

Does Time Always Pass? Temporalities in Scientific Narratives

*Workshop held May 30-31 2019, at the Royal Institution, London
Organised by Dr Andrew Hopkins and Prof Mary S. Morgan*

Author: Andrew Hopkins

London's historic Royal Institution played host to the fifth in a series of workshops organised by the Narrative Science Project. The event, held over two days at the end of May 2019, comprised fifteen presentations from a diverse range of disciplines from geology and biology to economic history and anthropology, and was attended by around fifty academics from Europe, North America and Asia.

In her introductory remarks, Mary Morgan acknowledged that while the Project was discovering instances of narrative in which time does not play a leading role, the starting point for this workshop was the recognition that the standard view of narrative, in science and elsewhere, is inextricably bound up with the passage of time. Scientists use time in narratives in a number of different ways: it may be an element in the way they write and explain their handling of materials, processes, practices and discoveries; alternatively, it may feature in accounts of causes, mechanisms, interactions, and developments in scientific materials; and it may be an important component in scientists' theoretical and conceptual terms and discussions. Thus, there are many different sites and guises in which scientists use time in their own subject-based narratives.



Perhaps the most obvious loci for explorations of the role of time in scientific discourses are what are generally referred to as the historical sciences, that is, those that seek to reconstruct the past, which may be very deep, on the basis of what can be observed in the present, and several of the presentations at the workshop fell into this category. Meanwhile, a number of the cases looked at the importance or otherwise of temporal sequencing, with examples from both the natural and human sciences, while in other presentations, speakers wrestled with counterfactual "what if" questions. The first afternoon included a session on temporalities in scientific narratives from a philosophical perspective.

To stimulate maximum participation from attendees, each presenter was limited to a 20 minute illustrated talk which was followed by 25 minutes of question, answer and discussion. The format worked well for all of the presentations, and moderators regularly had to curtail questioners to ensure the workshop did not fall behind time. The workshop concluded with a "wrap-up" session at which attendees were invited to share their thoughts and impressions.

THURSDAY MAY 30th AM

Faraday's lines of force and the temporality of serial narration

Norton Wise (UCLA)

Lines of force in Faraday's (and Maxwell's) emerging field theory of electromagnetism in the mid-19th century were somewhat mysterious things that gradually became increasingly real for scientists. Looking aside from temporal processes involving the lines of force themselves, I want to look at how their believability was enhanced by Faraday's unusual process of serial narration over twenty years. That is, does the temporality of serial narration have interesting properties for thinking about the effectiveness of narrative in science?



Do we always need a timeline? The roles of temporal sequence in art narratives and science narratives

Elspeth Jajdelskar (University of Strathclyde)

Temporal sequence is at the heart of narrative theory, from linguists like Labov, who defines 'narrative' clauses as those whose order cannot be reversed, to anthropologists and folklorists like Bauman or Aarne & Thompson, whose narrative structures are defined by temporally ordered episodes. This is the case even if these episodes are narrated out of sequence, eg through flashback. The centrality of temporal sequence suggests that processing narrative requires us to form a mental timeline of events. In this talk, I explore how far this is so for processing of art narratives, which have the potential to transport readers/hearers, and how far art narratives might overlap in this respect with science narratives.

Mass extinction, narrative closure, and evidence

John Huss (University of Akron)

The finding by David Raup and Jack Sepkoski that mass extinctions as reflected in the fossil record exhibit a 26.2 million year periodicity, coupled with the discovery by the Alvarez research group of an iridium anomaly coinciding with the mass extinction of the dinosaurs at the end of the Cretaceous period had a transformative effect on the epistemology of the palaeontology of extinction. Linking periodicity with a possible extra-terrestrial cause for mass extinction altered the temporality governing paleontological research from one based on temporal sequence to one based on periodicity. The most fruitful way to characterize the resulting transformed epistemology is that the search for evidence, and the cessation of the search for evidence, is best explained as the pursuit of closure for the overarching narrative of cyclical causation of extinction.



THURSDAY MAY 30th PM

Special Session – Philosophy of Temporalities in Scientific Narratives

Narrative understanding: parts, wholes, and recombinable systems

Rosa Hardt (OPEN Scotland)

This talk explores the idea that our ability to understand narratives involves using a recombinable system. Conceptualising narratives as a sequence of events that can be told, retold and altered, brings us to consider narrative understanding as requiring a capacity to creatively organise parts into wholes.

Memory, imagination and narrative

Dorothea Debus (Universität Konstanz)

In this brief presentation, I ask what relations might obtain between an individual subject's memories, her imaginations, and her narrative approaches to her own past. I aim to show that it is only because a subject is able to tell autobiographical stories about events in her own past that she has reason to take it that her experiential memories actually do present her with how things were in the past. Thus, our ability to tell autobiographical stories about events in our own past turns out to play a crucial epistemological role.

Narratives in scientific argument and explanation

Paula Olmos (Universidad Autónoma de Madrid)

In this paper I use the tools and framework developed within the field of Argumentation Theory to present a conceptual description of the way rational communicative practices (i.e. practices of giving reasons) combine argumentative and explanatory structures so that narratives may (and in fact do) occupy different functional roles in them. This is especially intriguing in scientific discourse which is not always simply “explanatory” but in which the “explanatory power/virtue” is always somehow involved. At least two main narrative models of reason-giving practices will be explored: the "narrative account of experimental activities in explanation-discussing practices" and the "narrative reconstruction of past trajectories in explanation-giving practices



Time and space in Alfred Wegener's narrative arguments for continental drift

Andrew Hopkins (LSE)

Alfred Wegener's arguments for the large scale horizontal displacement of continents, developed between 1912 and 1929, were ultimately unsuccessful in convincing the geological establishment, at least until they re-emerged in the context of the theory of plate tectonics during the 1960s.

However, his arguments constitute an interesting study in how narrative explanations are used to build a case for a particular hypothesis in historical science. In this talk I will examine the roles of the temporal and spatial aspects of the narrative explanations that make up Wegener's arguments.

Temporal detail and evidence in seismic source reconstruction

Teru Miyake (NTU, Singapore)

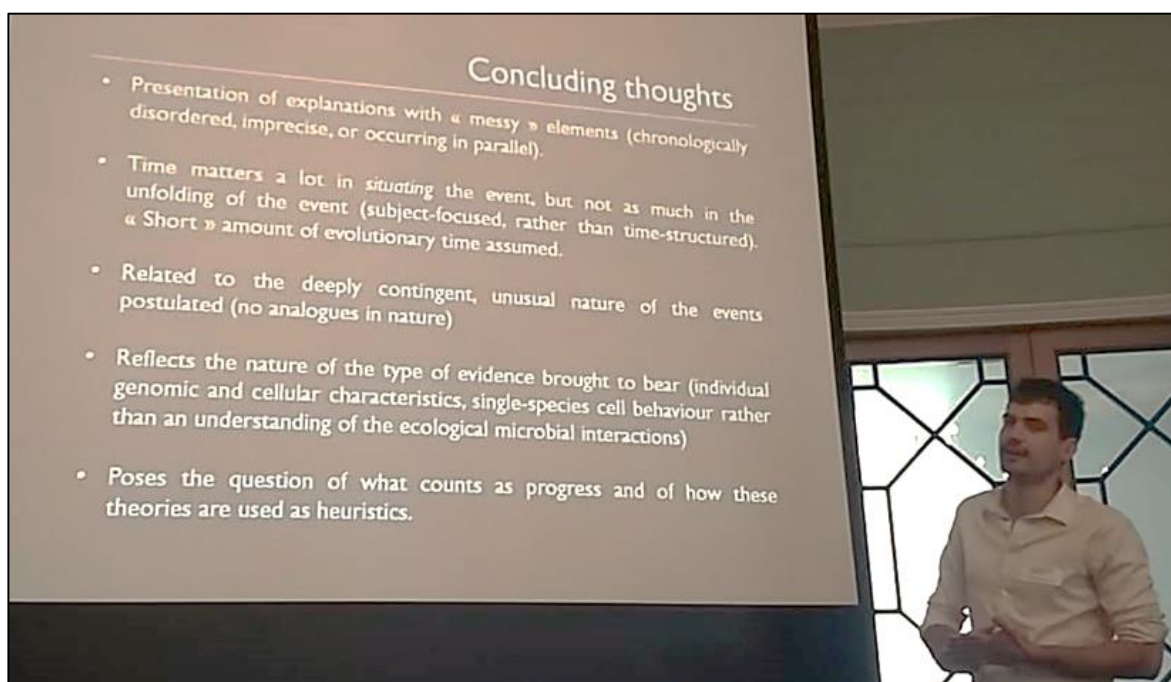
Earthquakes are often thought of as sudden and isolated events, but large earthquakes are extended processes consisting of sub-events that unroll over a period of several minutes over faults that can be hundreds of kilometers long. Earthquakes themselves can be thought of as sub-events in a larger narrative about tectonic processes that occur along particular faults and subduction zones. This talk will be a preliminary investigation of how narratives at different time scales are constructed in seismology, and how they are fit together.

FRIDAY MAY 31ST AM

Explaining the origin of eukaryotic cells between narratives and mechanisms

Thomas Bonnin (Université de Bordeaux)

This presentation investigates the nature of contemporary theories, in evolutionary biology, employed to explain the origin of eukaryotic cells. I use these case studies to assess the relevance, convergence and divergence of narrative and mechanistic explanations in this particular context.



When you can't get there from here: The importance of temporal order in evolutionary biology and ecology

John Beatty (UBC)

To give a Darwinian explanation of the characteristics of a species, it is not enough to show that those traits are appropriate for the environment inhabited. One must also show that the traits in question are more appropriate than the ancestral traits from which they are derived. But one must go further still. Even if there is no question that the derived traits are more appropriate, one must still specify the sequence of slight modifications leading from the ancestral to the derived traits. Which may be no small task. Often the Darwinian is in the



position of the traveller seeking directions from the Arkansas farmer, who thinks for a while and finally declares: you can't get there from here. But get there you must. You need to know the order of left and right turns, so to speak, that will get you from "here," the ancestral state to "there," the derived. I'll give a couple of examples. Flatfishes are fun. Antibiotic resistance less fun but also instructive.

Using allohistorical narratives to envision alternative energy futures

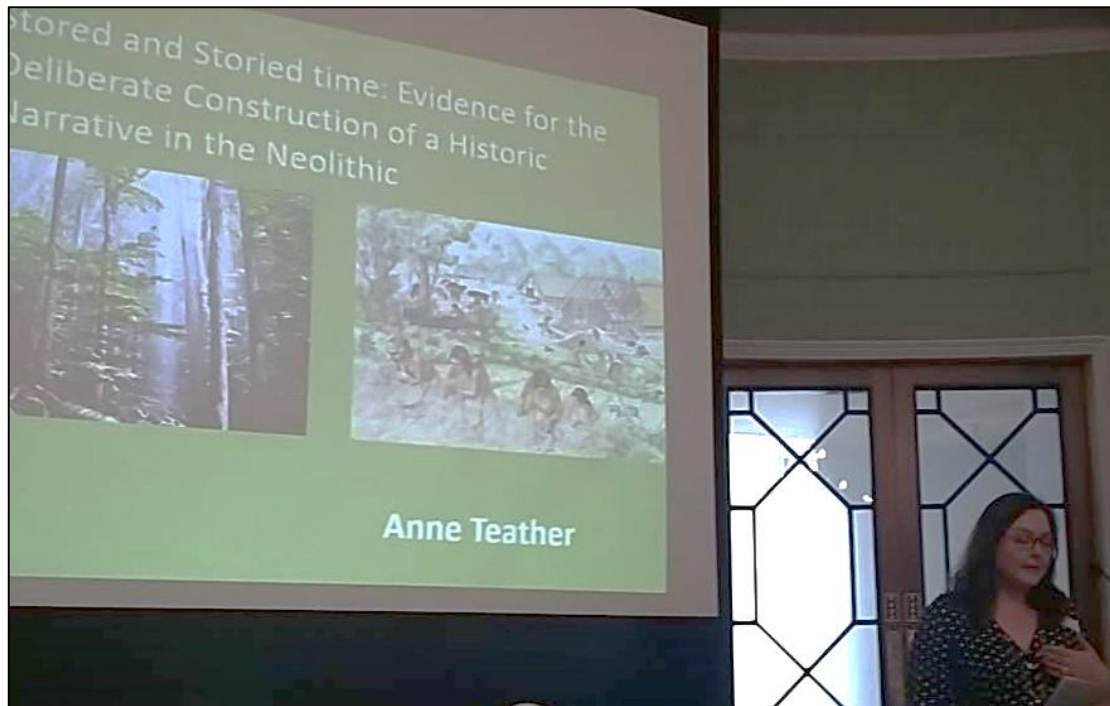
Daniel Pargman (KTH, Stockholm)

Everything unsustainable is possible only until it isn't any longer. Our use of non-renewable fossil fuels (coal, oil and gas) is unsustainable but has for centuries increased both in relative and absolute terms and currently constitutes 85% of the global energy supply. We intuitively sense that the consequences of phasing out fossil fuels will be momentous, but it is hard to envision what the transition to alternative energy sources could look like since "prediction is hard, especially about the future". We suggest that allohistorical (counterfactual) narratives can be used for that purpose and we explore a specific scenario in our 2017 paper "What if there had only been half the oil? Rewriting history to envision the consequences of peak oil", the first in a planned series of papers about "Coalworld".

Stored and storied time in the Neolithic

Anne Teather (University of Manchester)

Radiocarbon dating is a key method for establishing archaeological chronologies as it is able to determine an absolute date of 'death' for organic artefacts such as human or animal bone. However, we are increasingly finding some artefacts are dated to be older than the dated material they are found with. This suggests that the date of physical death is not always equal to the social death of an artefact, although curation over thousands of years is improbable. This paper discusses the problems and opportunities for archaeology through this inclusion of already old material in Neolithic deposits (4000-2500 BC), that appears to be part of a Neolithic social strategy of deliberate and meaningful retrieval and reincorporation of material remains, from a Neolithic past.



FRIDAY MAY 31ST PM

Time and ethnographic generalisation in anthropology, with Chinese divination as an example.

William Matthews (LSE)

Anthropologists have long been concerned with time, in terms of both the historical representativeness of ethnography and of cultural variations in how it is conceptualised. This paper focuses on the latter, using examples from Chinese Yijing divination to argue that 'time' in a given context must be considered not only in terms of culturally-specific understandings, but on different levels of cognition. Whilst Yijing divination has been characterised as correlative rather than causal, this correlative logic in fact stems from a particular interpretation of explicit reflection rather than indicating a fundamentally different understanding of time and causation on the part of diviners. Moreover, these reflective characterisations vary between individuals through time and space, and cannot be generalised to a particularly 'Chinese' conception of time.

Why narratives matter in economic history: The case of Indian textiles in the long run

Tirthankar Roy (LSE)

The paper discusses a case from the history of the cotton textile industry in the non-western world (India) that illustrates why economic historians need narratives. Between 1850 and 1920, British cotton textiles captured the world market, causing a 'de-industrialization' in regions where a large artisanal textile industry flourished until then. De-industrialization has been used to illustrate how the third world fell behind in the race to join modern economic growth. Textile history research from India however, reveals that after an initial decline (1850-1890), artisanal textiles revived and grew again. This U-shaped trend is puzzling. It is not surprising that a machine should lose to one eight times faster than itself. It is surprising that a slower machine would get back to business again. The alternative to this de-industrialization story recognizes that cloth consumers had a strong quality-preference in a range of cloths. But quality is a dynamic thing. It shapes the economic history of the textile industry, but not through the external and quantifiable agency of technological shocks.

Closing session: Wrap up

In the final session attendees were invited to share their thoughts and impressions from the two-day workshop. The following list is an edited summary of the comments recorded.

- The direction of time is different in different projects (hindsight; foresight; periodic; circular; linear).
- Temporality can be important for establishing the passage of time or in terms of sequencing of events.
- There is a possible distinction between A time and B time (McTaggart). Time passes in one, but in the other it stands still.
- The workshop might have benefitted from a philosopher working on the metaphysics of time.
- The title of the workshop might have implied an attack on the notion that time was essential to narrative.
- Narratives can inform by unfolding and synoptically. Do each these conceptions of narrative pair with different notions of time? Do they need time?
- Many existing conceptual languages were in play when dealing with narrative. When bringing 'narrative' into the philosophy of science, we want to avoid narrative becoming a licence to say anything and everything.
- The significance of narrative closure was brought out in Huss's presentation.
- Is it possible that a mechanistic closure is different from a narrative closure? There may also be an analytical closure in cases depending on continuity.
- Are narrative explanations and mechanistic explanations mutually exclusive? Do they live in different worlds? Narrative is good in the world of complexity.
- Are mechanism and narrative synonyms? Or perhaps are narratives needed to know how any given mechanism works?
- Is it the case that mechanism is related to law-like explanations, while narrative explanations may be seen as reason-giving?
- Non-scientific narratives typically involve some appeal to the emotions (as in Jajdelskar's example of eating children). Physiology meets narration?
- Narrative has multiple valence. But we can also focus on narration.
- There is a need to increase the volume on the epistemic work of narrative explanation.
- What is the relationship between epistemology and rhetoric, and do we need to know more about the rhetoric of narrative?
- A better understanding of narrative argumentation would seem to be very fruitful.
- There can be narratives that structure an argument, the way it is argued, and also narrative as something written.
- Explanation v argument: these two kinds of discourse are arguably not organised around the same sorts of things.
- Sometimes the narratives produced seem highly exportable to other domains or cases, whereas others seem very tailored. We can push back on the notion of their specificity as a fundamental feature.
- The workshop refreshed the way some people looked at the history of a subject in science. Being forced to adopt a new lens as a challenging and fruitful method, and makes you attend to new things.