



hypothetical reconstructions >

diachronic study

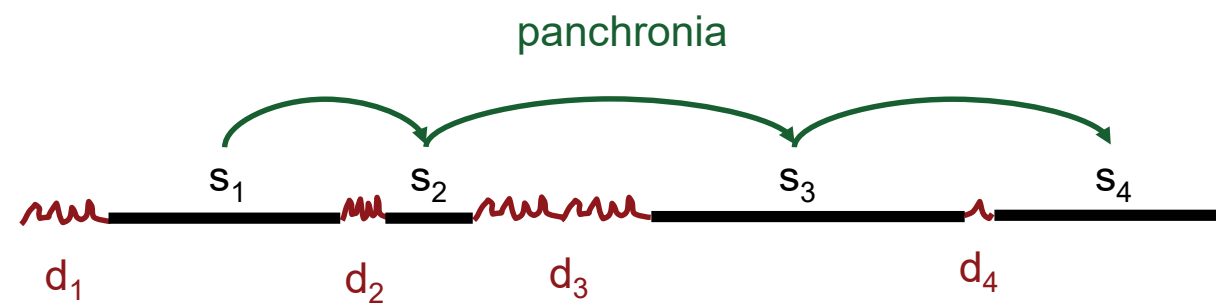
VIA / SOL2 - Knowledge management and visualisation platform for the architectural heritage
2006 - 2008

three modes of time existence in human experience:

- synchronia > a moment of stability - object of our analysis is the same
- diachronia > a period in which the object changes
- panchronia > what steps out of time-space continuum and authorise us to state the identity of the object regardless changes



Ferdinand de Saussure
1857-1913





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transformation of a form of an object is not enough to understand its evolution

ATIP 2005, *Informational 2D/3D models for multi-scale analysis of built heritage transformations*
2006 - 2008

Chronographs are primarily designed in order to :

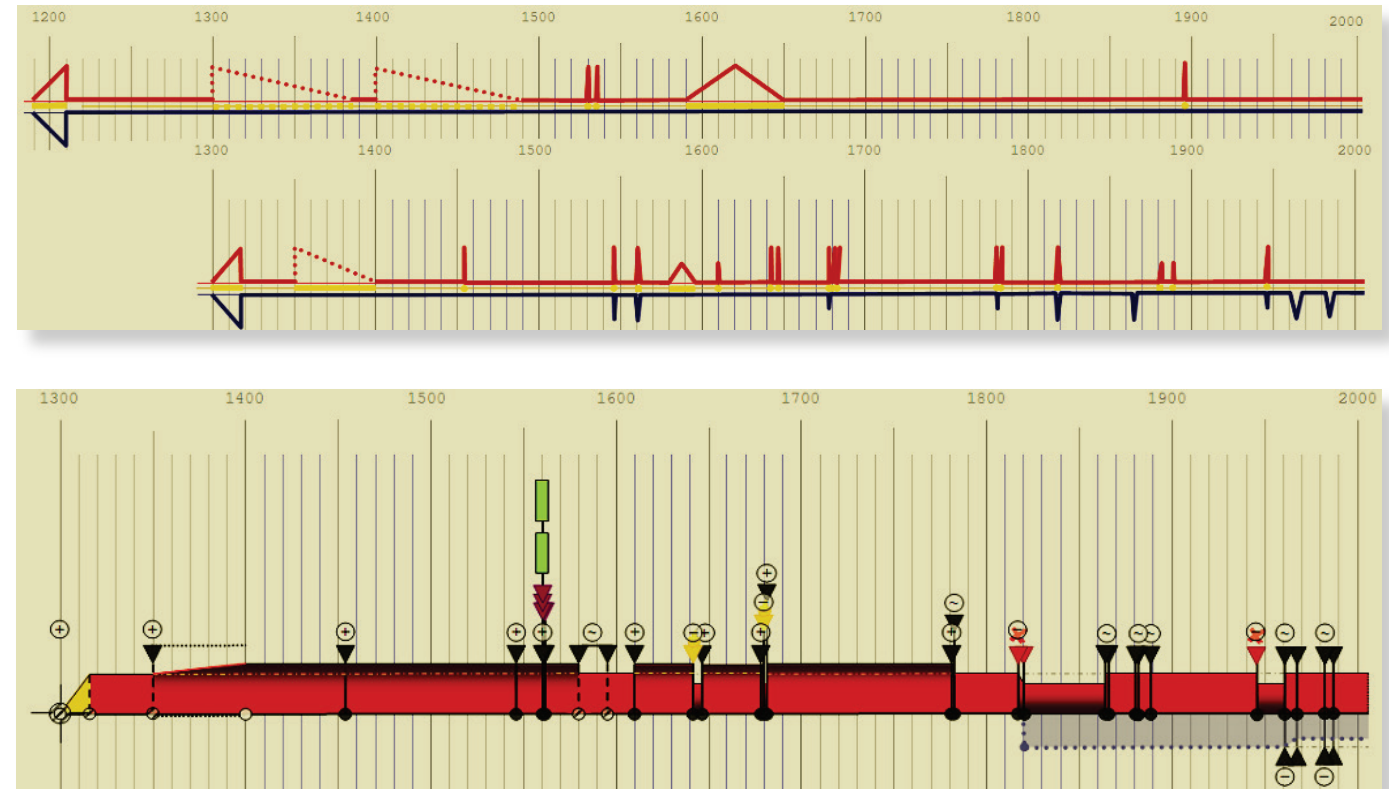
- provide a synthetic, visual description of our knowledge about a whole evolution of an artefact
- enable reasoning about changes, and facilitate exchanges & understanding between researchers
- allow visual comparisons over collections
- uncover possible patterns of changes

They build on a description framework that focuses on the way artefacts get transformed, with a grid of notions giving the analysts the means to date, describe and order events/facts/elements of context that we consider meaningful in the understanding of the artefact's transformations.

Chronographs is in fact the name given to a set of graphics, composed of three different visualizations:

- **diachrograms** that present the evolution of an artefact along a time axis that positions transitions, states, and causality assessments along the time scale.
- **variograms** further detail the nature of the artefact's transformation by combining three categories of changes.
- **features visualisation** that foster comparisons across features we observe

The "chronographs" solution has proven quite efficient in performing reasoning tasks - it does help assessing causal relations, and orders in time sequences, events and consequences in a robust manner.





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states and transitions

 ATIP 2005, *Chronographs > transformations*
 2006 - 2008

15 transitions

abandon <transition> [state]	Progressive withdrawing of a human activity from the object (artefact remains covered – presence of the roof).
annexation <transition>	Combining/incorporating an artefact or its portion into another artefact. The life cycle of the annexed artefact (or portion) ends, while the annexing artefact continues the same life cycle.
decay <transition> [state]	A gradual degradation of an artefact due to absence of human activity and destruction of roofing.
demolition <transition>	A relatively quick destructive incident, caused by environment or human activity.
modification <transition>	Each significant functional, structural or morphological change inside one life cycle. This is naturally the most common transition.
secession <transition>	A division of the artefact with a separation of one or several portions, leading to the creation of independent artefacts. The rest of artefact continues it's life inside the same life cycle.
segmental anaesthesia <transition> [state]	Loss of all functional activity and of connexion with the rest of an artefact in one of its portions - without formal separation. It concerns only the underground structures

6 states

creation <transition>	Birth of an artefact (not to mix up with reincarnation, which is a re-birth).
extinction <transition>	Irreversible destruction of an artefact including sub-structures, with as result, its physical annihilation. Ends not only a life cycle but also the evolution of the artefact.
hibernation <transition> [state]>	Destruction of the artefact's apparent parts, combined with absence of functional activity inside the remaining inaccessible portion.
internment <transition> [state]	Building of a new artefact over a previous one, the latter remaining underneath as an inactive, inaccessible portion called a segment. Internment may be deliberate (ex. preventive archaeological bury) or unintentional.
merge <transition>	Combining different artefacts or portions of artefacts into a union, that is considered as a completely new artefact.
reincarnation <transition> [state]	Re-birth of an artefact in a new embodiment, occurring in particular as a result of excavation and reuse of a hibernating artefact.
split <transition>	Formal division and separation of an entire artefact into parts, leading to the creation of two (or more) new, independent artefacts.
translocation <transition> [state]	Displacement of an artefact or sub-parts of an artefact, caused by human activity.

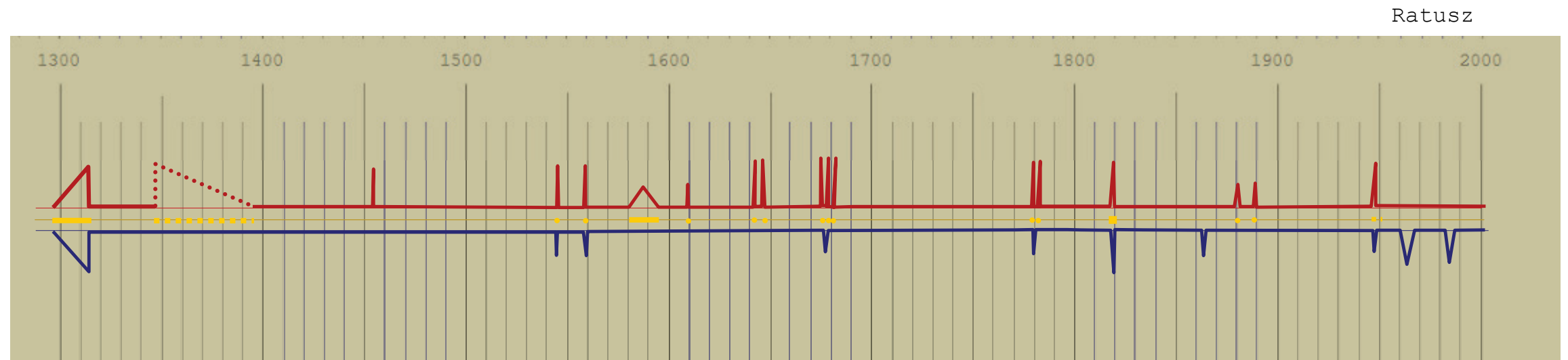


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Variograms detail nature and relative importance of transformations

ATIP 2005, *Chronographs* > transformations
2006 - 2008

combines in a parallel visualisation three aspects:



morphological changes

changes in surface, volume, style, etc.

structural changes

technical modifications such as change of roof construction or material,
replacement of sub-elements such as floors, etc.

functional changes

significant switches in the way the artefact is used, or change of owners

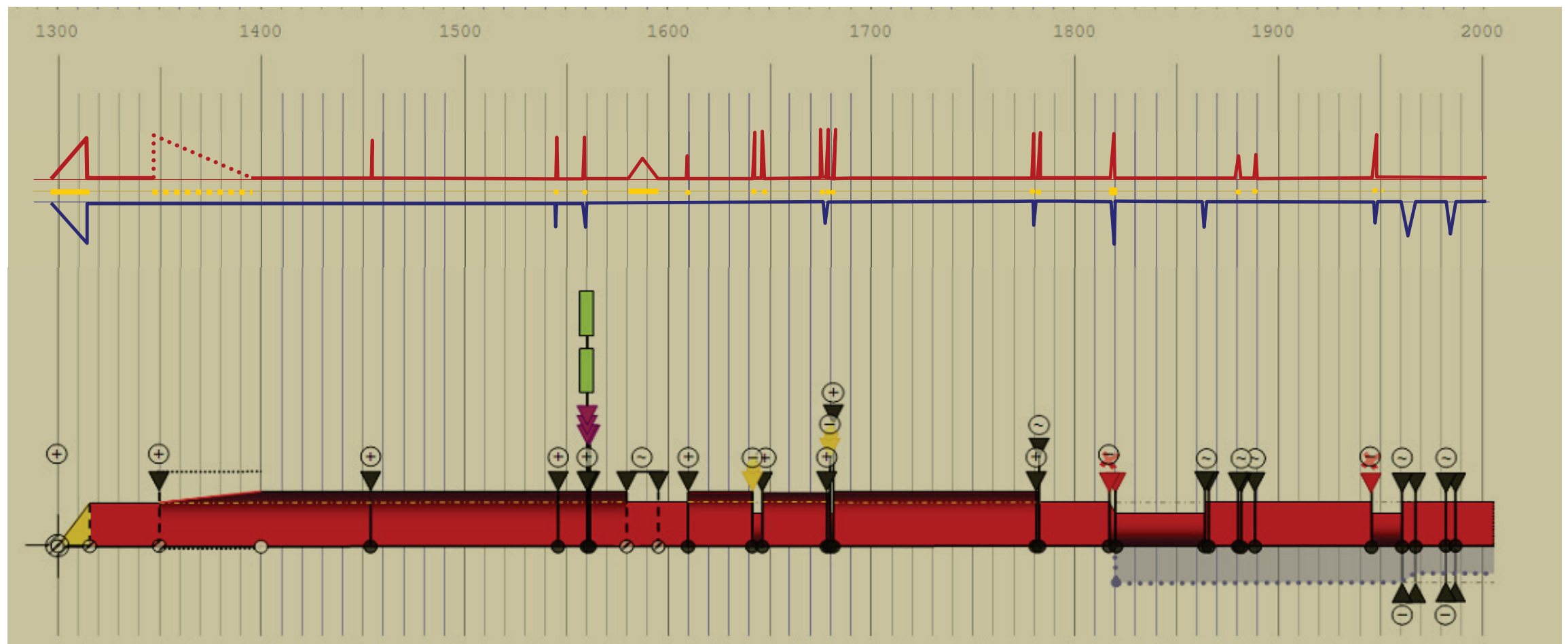


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diachrograms present the evolution of an artefact along a time axis that positions transitions, states, and causality assessments along the time scale.

ATIP 2005, *Chronographs > transformations*
2006 - 2008

Ratusz

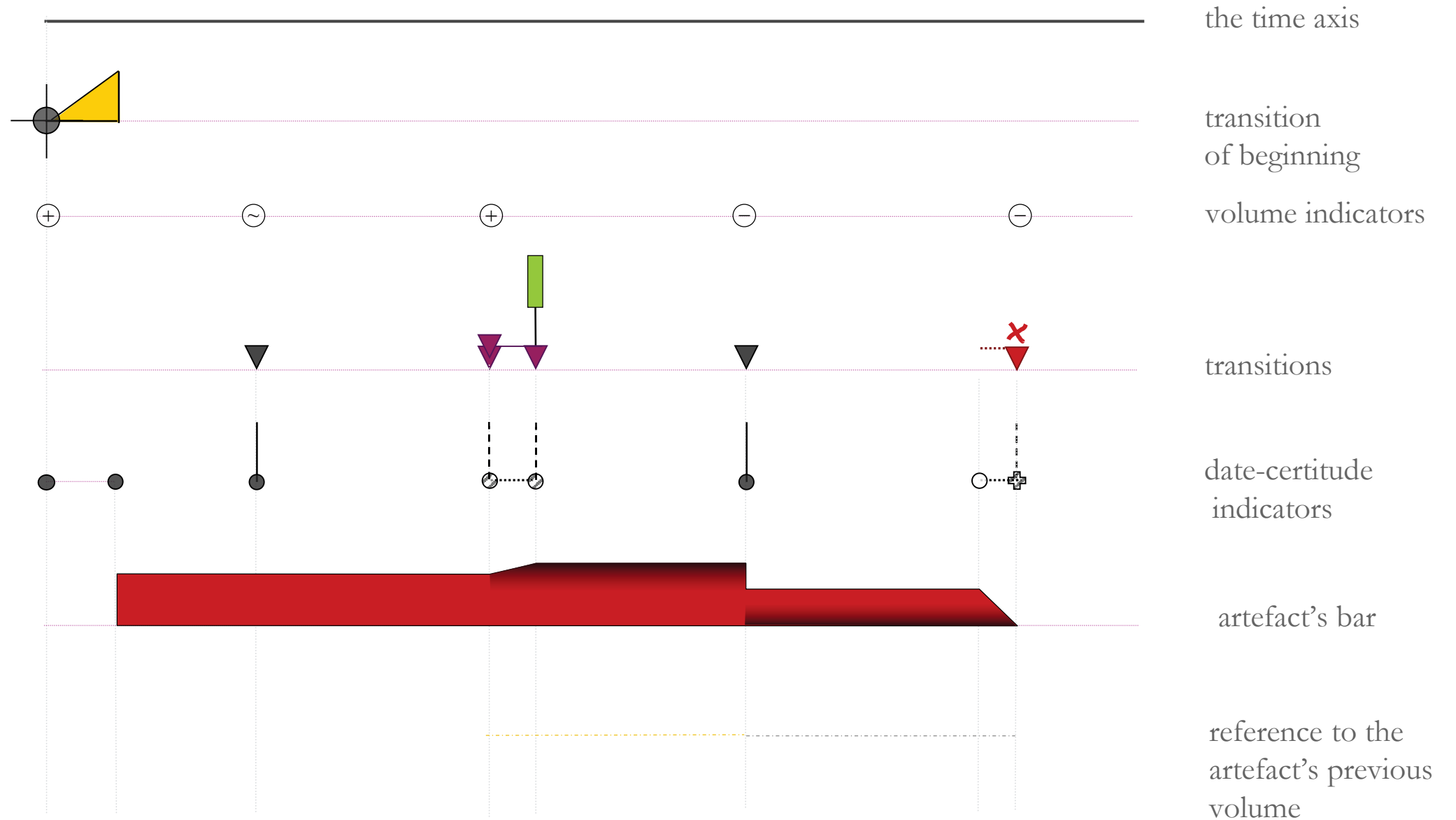




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construction of diachrogram

ATIP 2005, *Chronographs > transformations*
2006 - 2008

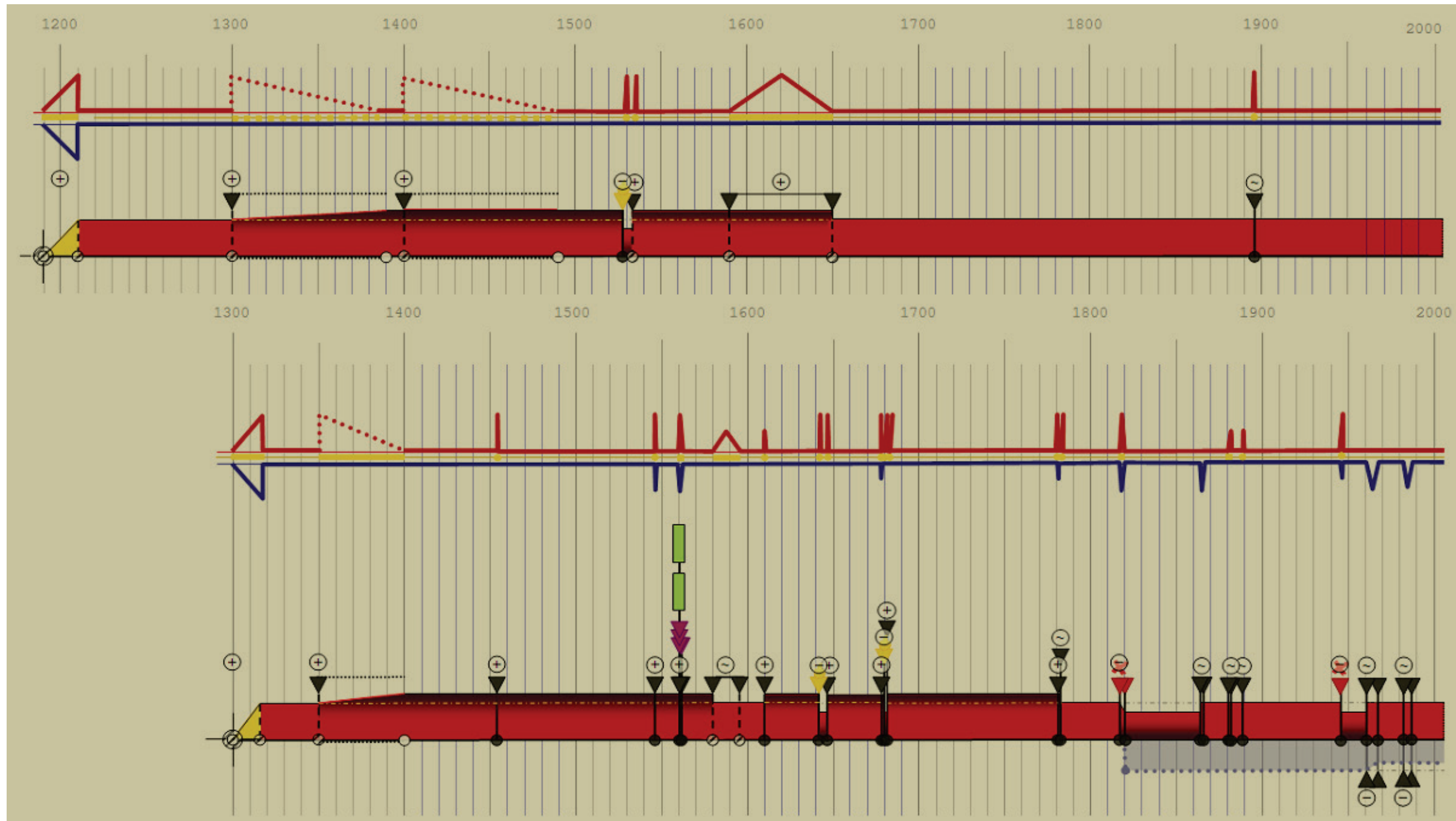




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Variograms and diachrograms

ATIP 2005, *Chronographs > transformations*
2006 - 2008

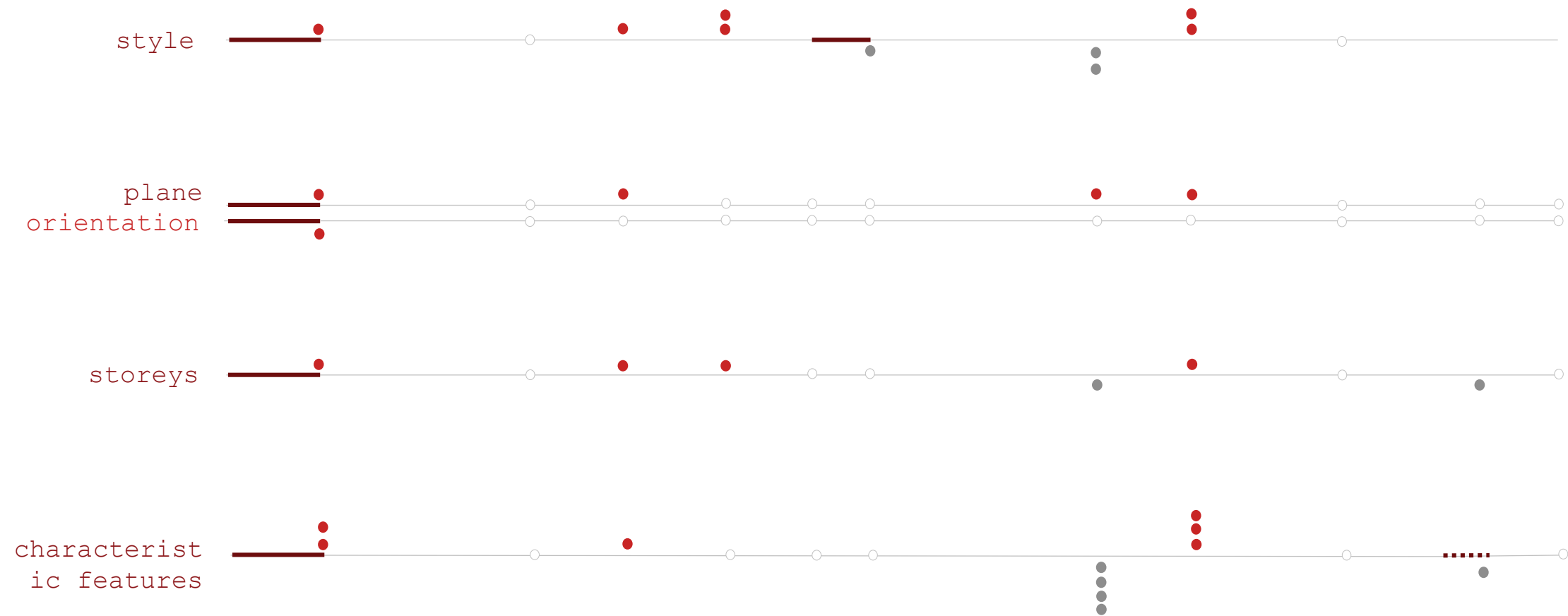




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features visualisation - foster comparisons across features we observe

ATIP 2005, *Chronographs* > *transformations*
2006 - 2008

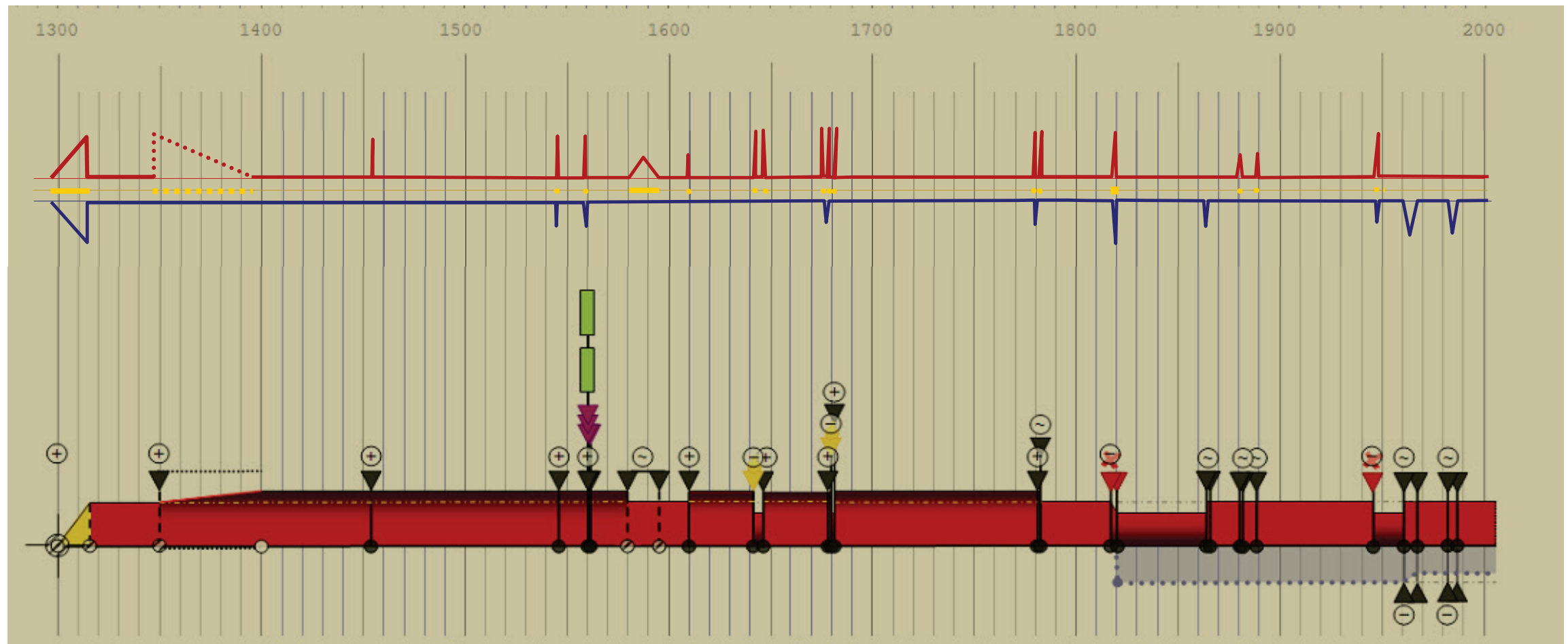




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weak points of chronographs > uncertainty management

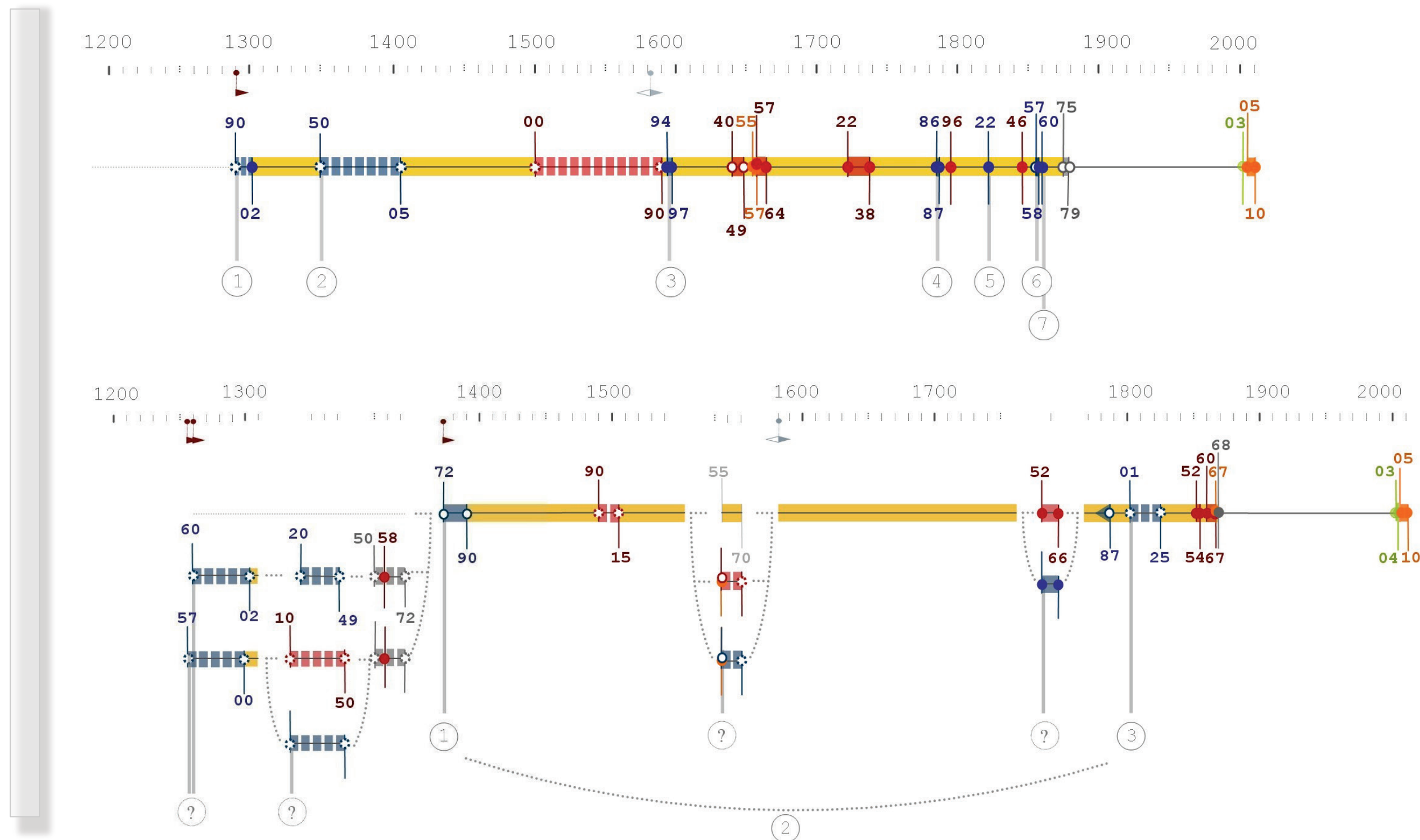
ATIP 2005, *Chronographs > transformations*
2006 - 2008





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Multi-hypothesis chronology diagram, 2012





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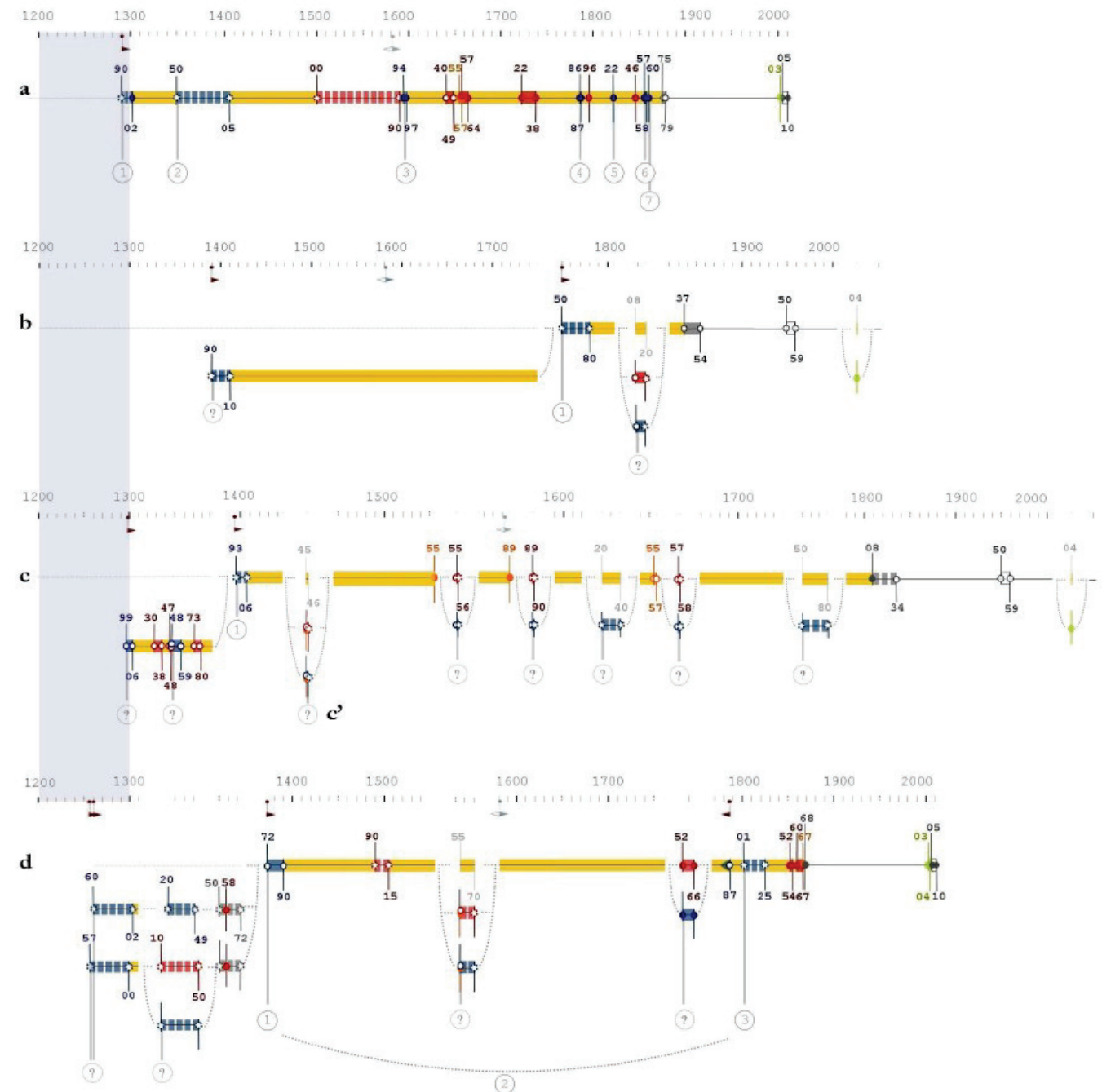
Multi-hypothesis chronology diagram, 2012

Multi-hypothesis chronology diagrams provide a quick, synthetic view on where alternative scenarios exist in time.

They show doubts concerning the precision of dating and alternative paths, along with their potential consequences.

In multi-hypothesis chronology diagrams time is represented in real scale, and in discrete time: durations are therefore assessed, their relative lengths can be compared. These diagrams present alternative paths as they appear from the analysis of the data obtained from historical sources and of material traces: what they show is what we know, and consequently is most probably incomplete, and possibly deformed as a consequence of the source effect.

branching time





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Graphs of potential interactions allow a reading of transformations, states and contextual information in ordinal time, detailing the nature of alternatives and distinguishing clearly alternatives that are based on duly established facts from those that are based on circumstantial evidence.

These diagrams use the same classes of transformations as multi-hypothesis chronology diagrams. The chronology of events is retained, but the durations do not appear - only the order is assessed.

The diagram emphasizes visually differences between definite, confirmed and potential transformations. As a result, these diagrams support other reasoning tasks: comparisons between objects (in terms of number and type of transformations and alternatives) or densities, order, frequencies and transformation patterns are easier to read in ordinal time since the actual length of the lifeline ceases to command the length of the visualisation.

ordinal time

Graph of potential interactions, 2012

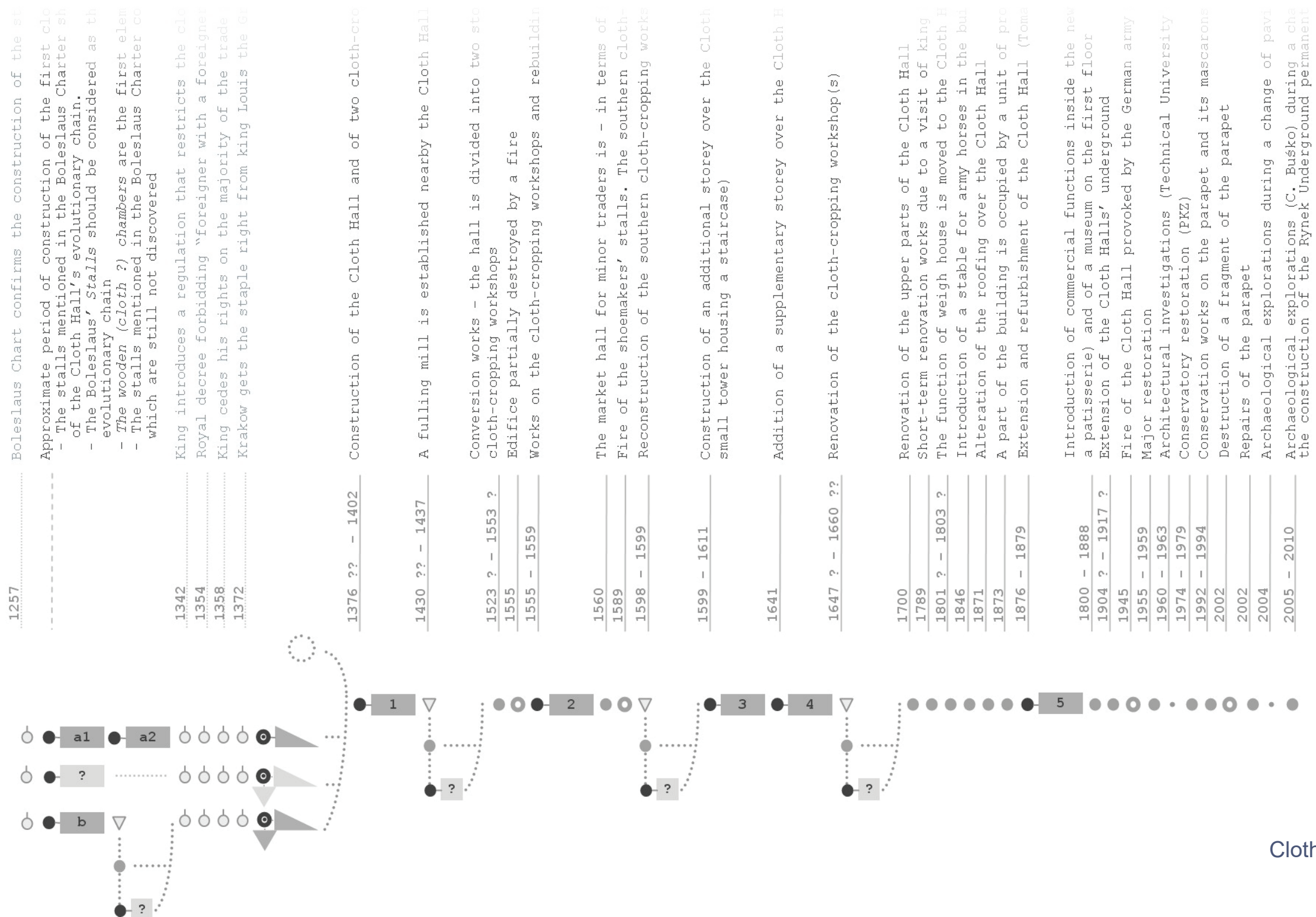


Iron stalls



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Graph of potential interactions, 2012

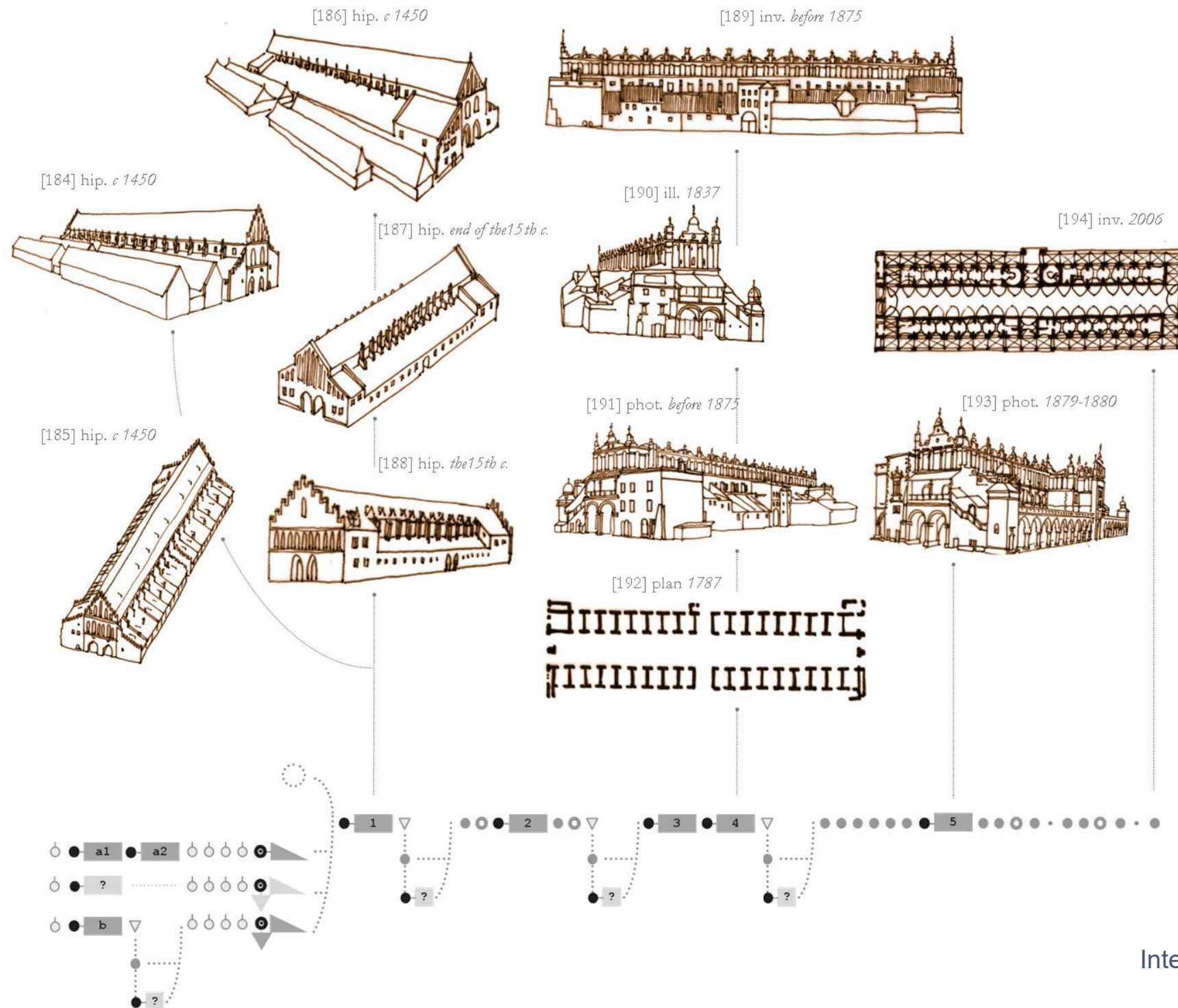


Cloth hall



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Graph of potential interactions, 2012

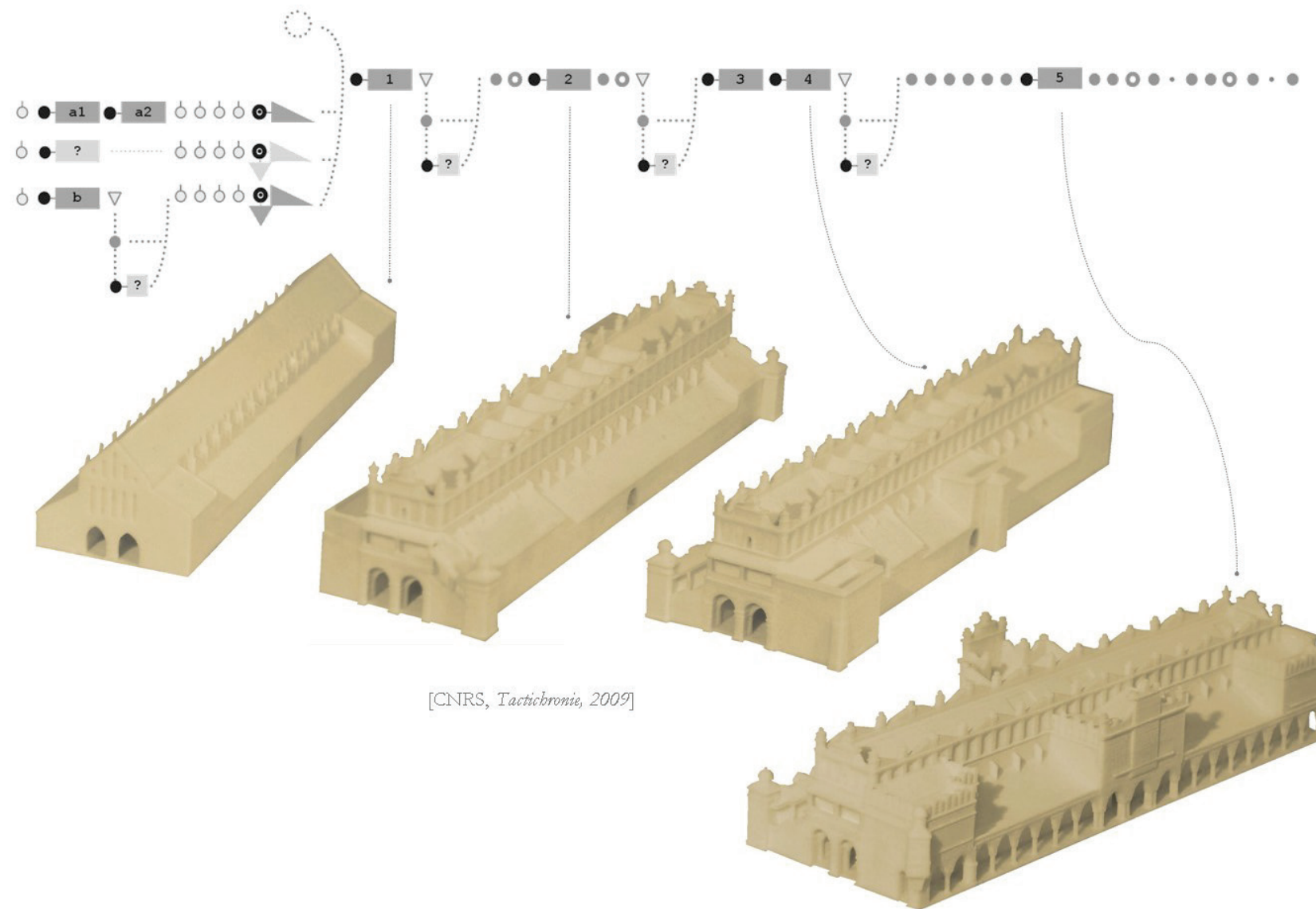


Interpretation problems



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Graph of potential interactions, 2012



[CNRS, *Tactichronie*, 2009]



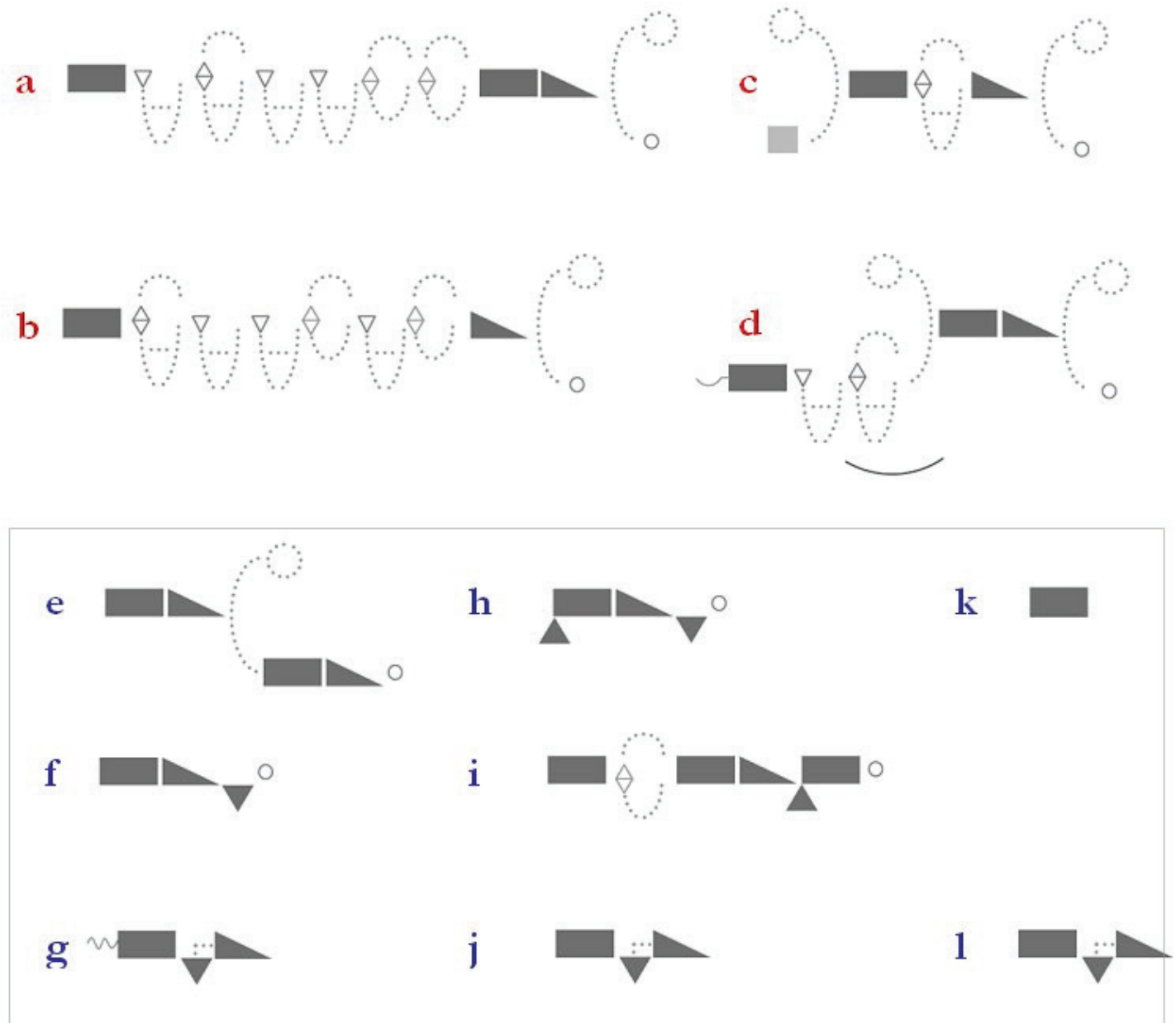
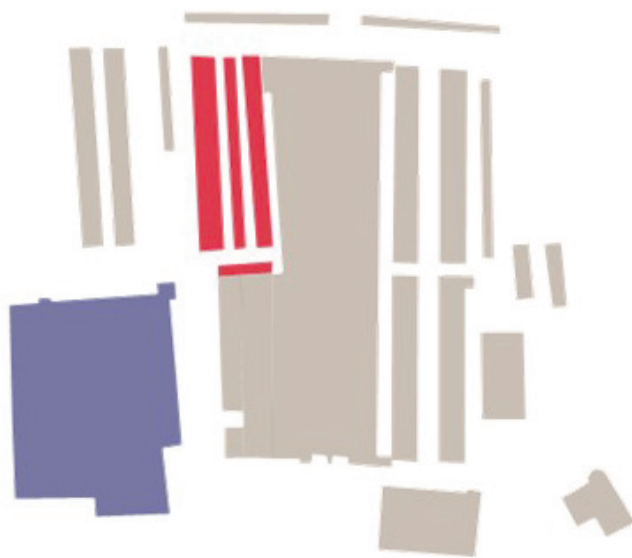
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Visual measures of complexity, 2012

Visual measures of complexity allow a synthetic comparison of levels of complexity, underlining the amounts of alternatives and the density of doubts.

They are created by simplifying graphs of potential interactions.

The main role of the visual measure of complexity is to foster comparative analyses. Juxtaposing visual measures of complexity for a group of objects with some features in common gives a broader picture, summing up the character of our current state of knowledge concerning this group.





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diachronic study for wide public

Tactichronie (tangible chronology), 2011

