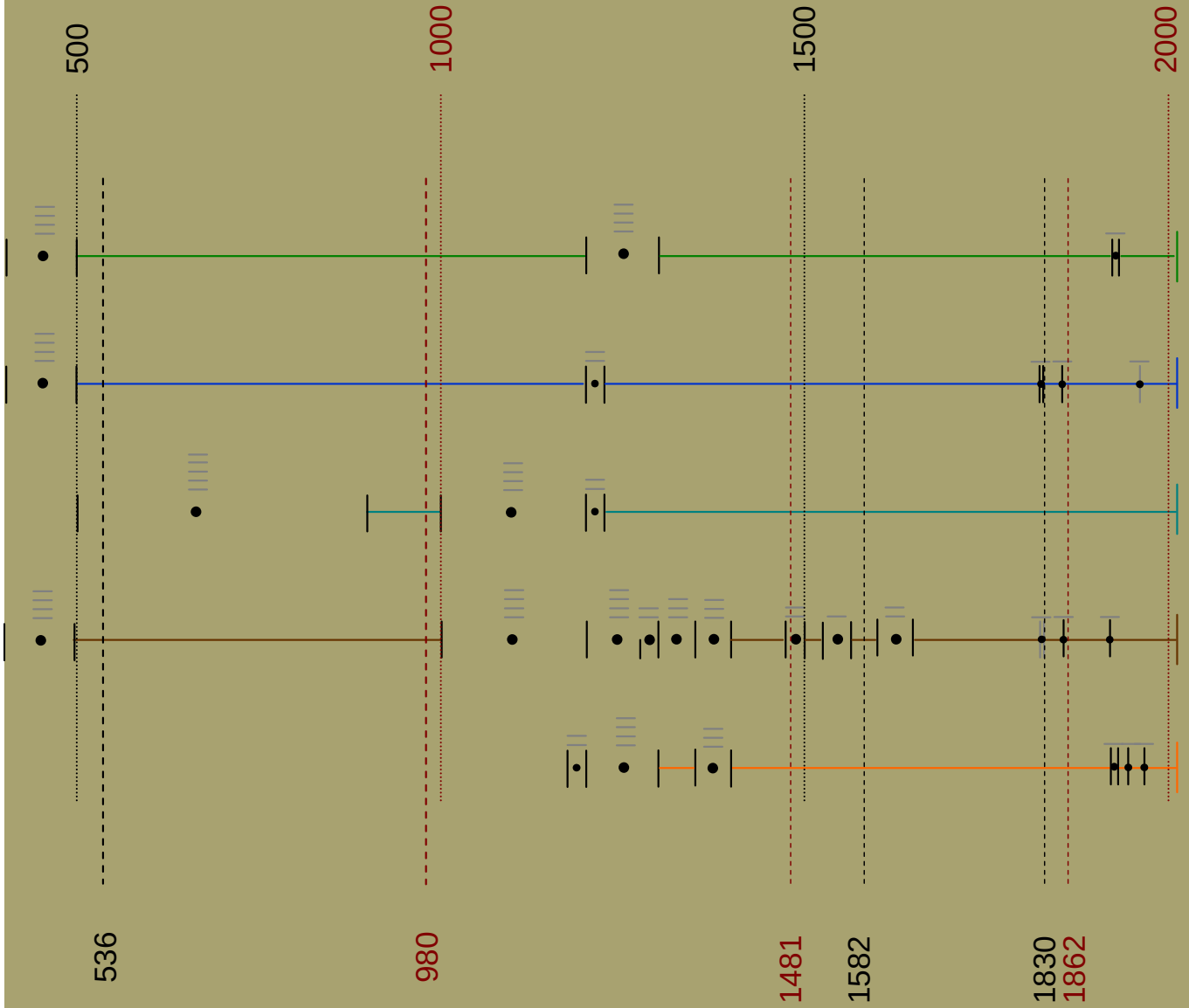
Between a and b

Beginning of / end of

Around / approximately (etc.)



3. And now what (2)



Dating, trend, duration

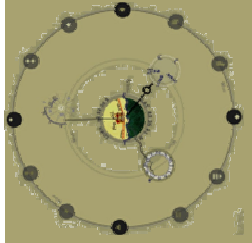
Granularity

Open intervals

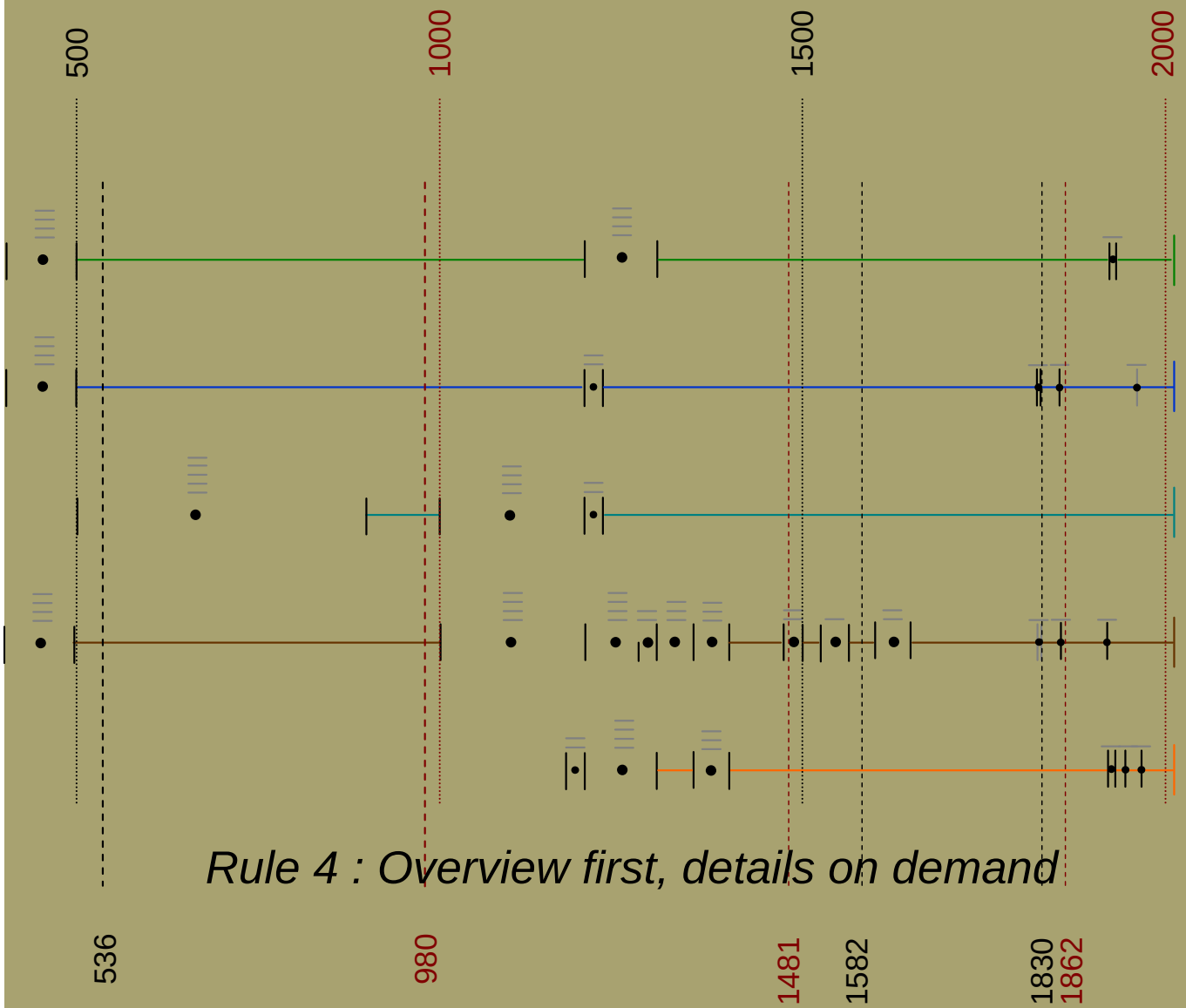
Between a and b

Beginning of / end of

Around / approximately (etc.)



3. And now what (2)



Rule 4 : Overview first, details on demand

Dating, trend, duration

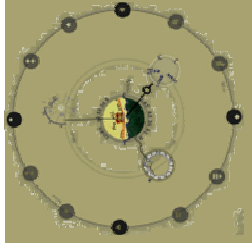
Granularity

Open intervals

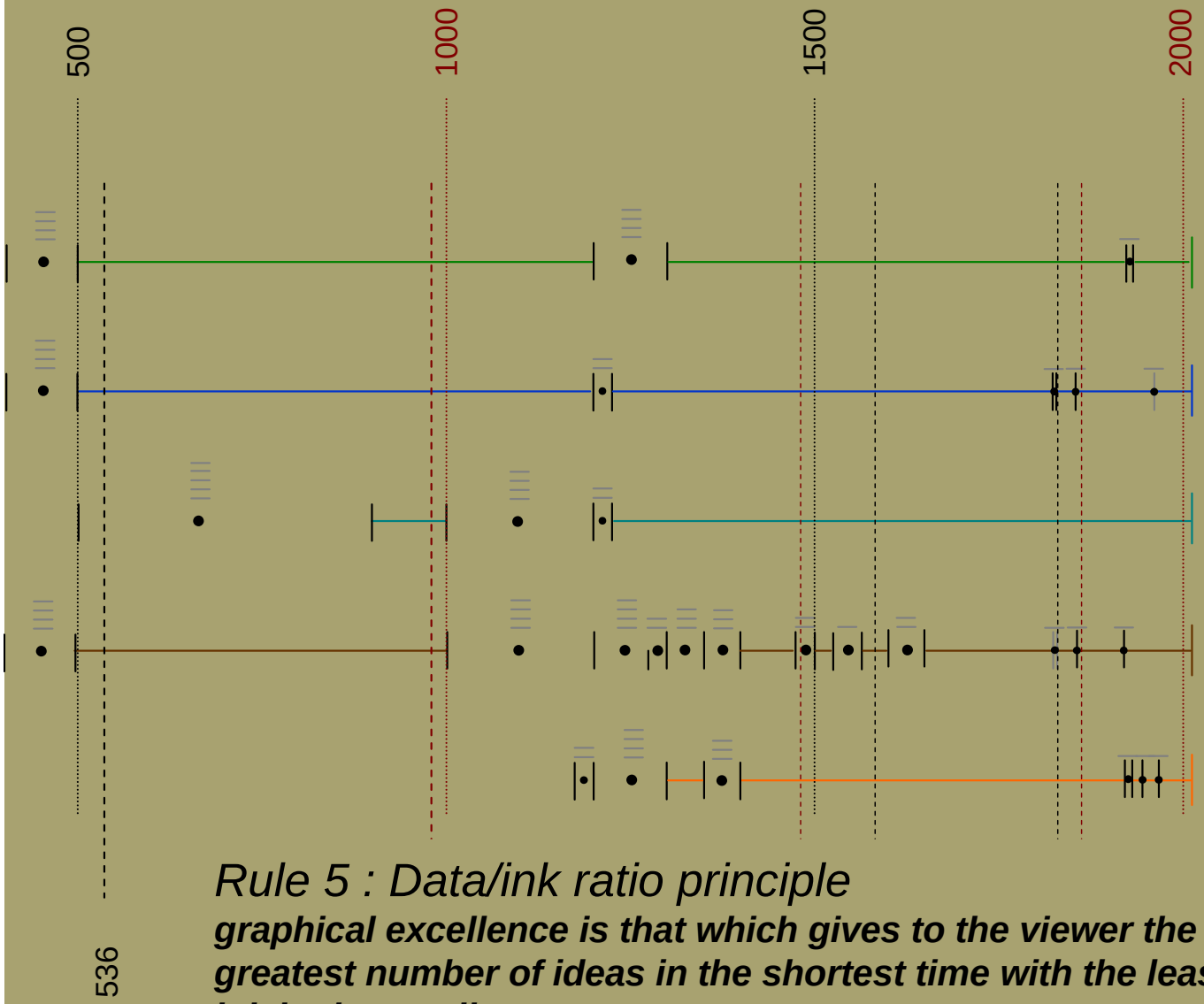
Between a and b

Beginning of / end of

Around / approximately (etc.)



3. And now what (2)



Rule 5 : Data/ink ratio principle

graphical excellence is that which gives to the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space.

Dating, trend, duration

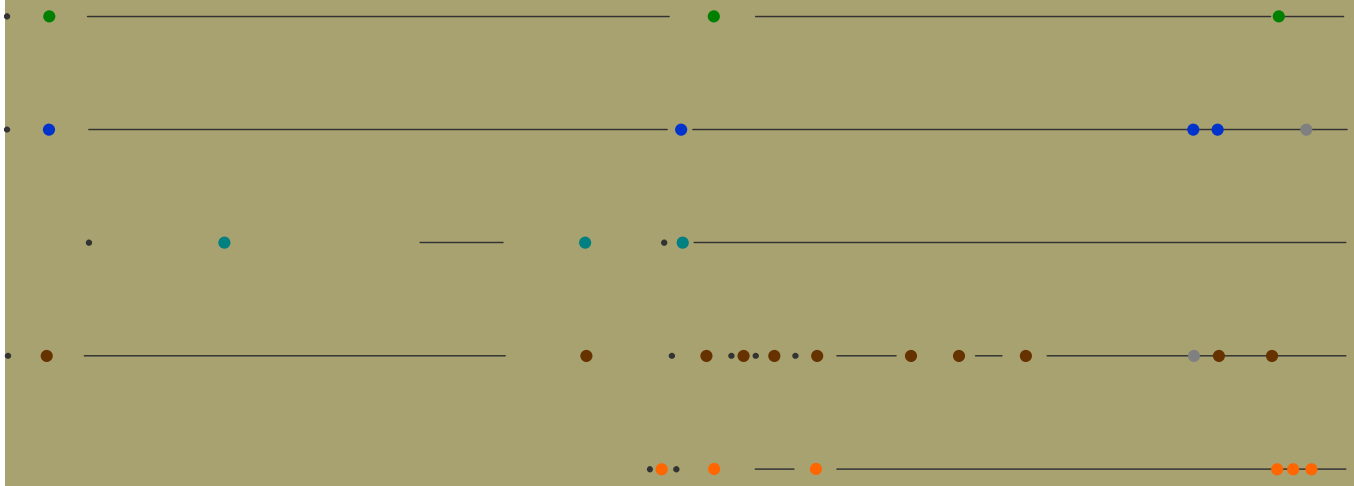
Granularity

Open intervals

Between a and b

Beginning of / end of

Around / approximately (etc.)



Dating, trend, duration

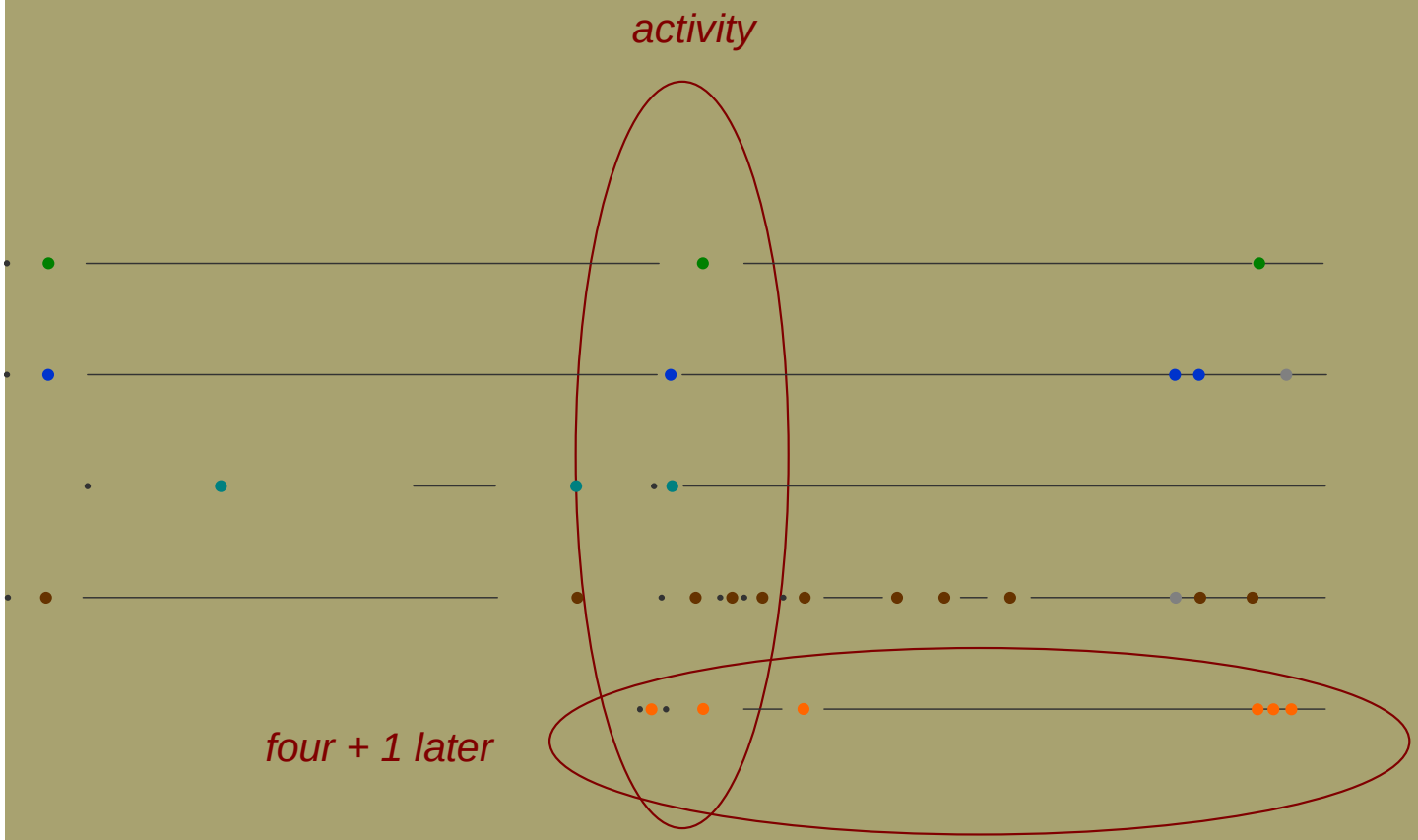
Granularity

Open intervals

Between a and b

Beginning of / end of

Around / approximately (etc.)



Dating, trend, duration

Granularity

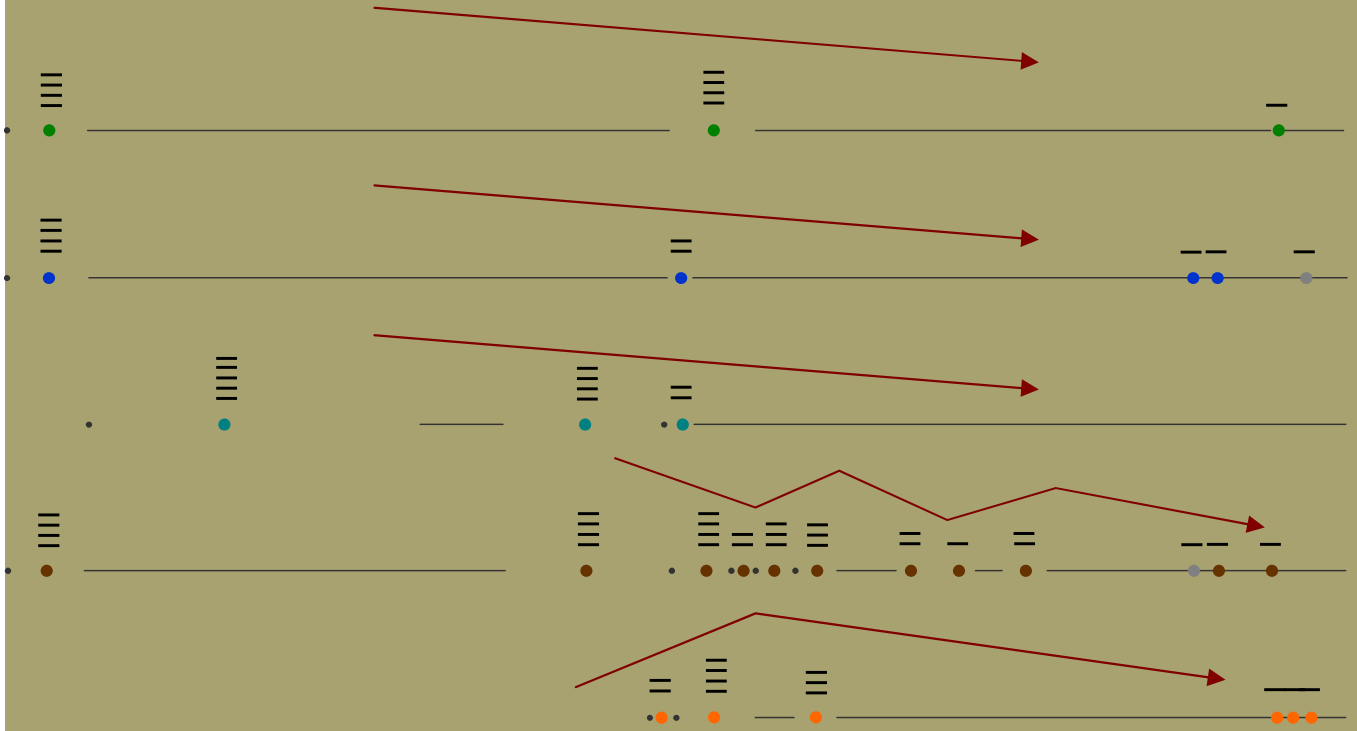
Open intervals

Between a and b

Beginning of / end of

Around / approximately (etc.)

encourage the eye to compare the data;
What do we see – overview first



Dating, trend, duration

Granularity

Open intervals

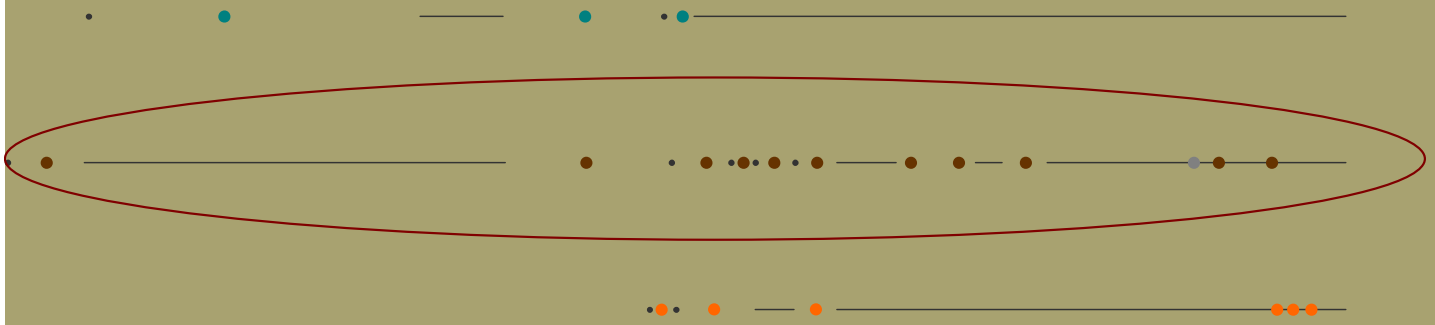
Between a and b

Beginning of / end of

Around / approximately (etc.)

What do we see – granularity on demand

« De tous les éléments de l'ensemble cathédral, le palais épiscopal est le moins bien conservé […] il faut se résigner à ignorer à peu près tout d'un édifice dont seuls l'existence et l'emplacement sont avérés »



« among all the elements of the cathedral ensemble, the episcopal palace is the least well preserved. […] one has to accept ignoring almost ever
said is that it existed and where »

What do we see – an outlier

Dating, trend, duration

Granularity

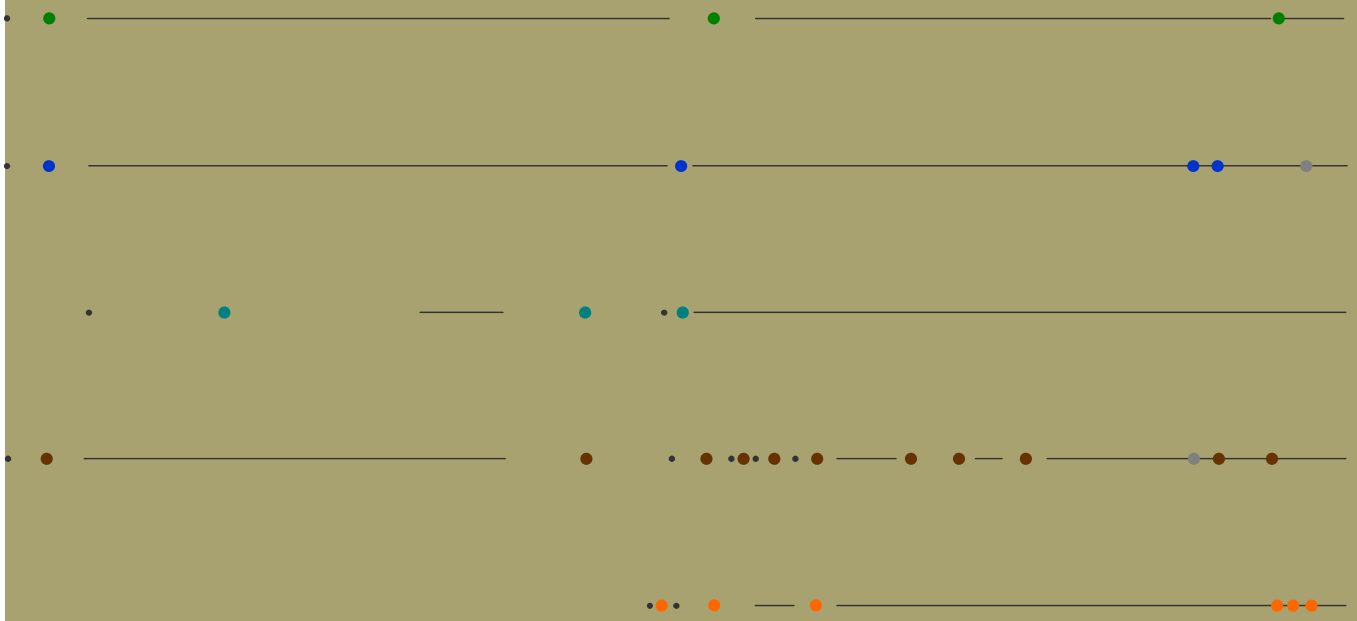
Open intervals

Between a and b

Beginning of / end of

Around / approximately (etc.)

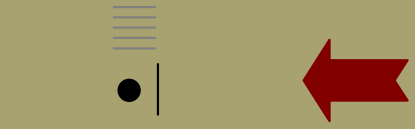
« La sacristie existait déjà à la fin du XIIIème siècle. Sa réfection date probablement du premier tiers (etc.) »



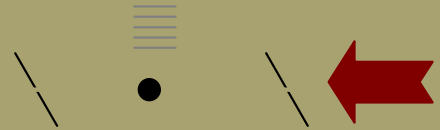
« … existed at the end of the XIIIth c. Its repair probably dates from (etc.) »

Dating, trend, duration

Granularity



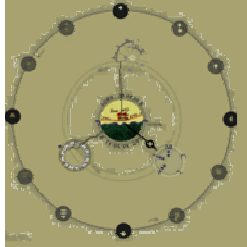
Open intervals



Between a and b

Beginning of / end of

Around / approximately (etc.)



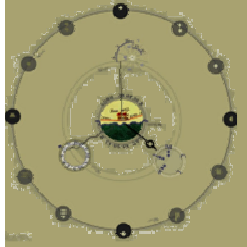
Conclusion

The visualisation did help spotting some indications (not that obvious from reading the text)
Above all with this little « *par l'absurde* » demonstration proves – or helps understanding - *through visual means* that the proposed chronology tells just another story than the book…

(Most likely with very good reasons)

The reader could have imagined it as an outline of the book. It is not.

And this is one of the services visual thinking can offer in the context of long time spans, and poor data sets: analyse our own work, have ourselves face what we say, re-read our data and spot where we over-interpreted it.



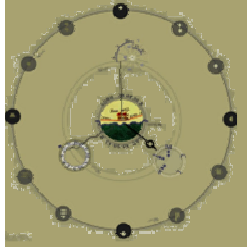
Handling uncertainty: a modelling issue first, a visualisation issue too

3 open challenges:
- Classifications
- Qualifying / quantifying
- Visualisation

Accuracy/error
Precision
Completeness
Consistency
Lineage
Currency/timing
Credibility
Subjectivity
Interrelatedness

Classifications exist, main categories introduced can be of use across disciplines , although it is likely that they will need to be be adapted / extended for this or that specific problem – in particular in historic sciences.

Thomson J., Hetzler B., MacEachren A., Gahegan M., Pavel M., *Typology for Visualizing Uncertainty*, Proceedings of the SPIE-VDA 2005: SPIE/IS&T, (Conference on Visualization and Data Analysis, part of the IS&T/SPIE Symposium on Electronic Imaging 2005), 16-20 January 2005, San Jose, CA USA



However when it comes to qualifying/quantifying, things get tougher.

Accuracy/error : Difference between observation and reality.

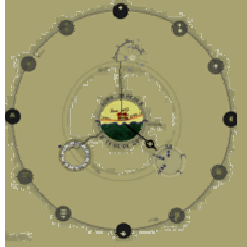
Sub-categories :

- Collection Accuracy
- Processing errors
- Deception

- *A report may note that 50 tanks were observed although the tanks may in fact be dummy placements.*

D'authentiques historiens qui, par la suite, relateront [ce récit miraculeux] dans des textes souvent succincts, quelquefois romancés, mais toujours empreints d'une grande conviction. .

At the end of the day factors of uncertainty are most often weighed through discrete (numerical or lexical) scales that introduce yet another uncertainty.



Conclusion

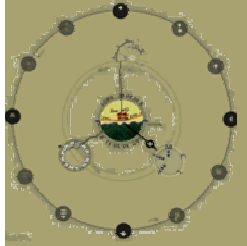
Handling uncertainty: primarily a modelling issue

In short there are many factors contributing to uncertainty, as shown by existing classification efforts.

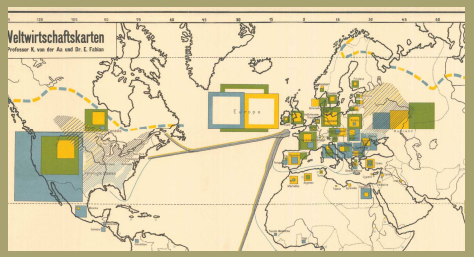
It seems that as soon as we wish to qualify/quantify the doubt, and ultimately visualise it, means and solutions that we can rely on in order to convey the information's complexity (i.e. uncertainty) tend to shrink.

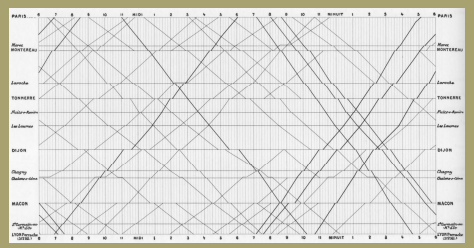
Accordingly, we believe it is necessary to address the 3 issues at a time - classifying, qualifying/quantifying, visualising – otherwise we find ourselves commenting uncertainty, rather than analysing it.

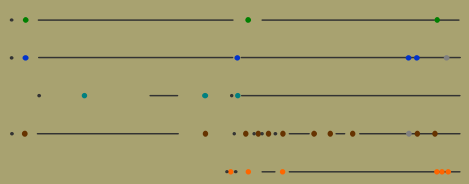
This is the reason why this thematic school's programme encompasses modelling and visualisation steps.



Conclusion





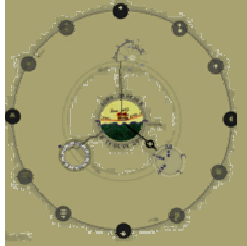


Infovis as a discipline is not necessarily directly and/or fully applicable to ill-sourced dynamics: too weak data sets

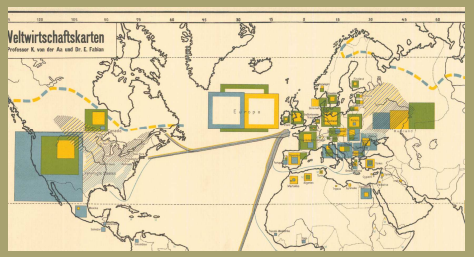
However even in the context of historic sciences, on long time spans, it can be profitable to take inspiration from the modelling, data structuring, visual reasoning and evaluation efforts in use in that discipline.

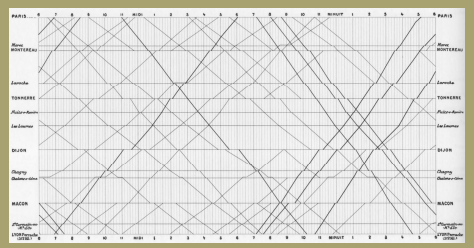
So, infovis and its outgrowths, yes, when possible. But if not, at least some visualisation effort can help the analyst. XIXth c. key milestones show that even without the support of contemporary computer tools insight on a time+space related problems can be gained by an appropriate visualisation effort.

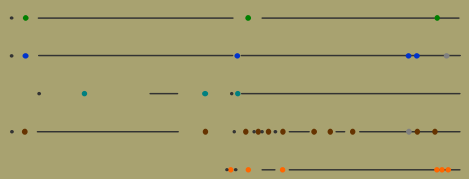
And because the tools we use to produce graphics have changes over time, the afternoon lectures focus on computer graphics



Conclusion







Thank you

and maybe

Ooops sorry (means I did not finish on time)