

Of Records & Ruins: Metaphors about the Deep Past

Penultimate version, forthcoming in Journal for the Philosophy of History

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Acknowledgements

Thanks to the audience and participants of the 2022 “Writing Global Histories” workshop at Brown University, as well as Derek Turner and Alison McConwell, and two anonymous referees for feedback on this material.

Abstract

Consideration of evidence and data in historical science is dominated by textual metaphor: we reconstruct the past on the basis of various incomplete records. I suggest that although textual metaphors are often apt, they also lead philosophers and scientist to think about historical evidence in particular ways, and that other perspectives might be fruitful. Towards this, I explore the notion of natural historical evidence being thought of as ‘ruins’. This has several potential benefits. First, the architectural aspect of the metaphor emphasizes the contingency of historical subjects and the coherency of design-based reconstruction. Second, historical data, like ruins, are co-constructed, involving intimate interaction with materials.

1. Introduction

Scientists mining the past’s deep veins, hunting rare (or well-done) evidential game, ballast for voyages between the Scylla of uncertain seas and the Charybdis of the ignorant isles (where,

maps say, there be dragons) often reach for a particular metaphor when asked to explain their epistemic situation: our evidence of the past is a *record*, and indeed a poor one¹.

That is, past evidence is like a text, but one with many pages or letters missing. Appeal to the archaeological, paleontological and geological record, particularly coupled with the idea that it is an incomplete record, is easily the most prevalent metaphor concerning our past knowledge. Yet a metaphor it is: shaping how we conceptualize our knowledge of the deep past in potentially profound ways.

In this paper I'll reflect on the textual metaphor, and sketch another: the present is a *ruin* of the past. I won't suggest the latter metaphor should replace the former. Rather, I'll emphasize that how we think about our epistemic access to the past is (as it were) 'metaphor-laden' and as such, considerations of different metaphors might lead us to different perspectives on that knowledge.

I'll start in section 2 with a brief discussion of metaphors generally, providing a few tools to help us along the way. In section 3 I'll discuss the textual metaphor, and section 4 the ruin metaphor. For both I'll provide a historical sketch rooted in early modern natural philosophy, and a philosophical account pointing to the differing perspectives—advantages and possible downfalls—of the metaphors. Although the ruin metaphor has challenges, I do think it provides two major advantages. First, it draws our attention to the importance of considering both contingency and coherency in design-thinking. Second, it emphasizes the co-creation of historical traces and data, along with materiality.

I take discussion of how metaphors shape our conception of scientific knowledge to be one way of blurring the divide between epistemic and non-epistemic values pertaining to these

¹ Thanks to Tom Roberts, Ben Smart and John Dupre for aid in this sentence, as well as anonymous referee who convinced me to sacrifice at least a little fun in favour of readability.

pursuits. Although my discussion will be in a decidedly epistemic key, I take it that considering the aptness of metaphors reaches beyond considering knowledge in dry, propositional terms, to encompass various ‘extra-epistemic’ factors, particularly aesthetic². Further, considering the aptness of metaphors takes us beyond purely epistemic conceptions of value as they play out in the philosophy of science. For instance, I suspect that metaphors, like narratives, might be an important vehicle for what Perkins calls *cultural readiness*—roughly the receptivity of an epistemic community to some theory³. As I discuss below, if the records metaphor was carefully subverted by the architects of the paleobiological revolution, the pre-existence of the metaphor, and its capacity for manipulation and transformation, were potential preconditions crucial for readying the paleontological community. As such, I take this discussion to be relevant to how we understand values in both science and the philosophy of science.

2. Metaphors

The ubiquity of metaphors, analogies and other linguistic and imaginative devices throughout science is well-known and well-noted⁴. In this paper, I’m concerned with how metaphors might shape how we conceive of epistemic pursuits, that is, what we focus on when we look at some investigation or discipline and ask after its method, epistemic situation, and suchlike. For instance, I’ll below suggest that much philosophical attention to knowledge of the deep past is shaped by the textual metaphor, and that this leads us to focus more on some aspects of knowledge production than others—potentially to our philosophical detriment. My approach in some ways departs from how philosophers of science have asked after scientific metaphors. I’ll

² D Turner. *Paleoaesthetics and the practice of paleontology*. 2019 Cambridge University Press; A Currie. *Epistemic engagement, aesthetic value & scientific practice*. Forthcoming, *British Journal for the Philosophy of Science*.

³ TJ Perkins. *Culture’s Impact on The Historical Sciences*. *Journal for the Philosophy of History*. Forthcoming.

⁴ R Dreistadt. *An analysis of the use of analogies and metaphors in science*. *The Journal of Psychology*, 1968, 68(1), 97-116; W Veit & M Ney. *Metaphors in arts and science*. *European Journal for Philosophy of Science*, 2021 11(2), 1-24; M Bradie. *Models and metaphors in science: the metaphorical turn*. *Protosociology*, 1998, 12, 305-318.

start by differentiating my approach from theirs, and then I'll say something about what metaphors are and how they function.

Philosophers of science have noted how metaphors aid scientists in understanding: metaphors act as mediators between things we have difficulty understanding—complex theories, say—and things of which we have more natural understanding⁵. We don't really think that atoms behave like billiard balls, but conceiving of them as such can provide a grip on some of their dynamics, while also potentially leading to misunderstanding. As such, metaphors as tools for understanding help shape scientific research in various ways. For instance, metaphors can lead to over-extending claims beyond evidence in non-reflective ways, as Powell & Mikhalevich caution about progressivist conceptions about evolution⁶. Metaphors might also shape how scientific ideas are extended across domains. For instance, Alison McConwell's discusses GG Simpson's disquiet with the notion of 'superorganism' being metaphorically extended to human societies⁷. For Simpson, the emphasis that the metaphor places on the good of the collective over the individual is ethically questionable.

Here, I'm interested in how metaphors might shape how scientists and philosophers give an account of an epistemic situation⁸. That is, scientists face different challenges and utilize differing

⁵ M Stuart & D Wilkenfeld. *Understanding metaphorical understanding (literally)*. *European Journal for Philosophy of Science*, 2022, 12(3), 1-20; A Levy. *Metaphor and scientific explanation*. IN: Levy & Godfrey-Smith (eds) *The scientific imagination*. 2020, Oxford University Press, 281-303; K Khalifa. *Understanding, explanation, and scientific knowledge*. 2017, Cambridge University Press. N Nersessian. *The cognitive work of metaphor and analogy in scientific practice*. *Philosophical Inquiries*, 2015, 3(1), 133-156.

⁶ R Powell & M Mikhalevich. *Wonderful Mind: Convergentism and the Crusade Against Evolutionary Progress*. *Journal for the Philosophy of History*. Forthcoming.

⁷ A McConwell. *George G. Simpson & Stephen J. Gould on Values: Shifting Normative Frameworks in Historical Context*. *Journal of the Philosophy of History*. Forthcoming.

⁸ For analysis of an 'epistemic situation', see: S Leonelli. *Data-centric biology*. 2016, University of Chicago Press; A Currie, A. *Stepping forwards by looking back: underdetermination, epistemic scarcity and legacy data*. *Perspectives on Science*, 2021, 29(1), 104-132. You might, as a referee does, worry whether an appeal to partial truth makes metaphors collapse into idealized models. It is worth noting that several accounts of scientific modelling just do identify them with metaphors (for instance: A Toon. *Models as make-believe: Imagination, fiction and scientific representation*. 2012, Springer; A Levy. *Modeling without models*. *Philosophical Studies*, 2015, 172(3), 781-798). As such, this might not be so bad a consequence—but here's not the place to take a stance on this.

resources when generating knowledge. Just as metaphor might help us grapple with complex theories, they also serve to communicate a scientist's or philosopher's perspective on knowledge generation. As we'll see below, when historical scientists describe the source of their data as an incomplete record, they draw on a textual metaphor which leads them to account for their methods, strategies and challenges in a particular way. I don't think these two questions—understanding particular scientific theories or ideas, and providing an account of an epistemic situation—are fully independent, but are sufficiently separable for our purposes.

A useful starting place in thinking about metaphors is the notion of *partial truth*⁹. Although we might think metaphors are necessarily false, or perhaps do not aim at truth, properly understood, they *are* truth apt and sometimes true: they aim to describe the world, but only partially. It is commonly said that metaphors (like similes) are in the business of drawing a comparison between two things and, we might claim that insofar as the relevant similarity holds, the metaphor is partially true. For instance, consider this rather depressing metaphor from Rahl Dahl's *Matilda*:

The parents looked upon Matilda in particular as nothing more than a scab. A scab is something you have to put up with until the time comes when you can pick it off and flick it away.

Helpfully, Dahl has done some of our work for us by identifying exactly which similarities we are interested in: namely, whether or not Matilda's parents viewed her as something to be put up with for the time being. This is the descriptive content of "The parents looked upon Matilda in particular as nothing more than a scab". As such, the metaphor can be understood as a partial description, here one saying something about the parents' attitude towards Matilda. If they had a different attitude towards her—say, they cared for her deeply—then the metaphor would be

⁹ I'm largely here inspired by Levy's adaptation of Yablo (see Levy *Modeling without models*; S Yablo. *Aboutness*. 2014, Princeton University Press.

false. Other aspects of comparisons between scabs and Matilda do not hold, but are not relevant for the metaphor's partial truth. For instance, the parents likely know that scabs act as protective layers to keep out germs and muck so skin can regrow. But I doubt they think of Matilda in these terms. Part of what it is to understand the metaphor is to understand which aspects are to be taken as having descriptive content and which are not. And so, metaphors are truth-apt insofar as we can isolate some subset of descriptive content behind the intended meaning of the metaphor.

The primacy of the truth-aptness of metaphors—reading them as descriptions—might be denied. For instance, on Kendall Walton's account we take metaphors as invitations to games of make believe¹⁰. Dahl invites us to imagine that Mathilda is a scab. I don't find such accounts very persuasive: I am not imagining Mathilda is a scab, I am rather using the metaphor to highlight similarities between our attitudes towards scabs and the parents' attitude towards scabs. But regardless, I don't think much turns on our commitment to this or otherwise going forwards: indeed, Walton's machinery can be used to generate a truth-apt semantics or pragmatics of metaphors. Stuart and Wilkenfeld¹¹ helpfully distinguish between *invitational* and *assertive* notions of metaphor, where the latter provision partial descriptions while the former are imperatives: invitations to imagine. As they point out, these views need not be in conflict:

... sometimes metaphors are best interpreted primarily as asserted indicatives and secondarily as imperatives, but sometimes it is the other way around. On this view, the very same metaphor might be best understood one way in one context (e.g., in a research paper) and another way in another context (e.g., the classroom).

Invitational accounts are motivated by the thought that considerations of partial truth only get us some of the way towards the nature of metaphors. For our purposes, we'll consider two

¹⁰ K Walton. *Metaphor and prop oriented make-believe*. European Journal of Philosophy, 1993, 1(1) 39-57

¹¹ M Stuart & D Wilkenfeld. *Understanding metaphorical understanding (literally)*. P 49.

further aspects. First, the notion of a ‘scab’ doesn’t simply provide a partially true description of the parents’ attitude towards Matilda, we can also judge it regarding its *aptness*. That is, whether the valence or resonance associated with the metaphor is relevant to the target given the aims at hand. Dahl assumes a highly negatively-valenced attitude towards scabs, and partially the success of the metaphor turns on our sharing that attitude. Indeed, I might argue against the aptness of the metaphor by pointing out that scabs act as protective layers, and—so far as I can tell at least—Matilda doesn’t play this role to the parents’ in Dahl’s tale. Further, we might note that the metaphor is being used in a book targeted at a younger audience, and the slightly gross, irreverent nature of the metaphor is apt given the tone Dahl is going for (or perhaps inapt if we’re of a more uptight disposition vis-à-vis children’s literature).

Second, metaphors have a kind of open-ended flexibility—they can mean different things to different audiences across time. This is a crucial aspect of Elizabeth Camp’s account of metaphor, whereby metaphors generate *perspectives* about their topics¹². She understands ‘perspectives’ as sets of dispositions, and as dispositions might shift over time and across audiences, so might the perspectives the metaphors generate. I suspect my conception of a ‘scab’ is similar to Dahl’s (and indeed his helpful clarification of the metaphor’s meaning aids in this) but I can also imagine the metaphor’s meaning, as it were, drifting over time. Perhaps, in light of promotion of the benefits of our own bodies’ capacity to defend and heal themselves, scabs gain higher cultural cache, becoming more positively considered. Presumably under those circumstances the metaphor would become less effective to historically ill-informed readers, but we might also think that the open-endedness allows metaphors to be a particularly flexible communicative tool capable of

¹² E Camp. *Two varieties of literary imagination: Metaphor, fiction, and thought experiments*. *Midwest studies in philosophy*, 2009, 33, 107-130; E Camp. *Imaginative frames for scientific inquiry: Metaphors, telling facts, and just-so stories*. IN: Levy & Godfrey-Smith (eds) *The scientific imagination*. Oxford University Press, 2020, 304-336.

evolution over time and across users. Indeed, as we'll see, the textual metaphor appears to have shifted since the early modern period.

So, we can understand metaphors as being partially true descriptions, which can be judged both in terms of that partial truth and in terms of aptness. These descriptions are generated via the perspective the metaphor invites, and their aptness regarding the usual richly contextual set of questions about aims, audiences, and so on. Moving forwards, I'm interested in how metaphors might influence and shape scientists' account of their epistemic situation. In particular, metaphors about historical evidence.

3. Records

The most prevalent—almost ubiquitous—metaphor shaping our understanding of the deep past is so prevalent that its metaphorical status is often, forgivably, not recognised. This is the *textual* metaphor: the idea that evidence of the past should be thought of in terms of *records*. The geological, fossil, and archaeological records form the basis of our thinking about our knowledge of the deep past. The metaphor, of course, relies on a comparison with human record-keeping.

As we've seen, we can understand metaphors via partial truth and aptness. So, which aspects of the textual metaphor are relevant here? The notion of a *written record* is at base a purposefully kept account of some properties over time. Here's an example. Parish registers were instituted across England and Wales in 1538. Each parish was instructed to note each baptism, marriage and burial under their jurisdiction, with specific instructions as to the materials used to make the records and to their storage. These were kept for several reasons—religious and otherwise—but

now form a base of evidence about the past: both for individuals tracing their ancestry but also demographic and similar studies of England and Wales' history¹³.

Fossils, middens and strata are not purposefully kept accounts of some properties over time. But they can be used as *trace evidence*, and are highly incomplete. And the same is to be said for Parish registers. For instance, parish registers recorded baptisms—not births—and burials—not deaths. As such, parish records speak to different aspects of the past more-or-less directly. Even if we think them a fair record of baptisms, there's a fair distance between this and births. So, in saying that fossils form a *record*, the partial truth turns on (1) that they can be used as *evidence* of the past, and (2) that they are *incomplete*. Derek Turner has put this elegantly:

The textual metaphor thus helps to capture the ideas that only some information about the past gets recorded in the first place, and that once recorded, historical processes also tend to degrade and destroy information, like bookworms eating through documents in an archive¹⁴.

Parish registry records leave out some information—the unbaptised and unburied, such as Catholics—and despite best efforts have sometimes been lost, or degraded, over time. But regardless, they serve as a valuable resource for those interested in demography across Britain. The textual metaphor is an invitation to think about evidence concerning the past in a similar vein¹⁵. It also has a fascinating history, and telling it can help us see how it has shaped our conception of historical evidence.

¹³ For example: M Drake. *An elementary exercise in parish register demography*. The Economic History Review, 1962, 14(3), 427-445; K Snell. *Parish registration and the study of labour mobility*. Local Population Studies, 1984, 33, 29-43.

¹⁴ D Turner, *Paleoaesthetics*, 52.

¹⁵ We might also think that the textual metaphor opens the door to understanding geology and other sciences of the deep past in terms of hermeneutic practices, but I'll leave an analysis of such interpretive issues for another day (see R Frodeman, R. *Hermeneutics in the field: The philosophy of geology*. In D. Ginev, ed., *The Multidimensionality of Hermeneutic Phenomenology*. Dordrecht: 2014, Springer, pp. 69–79..

3.1 A historical sketch

The tight connection between textual and natural historical analysis in early modern natural philosophy is extremely well-recognised¹⁶. In short, a major influence upon the empirical methods developed in the 17th Century were systems of practice built from chronologies—the use of the bible and other documents to understand the past—and forms of related scholarship. To take a single well-worn example, the idea of our knowledge being built upon ‘three books’ is a common theme. Consider Boyle:

Both our Divines and our Philosophers, compose Man’s Library of three cheife Books, which to Expound, apply and Rectify, is the Taske of the rest. Few men ignore that these 3 Volumes, are The Booke of Nature, the Book call’d Scripture, and the Booke of Conscience¹⁷.

The bible, nature, and our minds are all constructed by a Divine designer and as such their study can similarly and simultaneously inform us about both their topics and that designer. There is a virtuous epistemic circle between knowledge of nature and knowledge of God. Although the employment of the book metaphor is telling, it is about nature generally, not the past. For that, we’ll shift to one of Boyle’s near-contemporaries.

Amongst his many pursuits, Robert Hooke took to the study of fossils and was an early adopter of the idea that they were in fact the remains of deceased organisms (as opposed to being due to vegetative forces common both to mineralogical and biological growth¹⁸). With this,

¹⁶ P Harrison, P. *Reinterpreting nature in early modern Europe: Natural philosophy, biblical exegesis and the contemplative life*. In *The Word and the World* (pp. 25-44) 2007, Palgrave Macmillan, London; K Essary. *The Bible and Natural Philosophy in Renaissance Italy: Jewish and Christian Physicians in Search of Truth*. 2015, 32(2), 263-264.

¹⁷ R Boyle. *Of the Study of the Book of Nature*. In: *The Works of Robert Boyle*, 14 vols., edited by M. Hunter and E.B. Davis (London: Pickering & Chatto, 1999-2000), vol. 13, p. 147

¹⁸ M Rudwick. *The meaning of fossils: episodes in the history of palaeontology*. 2008, University of Chicago Press.

a connection between fossils and the past is made. Hooke, however, did not reach for a textual metaphor—and why is telling. He referred to fossils as ‘medals’ or ‘coins’, the reference being to Roman coins. As Martin Rudwick points out, the ‘coin’ metaphor specifically highlights a *supplementary* role to textual evidence. Just as Roman medals or coins were an aid to the analysis of textual sources (Tacitus’ histories, say), so also could the fossils supplement, say, biblical sources¹⁹. Lacking a conception of prehuman history, Hooke saw the placement and nature of fossils as secondary evidence to text in reconstructing the past, just the same role Roman coins played.

In the century after Hooke’s studies, natural philosophers began to accept that fossils represented dead organisms predating human texts—indeed, a time earlier than humanity itself. Without texts to supplement, then, fossils became evidence in their own right:

Having been regarded merely as supplementary to textual evidence, fossils came to be treated as historical evidence in their own right; they were evidence of events for which there could never be any human records because the periods had apparently been prehuman²⁰.

Taking fossils as evidence in their own right also enabled natural philosophers to bring the methodological strategies associated with textual analysis to bear on physical remains of the past. And with this shift—unsurprisingly—we see the textual metaphor become more popular. Rudwick illustrates this through the 18th Century naturalist François-Xavier Burtin who described geological history as follows: “the surface of the globe is but a series of documents that demonstrate a series of revolutions on this planet”²¹. With an indeterminate but long prehuman

¹⁹ M Rudwick. *Bursting the limits of time: the reconstruction of geohistory in the age of revolution*. 2005, University of Chicago Press.

²⁰ M Rudwick, *Bursting the limits of time: the reconstruction of geohistory in the age of revolution*, 195.

²¹ Burtin, quoted in M Rudwick, *Bursting the limits of time: the reconstruction of geohistory in the age of revolution*, 200.

history on the table, geological and fossil evidence began to stand on their own epistemic feet, no longer supplementary but primary evidence of the past. And thus the textual metaphor became apt.

A century onwards, the textual metaphor was further developed by Darwin and Lyell, adding the notion of the record being *incomplete*²². In chapter 9 of the *Origin*, Darwin argues that the lack of transitional fossils is not damaging to his incremental, gradualist model of evolutionary change because of the record's incompleteness. As he puts it, the fossil record provides...

... a history of the world imperfectly kept, and written in a changing dialect; of this history we possess the last volume alone, relating only to two or three countries. Of this volume, only here and there a short chapter has been preserved; and of each page, only here and there a few lines²³ (Darwin 1859/1964, 310–11)

So, the fossil record isn't simply a text, but an extremely incomplete text. John Huss emphasizes this aspect of the metaphor: "The implications of the book metaphor are clear. With incompleteness at every scale—from volume to chapter to page to line to word—it is no wonder that all changes in fossil form appear to be sudden and abrupt"²⁴. As he explains, it wasn't until the so-called "Paleobiological Revolution" of the 1970s onwards that this limited and limiting view of the record was challenged. The development of theories such as punctuated equilibria required that the record be read more literally: sudden changes are in fact biological changes, not mere artifacts of differential preservation. As he puts it,

²² M Tamborini. *Paleontology and Darwin's theory of evolution: The subversive role of statistics at the end of the 19th century*. *Journal of the History of Biology*, 2015, 48(4), 575-612.

²³ C Darwin. *On the origin of species: A facsimile of the first edition* (Vol. 11). 1964, Harvard University Press pp 310-311

²⁴ J Huss, J. *Paleontology: Outrunning Time*. In *Time of Nature and the Nature of Time* (pp. 211-235). 2017, Springer, Cham.

... barren zones in the fossil record may not be missing pages from the book of life, as Lyell and Darwin envisaged, but may actually be a record of the absence of life from those environments²⁵.

Although Huss and others have argued that we shouldn't take the incompleteness of the fossil record so seriously, this doesn't so far as I can tell undermine the textual metaphor itself. We simply take the record to be true—or more true—than we previously thought. Interestingly here we see the kind of meaning-shift that Camp's discussion of perspectives highlights. Earlier textual metaphors drew connections to well-established textual analyses, while later they drew attention to the record's incompleteness. David Sepkoski²⁶ understands the paleontological revolution as shaped by challenging the incompleteness of the record. Not only do paleontologists take the record as being more faithful to the true past than someone like Darwin would, they also 'reread' the record using various modelling strategies—'idealized rereading'—and the development and deployment of large data-sets, 'generalized rereading'.

The guiding principle behind paleobiology was a deliberate manipulation of Darwin's famous "book" metaphor. If the fossil record was widely considered to be an imperfect text, the strategy of paleobiologists was to "reread" that text in a manner that could produce reliable evolutionary insight²⁷.

If Sepkoski is right, the textual metaphor hasn't simply been a useful way of articulating various views about the nature of historical evidence throughout history, but was actively used as a kind of heuristic for shaping the development and direction of paleobiology. I suspect it has also shaped how philosophers analyse historical science.

²⁵ J Huss, *Paleontology: Outrunning Time*. 230.

²⁶ D Sepkoski, *D. Rereading the fossil record*. 2012, University of Chicago Press.

²⁷ D Sepkoski *Rereading the Fossil Record*, 4

3.2 Records & Philosophy

The history of the textual metaphor contained the core elements I identified earlier: first, the notion of trace evidence, and second, the notion of incompleteness. This model of thinking about past knowledge, I suspect, has profoundly shaped philosophical accounts and debate concerning the nature of our knowledge of the deep past.

Most accounts of historical evidence lean heavily on what I've called 'trace-based reasoning'²⁸. In effect, the present is taken to be a record containing information about the past. The record can be read if it is de-coded in the right way—that is, if we've the right background knowledge to translate the record and interpret its gaps. These models of historical reasoning generally consist in past hypotheses being tested against current observations in the form of traces. Disagreement concerns what best captures this epistemic relationship: whether it should be modelled in terms of common-causes²⁹, convergence or consilience of independent lines of evidence³⁰ and so on. Further discussion emphasizes how experimental and other methods can be brought to bare in understanding and decoding the flow of information from the past into the present³¹.

Another line of debate in recent philosophy of the historical sciences centres around how information-preserving historical processes are. Derek Turner's influential arguments can be cast in this light. For him, we should expect our historical knowledge to be systematically

²⁸ A Currie, A. *Scientific knowledge and the deep past: history matters*. 2019, Cambridge University Press.

²⁹ C Cleland. *Methodological and epistemic differences between historical science and experimental science*. *Philosophy of science*, 2002, 69(3), 447-451; A Tucker. *Historical science, over-and underdetermined: A study of Darwin's inference of origins*. *The British Journal for the Philosophy of Science*, 2011.

³⁰ A Wylie. *Critical distance: Stabilising evidential claims in archaeology*. In P. Dawid, W. Twining, & M. Vasilaki (Eds.), *Evidence, inference and enquiry* (pp. 371-394). 2011, Oxford, UK: Oxford University Press/British Academy; P Forber & E Griffith. *Historical reconstruction: Gaining epistemic access to the deep past*. *Philosophy and Theory in Biology*, 2011, 3, 1 – 19 .

³¹ B Jeffares. *Testing times: regularities in the historical sciences*. *Studies in history and philosophy of science part C: Studies in history and philosophy of biological and biomedical sciences*, 2008, 39(4), 469-475; P Kosso. *Observation of the Past*. *History and theory*, 1992, 21-36; P Kosso. *Knowing the past: Philosophical issues of history and archaeology*. 2001, Prometheus Books.

underdetermined due to information decay and our lack of experimental capacity to mitigate that decay³². In short, he argues that most historical processes are *information destroying* rather than *preserving*³³. And responses to Turner in part rely on denying this—consider, for instance, Jeffares’ discussion of the bowl thought experiment which Sober uses to articulate his distinction.

... surely there are systems... which are such that they do not preserve evidence? This too, surprisingly, is an empirical question. The slip with this example is to argue from an isolated model system, rather than acknowledge that historical sciences work in that complex, messy world outlined above. Simple, closed systems really are difficult, but events in the world are messy, complex, and rarely closed³⁴.

Jeffares’ point is that the causal complexity and messiness of the world is a boon for historical reconstruction, because that contingency preserves information³⁵.

So, the textual metaphor leads us to judge the epistemic capacities of historical science in terms of the incompleteness of the records available to us.

No doubt the textual metaphor is a powerful one. Indeed, much of our evidence of the past is based on traces—but crucially, *not all of it is*—and indeed, our access to the past does turn in part on how information decays—but, crucially, *it doesn’t turn entirely on this*³⁶. I’ve argued elsewhere that a focus on trace-based accounts of historical reasoning leads us to misconstrue the epistemic power of analogy, modelling, storytelling and coherence in these sciences. I

³² D Turner. *Local underdetermination in historical science*. *Philosophy of Science*, 2005, 72(1), 209-230; D Turner. *Making prehistory: Historical science and the scientific realism debate*. 2007, Cambridge University Press.

³³ E Sober. *Reconstructing the past*. 1988, MIT Press.

³⁴ B Jeffares. *Guessing the future of the past: Derek Turner, Making Prehistory: Historical Science and the Realism Debate*. *Biology & Philosophy* 2010, 25, pages 125–142; pp 139-140

³⁵ See also chapter 8 of A Currie. *Rock, bone, and ruin: An optimist's guide to the historical sciences*. 2018, MIT Press.

³⁶ A Currie, *Rock Bone & Ruin*.

suspect the record-metaphor takes some role in shaping this philosophical myopia. The metaphor's descriptive content, I think, is about right. But, again crucially, and I suppose ironically, the metaphor is also incomplete. This suggests that other metaphors may lead to other perspectives. As Turner has said,

Every scientific metaphor involves a kind of collective conceptual decision, and as in poetry, there are always other options. Moreover, once such a decision is made, the metaphor can shape our thinking in ways that are sometimes very difficult to notice³⁷.

In this spirit, then, let's try another metaphor on for size.

4. Ruins

Let's consider 'ruins' as a metaphor for natural historical knowledge. As we'll see in the next subsection, there is an historical story to tell about ruins as a metaphor for the natural world, and I think the metaphor applied to some aspects of historical reconstruction, particularly functional morphology, does carry some interesting insights. Parts of these insights are captured in Hetzler's rather beautiful account:

A ruin... is a special work of art. It includes the human-made and the nature-made and has its own time, place, space, life and lives. Ruin time is immanent in a ruin and this time includes the time when it was first built, that is, the time when it was not a ruin; the time of its maturation as a ruin; the time of the birds, bees, bats and butterflies that may live in or on the ruin; the cosmological time of the land that supports it and is part of it and will take back to itself the man-made part eventually; as well as the sidereal time of the stars, sun and clouds that shine upon it, shadow it and are part of it³⁸.

³⁷ Turner, *Paleoaesthetics*, p 50.

³⁸ F Hetzler. *Causality: Ruin time and ruins*. Leonardo, 1988, 21(1), 51-55. P51.

Hetzler emphasizes that ruins are co-constructed—built by us and by nature—and that ruins are inherently temporal—they are contingent. I'll suggest this contingency leads to a holistic approach to our understanding of ruins.

I'll argue the partial truth of the metaphor (at least applied to the cases I'm interested in) highlight two aspects of our evidence of the past. First, reconstructing a ruin involves what I'll call *coherent but contingent design*: the building is understood holistically, in terms of a plurality of functions, from cultural use to structural integrity. And various contingent features of its history are crucial. Similarly, paleobiologists reconstruct extinct animals using a wide variety of functional characterizations, and pay particular attention to how these hang together. Second, ruins are *co-constructed* by ourselves and nature, occupying one of the many grey areas between the artificial and the natural. So too are fossils co-constructed: fossils are the result of biological growth, death and decay, geological processes, and scientific processes of extraction and preparation. Further, co-construction highlights the materiality of specimens. As with the previous discussion, I'll dip my toe into some history, before turning to philosophical analysis.

4.1 A historical sketch

Although a history of ruins itself would be an enormous undertaking³⁹ (see Schnapp 2020), for our purposes a much shorter discussion will do, one returning to Robert Hooke.

In addition to considering nature's coins—fossils—as supplementary evidence of a human past, Hooke also studied snowflakes, and Alexander Wragge-Morley argues that these snowflakes illustrate a profound influence upon Hooke and his contemporaries in the early Royal Society's approach to natural philosophy⁴⁰. Hooke represents snowflakes as perfect geometric

³⁹ For instance: A Schnapp. *Une histoire universelle des ruines: des origines aux Lumières*. 2020, Seuil.

⁴⁰ A Wragge-Morley. *Aesthetic Science: Representing Nature in the Royal Society of London, 1650-1720*. 2020, University of Chicago Press.

figures, a far cry from what they in fact look like under the microscope. Why didn't Hooke portray the snowflakes accurately?

Wragge-Morley's explanation points to the work of architects and proto-archaeologists like Inigo Jones, who reconstructed ruined sites like Stonehenge. The strategy is to consider such ruins to have been temples, and thus designed according to geometric principles, such as those governing the Temple of Solomon recounted in the bible. In reconstructing a ruin, one isn't simply guided by the ruin itself, but by your understanding of the purposes of the ruin's past builders. A knowledge of the design principles and purposes at play enable rich reconstruction. Similarly, the natural philosophers of the early Royal Society saw nature as a kind of ruin: fallen, the Earth's previous perfection decayed. If they could understand God's intended design, then, they could infer from the current fallen state to that lost perfection. Hooke, then, didn't represent snowflakes as they were, but in their (he considered) intended, geometrically perfect state. As Wragge-Morley puts it,

[Hooke's] response to the lack of beauty in snowflakes was not, then, to faithfully record what he saw. Instead he mobilized strategies of inquiry and representation behind an almost entirely imagined history of beauty and perfection ruined by external forces⁴¹.

Put coarsely, then, for the early Royal Society the project of natural philosophy involves uncovering the perfect design immanent in nature. The role of idealization and representation, then, is heavily linked to, and influenced by, metaphysical commitments. In a sense, ruins like Stonehenge act as a metaphor for all of nature: by understanding the intentions of the makers, the original—perfect—state can be inferred. In the next section, I'll take the metaphor in a rather different direction.

⁴¹ Wragge-Morely, *Aesthetic Science*, 90

4.2 Ruins as metaphor

As Alain Schnapp has shown, a fascination with ruins is not limited to the enlightenment traditions partaken of by Hooke⁴² (Schnapp 2015). Examination of and speculation about traces of past human activity and construction is wide-spread across time and culture. Here, however, we're not concerned with literal ruins, but of ruins as a metaphor for natural historical evidence. As with any metaphor, we should identify both the descriptive core—the intended partial truth of the metaphor—and consider the perspectives it engenders.

The first worry we might have about ruins as a metaphor is exactly the central part of Hooke's use of it: the role of purpose and intention. As we do not believe the biological past is a product of intentional design, we'd better not take that part of the metaphor to be core. To begin, then, we should try to characterise a notion of 'ruin' that is free of specific reference to intentions. Here is my suggestion:

A *ruin* (as metaphor) can be understood as a *processual* connection between a *past state* and a *current state* of some particular location or entity, where the current state is the result of forces which have disordered the past state.

On this understanding, a fossil is a ruin of a once-living critter. This is because the past state (a living organism) is processually connected to the current state (a fossil) via fossilization. Fossilization (and other processes) have 'disordered' that past state insofar as the various properties that kept the living organism in a rough equilibrium have ceased. The idea isn't that fossils are less ordered than living organisms *tout court*, but rather that they are *relative to that past state*. Fossils are fairly stable, ordered objects, but they are not stable, ordered organisms. Derek Turner points out that there is an element of pseudo-thermodynamic convergence in ruin

⁴² A Schnapp. *The Path of Ruins in the Graeco-Roman World*. In *Globalized Antiquity* (pp. 259-280). 2015, Dietrich Reimer Verlag.

processes: without work, any past state will become disordered. Although in a sense ruination is a convergent outcome, how those processes play out, and our work in creating stable ruins, are deeply contingent processes.

With a definition of a ‘ruin’ on the table, I can now turn to the two features I think the metaphor highlights. Note that while the textual metaphor is applied across historical evidence, I’ll think about ruins in terms of what I’ve been calling ‘natural’ historical evidence, that is, traces that are not due to, nor evidence of, past human activity.

4.2.1 *Design: Coherent & Contingent*

Ruins are the remains of buildings—*architecture*—as such, the metaphor leads us to link historical reconstruction of, say, extinct organisms with the reconstruction and understanding of architecture. In this subsection, I want to highlight two aspects of architectural understanding and the reconstruction of ruins. First, ‘function’ is understood in a very general way and involves rich notions of coherence. Second, these reconstructions and explanations take into account highly contingent and local features of the building itself. For a single example, let’s take a case that is far from a ruin but nonetheless highlights these same architectural features: Ely Cathedral’s octagon tower.

The majority of Ely Cathedral was completed in the Norman Gothic style by 1083. However, the tower over the crossing collapsed in 1322, perhaps due to changes in the water table caused by the recent construction of a large lady chapel. By 1328 this tower was replaced by the current structure, consisting of eight internal arches made from stone, supporting the soaring timber fan-vaulted roof with a high lantern apparently balanced on fairly thin wooden struts 52 meters from

the cathedral floor⁴³. The cost coming to £2,406 (or, as Wade et al estimate, nearly two and a half million pounds today).

In explaining the structural and functional features of the octagon, engineers and architects understand the building as a *coherent structure*, that is, something that doesn't only play various functions (housing sermons, etc...) but also, well, being capable of standing up. Consider Wade et al's summary of the complex engineering involved in understanding the tower:

[their modelling] leads to a set of equilibrium forces which can perhaps be generated precariously by reason of the many extra supporting members in the real framework and which are satisfactory except for the main curved supporting ribs.... The ribs must be backed by the diagonal stays, but these in turn then become overstressed. Alternatively, the model in which all the load is taken by the diagonal stays requires excessive bending to be developed in the eight great posts. In practice it may be imagined that the forces from each of these two basic models will combine to support the weight of the lantern. Even so, the stresses will not be at that comfortably low level at which maintenance problems will be slow to arise.⁴⁴

The apparent precarity of the soaring lantern is an ingenious architectural illusion caused by the interaction of forces from the eight columns and struts below, and a complex hidden structure of enormous timbers above the vaulting, which Wade et al describe.

In explaining the structural and functional features of the octagon, engineers and architects must accommodate the contingencies of the structure's construction. The two-hundred-year stylistic lag between the majority of the Cathedral and the octagon tower is, of course, due to the collapse, and how the builders responded and adapted to those changing conditions, and these

⁴³ P Meadows & N Ramsay. *A History of Ely Cathedral*. 2003, NY: Boydell & Brewer.

⁴⁴ E Wade, J Heyman, W Hurley, D Walsingham, M A Essex & G Scott. *THE TIMBER OCTAGON OF ELY CATHEDRAL*. Proceedings of the Institution of Civil Engineers, 1985, 78(6), 1421-1436. P1433

are all influenced by evolving architectural styles. For instance, the octagon tower, unlike the rest of the cathedral, is built in decorative gothic style, and the lantern is the only gothic dome in existence. An explanation of the tower doesn't simply involve physics and expediency, but also changing style and technology.

Ely, of course, is no ruin—it is a living building—but the ruin metaphor nonetheless brings these architectural features of reconstruction to the fore. In particular, the contingency and coherency of design: that in reconstructing a building, we attend to the various happenstances and influences shaping it, and consider it simultaneously along cultural, socio-economic and engineering grounds⁴⁵. So, how might these features of architecture—including ruins—be incorporated? There is a certain squeamishness about notions of 'design' in biological reconstruction. This is due to worries concerning adaptationism, that is, the idea that biological form and function should be understood in terms of particular traits shaped for particular functions through natural selection. No doubt many traits are adaptations, but *assuming* them to be so, and characterizing organisms as consisting of adaptations, isn't licensed⁴⁶. Happily, many paleontological reconstructions follow architects in tracking the contingency of a lineage via a whole-organism, coherent approach: 'design' is in these contexts tracked across several dimensions in complex ways.

For example, consider Sander and Clauss' reconstruction of sauropod metabolic strategies⁴⁷ as we'll see, they don't consider the design elements of sauropods in purely adaptationist terms but along multiple dimensions, holistically. One of the many puzzles concerning sauropods goes

⁴⁵ A referee insightfully points out that something like this sense of contingency may have been in the original textual metaphor insofar as those textual approaches were intended to capture the complex contingencies of written text. I suspect this element of the perspective was lost when information-loss came to the fore.

⁴⁶ SJ Gould & L Lewontin. *The spandrels of San Marco and the Panglossian paradigm*. 1979, Proc. R. Soc, Lond. B, 205, 581-598. R Amundson. *Two concepts of constraint: Adaptationism and the challenge from developmental biology*. Philosophy of Science, 1994, 61(4), 556-578.

⁴⁷ P Sander & M Clauss. *Sauropod gigantism*. Science, 2008, 322 , 200 – 201 .

as follows: their growth rates indicate an endothermic metabolic system, however large mammal analogues indicate that an animal of that size would be unable to eat sufficiently to fuel an endothermic system. Sauropods, then, must be significantly more efficient consumers than large herbivorous mammals. Answering this, Sander and Clauss highlight four traits. First, the sauropod's distinctive long neck serves to maximize browsing range while minimizing energy expenditure. Second, non-mastication allows sauropods to intake plant matter much more quickly than chewing mammals. Further, not chewing allows for less complex dental machinery, enabling the smaller head-to-body ratios required for the long neck. Third, their enormous stomachs are required to house prodigious plant matter, especially compared to mammals, due to their lacking the pre-digestion break-down provisioned by mastication. Fourth and finally, the long neck and mastication enables gigantism itself, gigantism which is required to house the enormous fermentation vats that were sauropod stomachs.

Similarly to how Wade et al understand Ely Cathedral's octagon tower's stability as due to the interaction of various tensile forces through the timber's arrangement, Sander and Clauss consider sauropods as concrete, living organisms situated in environments. They are not a system of adaptations for particular, largely independent purposes, but a consistent—coherent—critter, understood through a set of mutually interacting and supporting traits. Sander & Clauss understand the sauropod as we might a ruin in that sense. The metaphor is well-suited to accounts of historical reasoning that emphasize the coherence of historical narratives and evidence⁴⁸.

Further, Sander and Clauss' make use of sauropods' contingent history, nesting sauropods in their ancestral history. Early sauropods lacked the enormous size of their descendants, but otherwise possessed the distinctive sauropod body plan: long neck, long tail, barrel-shaped

⁴⁸ P Kosso, P. *Historical evidence and epistemic justification: Thucydides as a case study*. *History and Theory*, 1993, 32(1), 1-13; A Currie. *Hot-blooded gluttons: Dependency, coherence, and method in the historical sciences*. 2017, *The British Journal for the Philosophy of Science*.

quadruped with a lack of mastication. These ancestral traits were enabling conditions for later gigantism. That is, the original sauropod state opened the way to their later gigantism. Sander & Clauss further speculate that the shift to gigantism was driven by the increased specialization and diversity in predators throughout the Jurassic. Although gigantism is considered an adaptation, it is a highly contingent and situated one.

So, just as the collapse of the original tower was an enabling condition for the octagon tower's construction, so too was the primitive sauropod state an enabling condition for their later gigantism.

Where the textual metaphor leads us to emphasize inferences from traces to the past, the ruin metaphor leads us to emphasize the holistic and coherent nature of historical reconstruction, and its emphasis on contingency.

4.2.2 Co-Construction & Materiality

Ruins are the products of human ingenuity as well as nature's processes. As Florence Hetzler put it, "A ruin is the disjunctive product of the intrusion of nature upon the humanmade without loss of the unity that our species produced"⁴⁹. Ruins are once constructed by human societies, then left to, well, ruin, that is, nature's influence. We needn't commit to any philosophically deep natural/artificial distinction here. Building practices by our own species create certain forms of order, which without continual maintenance leads to the weather, other species, and so on, to slowly reduce that order.

But many ruins are doubly the product of human activity, being both originally built by us, and then either reconstructed or in some regards preserved by humans at a later date. We are often interested in keeping ruins *as ruins* and this requires certain kinds of intervention in order to

⁴⁹ Hetzler. *Causality: Ruin time and ruin*, p51

keep them from further decay and disorder. And we do this for multiple reasons: to preserve the remaining information for study as best we can, for acting a markers of cultural meaning and place, and for related economic activities, particularly tourism⁵⁰. Further, ruins typically must be extracted from nature's grip—vegetation and soil removed, etc...—to be visible and studied as ruins.

Historical evidence, too, is multiply constructed. As Derek Turner has pointed out, fossils are a kind of co-production between biology and geology⁵¹. Certain forms of biological order—most obviously morphological form—are partially preserved by geological processes as those structures are mineralized. But fossils are not only co-produced by biology and geology, but ourselves. They must be discovered, extracted, and prepared. Fieldworkers in historical sciences are well-aware of the information-destroying nature of their craft. Decisions must be made during extraction that have downstream consequences regarding what information is recoverable from the site and the objects taken from them. Further, as Caitlin Wylie has made extremely clear, fossil preparation is a skilled, idiosyncratic practice that makes a difference to paleontological research⁵². As she has put it, “good specimens are the product of good preparation, not purely of lucky preservation”⁵³.

Like ruins, historical data has a life, both through the natural processes that created and preserved them (what Leonelli⁵⁴ has called ‘phenomena-time’) and their history of extraction, preparation, storage and analysis (what Leonelli calls ‘data-time’). The status of fossil as evidence, the epistemic uses to which they can be put, depend crucially on a good understanding

⁵⁰ P Garcia. Ruins in the landscape: Tourism and the archaeological heritage of Chinchero. *Journal of Material Culture*, 2017, 22(3), 317-333; G Moshenska, G. *Curated ruins and the endurance of conflict heritage*. *Conservation and Management of Archaeological Sites*, 2015, 17(1), 77-90.

⁵¹ Turner, *Paleoaesthetics*.

⁵² C Wylie. *Overcoming the underdetermination of specimens*. *Biology & Philosophy*, 2019, 34(2), 1-18; C Wylie. *Preparing Dinosaurs: The Work Behind the Scenes*. 2021, MIT Press.

⁵³ Wylie, *Preparing Dinosaurs*, p21.

⁵⁴ S Leonelli. *The time of data: timescales of data use in the life sciences*. *Philosophy of Science*, 2018, 85(5), 741-754.

of both phenomena- and data-time. Taking ruins as a metaphor, then, can highlight and emphasize the constructed nature of historical evidence, and the epistemic consequences of this.

Where the textual metaphor might lead us to think about evidence in abstract, symbolic terms—texts are built of words, after all—the ruin metaphor better places us to confront the materiality of historical evidence. Wylie and Chapman’s account of archaeological reasoning leans heavily on materiality: although archaeological hypotheses must draw long bows from scant remains to past human culture, intimate engagement with physical remains constrain and shape their theorising in fruitful ways⁵⁵. Materiality provides a point of resistance to archaeological theory⁵⁶. Similar can be said of much paleontology: even as digital technology, scanning techniques and chemical and molecular lines of evidence come online, fossil specimens often retain a privileged epistemic role in grounding paleontological speculation. Fossils are interpreted, but I don’t think they are read.

5. Conclusion

Metaphors can be misleading, and I can imagine an interlocuter arguing that as such they should have no place in science, or at least be minimized. I’ve here considered a different tack: instead of avoiding them altogether, we should judiciously employ multiple metaphors.

Although I think many metaphors can be partially true or false, depending on their descriptive content, I hope I’ve sufficiently emphasized that this is only the beginning of their consideration. Ultimately, because metaphors are choices we make, we should judge them on their aptness—how illuminating they are of their subject matter. Here, I’ve discussed two metaphors for historical evidence, one extremely familiar and the other much less so. One major

⁵⁵ R Chapman & A Wylie. *Evidential reasoning in archaeology*. 2018, Bloomsbury Publishing.

⁵⁶ A Currie. *Speculation Made Material: Experimental Archaeology and Maker’s Knowledge*. *Philosophy of Science*, 2022, 89(2), 337-359; A Wylie. *Rock, bone, and ruin: a trace-centric appreciation*. *Philosophy, Theory, and Practice in Biology*, 2019, 11

drawback of the ruin metaphor for considering non-human pasts is the rather teleological perspective it engenders—although presumably the textual metaphor has that as well. It also might be evocative of static preservation and decay, which underemphasizes the active agency required to generate and utilize natural historical data (although this point holds as well for ruins themselves!) But I do think it has major advantages.

First, the ruin metaphor calls to mind archaeological reconstruction, rather than textual interpretation, and this leads us to consider the holistic and contingent features of historical reconstruction. Historical scientists do not simply engage in trace-based reasoning, but bring to bare rich, integrative strategies in uncovering the past. Further, they make use of historical contingency both to generate evidence and narrative explanations.

Second, the ruin metaphor emphasizes the co-constructed nature of historical evidence. Traces are not historical evidence without first being made into data by human activity, and this data fulfils multiple purposes. In a sense, there should be nothing surprising about this—no one believes in ‘raw data’—but I think the sheer amount of legwork required to generate historical evidence is often something underemphasized by both public presentations of knowledge of the deep past and philosophical analyses of it (while being something extremely present in the practices of the scientists themselves). Thinking of traces as ruins also emphasizes the materiality of historical specimen.

So, the ruin metaphor—while having drawbacks—I think has some claim to aptness, due to reminding us of the holistic nature of historical reconstruction and the prepared, material, nature of historical evidence. If it is right that the metaphors we employ in accounting for our evidence and scientific practices shape those practices—and I think both the historical sketches and philosophical accounts here suggest they do—then generating and exploring further metaphors seems a worthwhile pursuit.