

Report on the Teaching of the Historical Sciences

Phil Andrews

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Abstract

In 1795 James Hutton, in *Theory of the Earth*, laid out two of the key elements of the scientific method for the Historical Sciences. Firstly, that narratives should predict/culminate in line with what we observe in the present, in his words: “Let us now proceed in endeavouring to decide this important question, viz. By what active principle is it, that the present state of things, which we observe in the strata of the earth, a state so very different from that in which those bodies had been formed originally, has been brought about?” (Vol 1, Chap 1, Sec 2) Secondly, that narratives must align with the established regularities of nature, in his words: “no action to be admitted of except those of which we know the principle” (Vol 2, Chap XIV).

Interestingly, with 230 years of this knowledge being available to us, the teaching of the Historical Sciences, still causes statements like: “Equipping students with the tools of historical reasoning is not only an educational priority, it is a democratic imperative.” (Gray, 2025) There are numerous modern papers on the philosophy of the historical sciences, but the reality is that Hutton’s insight and the analysis in the modern papers is not clearly reflected in Philosophy of Science textbooks or university course content. The question of whether such content should be present was asked of

professors of Philosophy and Philosophy of Science and the response was a resounding yes.

Textbooks reviewed for content regarding the Historical Sciences

The following list of textbooks were briefly reviewed to see if they contain analysis of the Historical Sciences. These textbooks were selected for review because they are listed on many universities Philosophy of Science course outlines as the primary text for the course. The review found that the following textbooks do not contain analysis of the Historical Sciences and generally do not acknowledge the existence of the field:

1. *Philosophy of Science* by Rani Anjum and Elena Rocca, 2024
2. *Theory and Reality 2nd Edition* by Peter Godfrey-Smith, 2021
3. *This is Philosophy of Science: An Introduction* by Franz-Peter Griesmaier, Jeffrey A. Lockwood, 2022
4. Brian Hepburn and Hanne Andersen, "Scientific Method", The Stanford Encyclopedia of Philosophy (Summer 2021 Edition), Edward N. Zalta (ed.), (<https://plato.stanford.edu/archives/sum2021/entries/scientific-method>)
5. *An Introduction to the Philosophy of Science* By Kent W. Staley · 2014
6. *Worldviews An Introduction to the History and Philosophy of Science* By Richard DeWitt · 2018
7. *Theories of Scientific Method: An Introduction* by Robert Nola and Howard Sankey 2014
8. *Philosophy of Science: The Central Issues* edited by Martin Curd, J.A. Cover and Christopher Pincock (eds.) (Norton 2012)
9. *Understanding Philosophy of Science* by James Ladyman · 2012
10. *Philosophy and the Sciences for Everyone* edited by Michela Massimi 2014

The following two do have content regarding the Historical Sciences:

1. *Philosophy of Science for Scientists* By Lars-Göran Johansson · 2015 (the Historical Sciences are referred to briefly)
2. *What is This Thing Called Science 4th Edition* by Alan Chalmers 2013 (in it he says “historical sciences, where experimental manipulation is impossible” otherwise he does not address the topic)

It is thus necessary to conclude that there seems to be very little content regarding the Philosophy of the Historical Sciences in the above textbooks.

Choosing the survey questions

There are various subtleties in the historical sciences that make it interesting, but they also make it challenging to select the best introductory question to arrest the attention of Professors of Philosophy of Science. Especially via an unsolicited email from a stranger. For example, questions could incorporate the following:

1. The distinctions between the historical sciences and experimental/applied sciences: Cleland (2001, 2002, 2011), Popper (1978), Turner (2005, 2007), Jeffares (2008), Currie and Turner (2016), Currie (2017, 2018), Page (2021).

2. The difficulty regarding going back in time to make direct observations: Jeffares (2008), Cleland (2011), Currie (2017).
3. The difficulty to replicate most pre-historic events in the present: Jeffares (2008), Forber and Griffith (2011), Currie (2018).
4. The distinct scientific method for the historical sciences: Hutton (1795), Cleland (2002, 2011), Jeffares (2008), Grim et al (2013).

However, to engage with professors successfully (i.e. receive an emailed response as an official on the record statement) it was decided that the questionnaire needed to be extremely brief. To that end it was decided that rather than attempt to include the various subtleties of the Historical Sciences (as listed above) it would be more effective to use the Oxford Dictionary of Philosophy (2024) definition: “Retrodiction: the hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future.” to introduce the questionnaire topic at question one. Being brief, but comprehensive and authoritative yet controversial seems to have worked. From the 219 emails sent out to university professors of philosophy and philosophy of science, 20 responded (see Appendix A). Then questions 2 through 7 were purposefully open ended to obtain as many differing opinions as possible. This was successful also because many professors provided lengthy explanatory answers.

The following is a direct copy of the questionnaire email sent out, and the responses are recorded verbatim in Appendix A. The email is as follows:

Dear Prof _____,

I am writing a report on The Teaching of the Historical/Retrodictive Sciences. If you would be so kind as to answer at least one of the following questions for inclusion that would be greatly appreciated.

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?
2. Why/why not?
3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?
4. If so, please provide details of each:
5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?
6. Why/why not?
7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences, what would it be?

Summary of the responses:

Twenty professors responded to the email questionnaire and a summary of their collective responses to each question is as follows:

Q1. Every respondent, except for three, agreed with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."

Q2. Generally, respondent's reasoning as to why they agreed with the definition was clarifying that definitions are not the be all, but conceded that this definition does reflect the key difference between prediction and retrodiction.

Q3. In response to knowing of a commonly used textbooks on Philosophy of Science that include the topic of The Historical Sciences the responses were as follows:

Yes: 2, No: 7, "They only allude to it": 4 and did not answer: 7.

Q4. Two respondents provided details: Lars-Göran Johansson said *Philosophy of Science for Scientists*, Springer, 2016 touches on the topic. Prof Vincenzo Fano said that Ernst Nagel covers the topic in *The Structure Of Science*.

Q5. All respondents who answered this question, except for three, said that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences.

Q6. Why/why not?

Respondents said it is an important field of science... Because cosmology, evolution and geology are, at their core, historical sciences... the humanities, including history, are sciences... it would be valuable to have this aspect of enquiry included in the matrix of investigative, inferential and evaluative tools employed in 'science'.

Q7. In making a statement about the teaching of the Historical/Retrodictive Sciences, some of the respondents provided the following:

Prof William Grey: The historical sciences include the disciplines that study past events, processes and systems that can't be directly observed and therefore must be reconstructed from past traces. The disciplines of geology, evolutionary biology, archaeology, cosmology, and parts of physics have a historical dimension which obviously can't be investigated by direct experimentation. We therefore need to deploy

alternative evidential strategies. Retrodictive reasoning is an important part of these strategies.

Prof Tyler Burge: Retrodiction is one sort of scientific inference and explanation, so it should be included in general accounts of science and scientific method.

Prof Kristian Camilleri: The teaching of the Historical/Retrodictive Sciences currently does not form part of most Philosophy of Science courses. This is a serious problem.

Prof Jeffrey Alan Lockwood: If scientist seek to understand how everything came to be, then it would behove us to teach the philosophy of the historical/retrodictive sciences.

Prof Anthony C. Grayling: Given the importance of history to our understanding of the world, a keen appreciation of the methods employed in acquiring historical knowledge is necessary; there is no case for coal-face enquiry in history to forgo the scrupulous methods expected in the natural sciences, and many of the principles applicable in the latter are equally applicable to the former.

Conclusion

The official on the record statements emailed back from university professors provide teachers and textbook authors with important guidance for moving forward. They clearly demonstrate that there is enough distinction between the predictive and retrodictive sciences to warrant specific teaching of the topic. They report that the current textbooks and courses do not appropriately cover the topic and provide multiple reasons why this is a problem. As a result, they clearly state that improvement of the teaching of the historical sciences is desperately needed.

Appendix A – Email responses pasted verbatim in chronological order

From Prof David Papineau

11 February 2026

1. Yes
2. That's what the word means
3. No
4. N/A
5. No
6. We normally have better ways of finding out about the past than retrodicting.
7. We don't need to change the name from "History".

Best

David Papineau
Professor of Philosophy
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From Dr Joe Gough

11 February 2026

Dear [name removed for anonymity] (if I may),

Sure!

1. Yes.
2. The OED is good at definitions. Worth noting, though, that the fact that a word is defined a certain way does not mean that the phenomenon it describes either (a) occurs or (b) is significant. More relevantly, it is far from clear that the historical sciences are primarily in the business of retrodiction - as opposed to explanation, interpretation, narrative, etc. That is not to say they don't offer and defend hypotheses about what happened in the past! Just that hypotheses claiming that

such-and-such an event happened may not be the primary focus of their intellectual labours.

3. I do not, but I am not hugely expert on the range of contemporary philosophy of science textbooks.
4. N/A
5. Yes.
6. History and other relevant fields are forms of systematic empirical inquiry, often with their own interesting questions to which answers might both inform and be informed by questions in other areas of philosophy of science - eg, Currie's work on paleontology, Radick's work on evidence for counterfactuals.
7. To be a bit sweeping, I think that historical evidence is often neglected in non-historical sciences, many areas of philosophy, and many areas of philosophy of science in ways that harm these areas of inquiry even relative to their ability to achieve their goals as construed narrowly.

All v best,

Joe

British Academy Postdoctoral Research Fellow
University of Oxford
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From Prof Samir Okasha

10 February 2026

Hi [name removed for anonymity],

Brief answers below.

1. Yes.
2. This is the usual meaning.
3. No

5. No

6. I don't think there is enough to say about this topic to include it. It doesn't fit naturally within the usual philosophy of science curriculum. I would be more inclined to include it under "philosophy of social science". There is an extant (small) literature on "philosophy of history". Also, "historical sciences" is tendentious (some would say pretentious). Not all historians agree that they are doing science. And presumably, "retrodiction" is only one part of what historians do. I imagine that an equally important part is interpreting events that are already known to have taken place.

7. No particular statement.

Samir Okasha
Professor of Philosophy of Science
University of Bristol
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From Dr Lawrence Krauss

10 February 2026

specific answers below.

1. no

3. no, thankfully

5. no

7. I don't see any difference between sciences that predict the future or the past, because both make predictions about things that haven't yet been observed. Both are falsifiable. All observations are essentially of things that have happened in the past, at least of the observation, so, I find this distinction facile.

Lawrence M. Krauss
President, The Origins Project Foundation
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From Prof Taylor Davis:

10 February 2026

Hi [name removed for anonymity],

I guess this is for 7).

My work just focuses on history in a very specific way: the history of selection processes for behavior. This is an issue in cognitive science, more than philosophy science. I think that behavior and psychology are made of functions, and you don't know what those functions are unless you know what has been favored by selection processes in history. Selection includes genetic selection, cultural selection and individual learning (punishments and rewards are selection pressures too, in their own way). Intuitively, it seems to me that explaining behavior through the history of functions involves a lot of retrodiction, but I've never used that word for it. For example, I would argue that the psychology of norms could only begin to evolve after the behavior of norms had already evolved. That seems to be retrodiction to me, once you mention it, but I've never thought of it that way before.

Best,

Taylor

Associate Professor of Philosophy

Purdue University

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From Prof Jeremiah Joaquin:

27 January 2026

Thanks for inviting me to participate in this study.

Here are my responses to your questions:

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

>>> Yes. I do agree with this definition.

2. Why/why not?

>>> "Retrodiction" is a good name if we aim to contrast it with "prediction."

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?

>>> Yes. I know of one.

4. If so, please provide details of each:

James Franklin's *What Science Knows and How it Knows It* (Encounter Books, 2009) has a chapter on the status of social sciences as a science. This chapter includes a section on the historical sciences.

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?

>>> Yes.

6. Why/why not?

>>> If a philosophy of science course deals with the nature of any science, then retrodictive sciences must also be there.

7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences what would it be?

>>> It's often said that those who don't learn from the past are bound to repeat it. Thus, if we don't want to repeat the "bad" things that happened in the past, we ought to learn from the past.

I hope this helps!

All the best,

JJ

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From Prof William Grey:

26 January 2026

Hello [name removed for anonymity],

I have points of puzzlement about your project. I think your suggestion that retrodiction is methodological lacuna in the historical sciences is unpersuasive.

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."? I disagree. I think retrodiction is an inferential process rather than a hypothesis, though it is a process that leads to a hypothetical conclusion. Maybe I'm being pedantic, but pedantry is my profession.

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences? I'm unhappy with your assimilation of historical and "retrodictive" sciences. Indeed, I don't think "retrodictive science" is a useful category. So its absence from textbooks is in no way regrettable.

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences? Philosophy of science should discuss the role of retrodictive inference in empirical inquiry. It has a role in empirical inquiry, as does controlled experimentation.

7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences what would it be? The historical sciences include the disciplines that study past events, processes and systems that can't be directly observed and therefore must be reconstructed from past traces. The disciplines of geology, evolutionary biology, archaeology, cosmology, and parts of physics have a historical dimension which obviously can't be investigated by direct experimentation. We therefore need to deploy alternative evidential strategies. Retrodictive reasoning is an important part of these strategies. We don't have direct access to the past but the present includes multiple independent causal traces of past events – ice cores, tree rings, cosmic background radiation, DNA profiles, and no doubt lots of other stuff which we haven't yet worked out how to decode. Prediction is a process whereby we infer the occurrence of an empirical fact (or event) **E** as a consequence of a natural law **NL** together with a specific event or state of affairs **S**. **NL** and **S** are a sufficient condition for **E**. The occurrence of **E** can usually be observationally confirmed. (I turn on the switch and the light goes on.) Retrodiction is a process whereby we infer the existence of an antecedent state of affairs **S** because it is a necessary condition (in conjunction with **NL**) for the existence of the observed event **E**. (When the light goes on I infer that there was power in the circuit.) If the world were strictly deterministic (which it isn't) then an infinite mind, which knew the physical configuration and motion of every material particle, could predict the entire future of the universe and retrodict its entire past. (A famous fantasy of Pierre de Laplace.) Retrodiction is part of empirical inquiry and plays an important complementary role to controlled experiments in the project of gaining secure empirical knowledge about the world. There are lots of cases of replication of past events. For example in evolutionary biology there is antibiotic resistance and industrial melanism. It is certainly possible, perhaps not to prove a

negative, but to rule a negative out of serious consideration (there is no element with two protons and no neutrons).

I see retrodiction as an inferential process within scientific inquiry but I'm unpersuaded that it is a topic which has suffered problematic neglect. There is another important category of historical inquiry which includes social and political history, but inquiry in these domains is importantly different to inquiry in the empirical sciences. Historical explanation deploys different methods, such as empathetic understanding. There's a mountain of material about this sort of understanding, e.g. Vico, Hegel, RG Collingwood, Peter Winch (*The Idea of a Social Science*). There may be a restricted role for retrodiction and prediction in the social sciences, but I think understanding in this domain faces a different set of challenges.

William Grey
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From Prof Alex Rosenberg:

26 January 2026

Answers to some of your questions below.

Alex

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

Seems fine to me as a definition of retrodiction.

2. Why/why not?

It's how I use the term.

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?

I have used “historical” science in journal articles to refer to biology. The term seems apt for geology in some contexts. I may have used the term in my phil of social science and phil of bio textbooks.

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?

It’s hardly worthy of a topic of treatment in a class.

6. Why/why not?

To call something a historical science doesn’t make it a science.

7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences what would it be?

Historical science and retrodictive science are two quite different things.

Alex Rosenberg
R. Taylor Cole Professor of Philosophy
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From Dr Michael Shermer:

23 January 2026

In my new book *Truth*, I have a chapter on historical truths and how historians can determine what happened in the past in no less an objective rigorous manner than can cosmologists, geologists, paleontologists, and archaeologists. Give it a read for my full defense of history as a science.

Michael

Editor *Skeptic Magazine*
mshermer@skeptic.com

From Prof Nancy Cartwright:

23 January 2026

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

Yes

2. Why/why not?

It's not my business to quarrel with the OED about what English words mean since they've done a good study of it

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?

Sorry, I haven't been looking at Phil sci textbooks in a while

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?

Yes, of course

6. Why/why not?

Well, I don't have a strong view of what does and doesn't constitute science. History is certainly a place where we use systematically collected and defended knowledge and subject results to critical scrutiny among communities of experts and expect claims to be responsive to evidence.

7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences what would it be?

We should do more of it, as the philosopher Robert Northcott urges. And he also studies how to do it better.

Nancy Cartwright
Prof of Philosophy of Science
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From Prof Gideon Rosen:

23 January 2026

Dear [name removed for anonymity],

I don't know much about this, but the definition of retrodiction that you quote looks wrong to me. History books don't "retrodict" the American Revolution. They tell us that it happened, and they give evidence. But a retrodiction worthy of the name would be more like a prediction: the derivation of a claim about the past from an independently supported theory, which may then be checked to give additional support to the theory. I'm not sure how to put this properly, but the definition you quote doesn't seem to nail it. (A paradigmatic retrodiction would be the derivation from of the timing of solar eclipses in the past from an astronomical model that has been established independently of any evidence for those eclipses.)

I definitely think that texts in the philosophy of science should have something to say about the historical sciences. For the reason just given, I would be inclined to distinguish historical descriptions and explanations from retrodictions. Does standard geology retrodict the formation of the Grand Canyon? I doubt it. Does it help us to explain it? Of course. The philosophy of science has to cover sciences like geology, and possibly also ordinary history (as Hempel thought). I don't know whether retrodiction in particular needs to be a special topic. But as I say, I don't know much about this.

Best,

GR

Gideon Rosen
Stuart Professor of Philosophy
Princeton University
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From Prof Catherine Elgin:

22 January 2026

Dear [name removed for anonymity]:

Here are my answers to your questions.

1. The definition of retrodiction strikes me as accurate and appropriate.
2. I do not know anything about commonly used textbooks, so I do not know whether they cover historical sciences.

A critical point about whether they should is whether there is anything distinctive about historical sciences. That is, how, if at all, do sciences that depend on retrodiction differ from sciences that depend on prediction? If there are important differences, historical sciences should be covered separately. If not, then the retrodiction/prediction difference is not significant.

That's the best I can do.

Kate
Catherine Z. Elgin
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From Prof Tyler Burge:

22 January 2026

I don't think I can be of much help. I certainly think that retrodiction is one sort of scientific inference and explanation, so it should be included in general accounts of science and scientific method.

Best wishes in your project.

Tyler Burge
Flint Professor of Philosophy
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From Prof John Heil

4 January 2026

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

The ODP definition seems fine (if not terribly informative).

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?

No

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?

Probably

John Heil FAHA
Professor of Philosophy
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From Prof Anthony C. Grayling

18 Dec 2025

Dear [name removed for anonymity] (if I may),

What an interesting project you have in hand. Here are my responses to your questions:

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

Yes.

2. Why/why not?

It seems an opposite antonym for 'predictive' given the etymologies of both terms.

3. Do you know of any commonly used university textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences?

Unfortunately, no. Given that the natural sciences constitute our most successful epistemology to date, the canons of enquiry in them offer much that is relevant to historical methodologies in a number of spheres (archaeology for a prime example), so it would be valuable to have this aspect of enquiry included in the matrix of investigative, inferential and evaluative tools employed in 'science' as such.

5. Do you think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences?

Yes

6. Why/why not?

For the reasons stated in the reply to 3.

7. If you were to make a statement about the teaching of the Historical/Retrodictive Sciences what would it be?

Given the importance of history to our understanding of the world, a keen appreciation of the methods employed in acquiring historical knowledge is necessary; there is no case for coal-face enquiry in history to forgo the scrupulous methods expected in the natural sciences, and many of the principles applicable in the latter are equally applicable to the former.

I hope these brief (and to my mind obvious!) comments are of some help. My very good wishes for your project.

Anthony
Professor A. C. Grayling CBE MA DPhil (Oxon) FRSL FRSA
Principal
Northeastern University London

From Prof David Z. Albert

18 December 2025

1. Do you agree with the Oxford Dictionary of Philosophy (2024) definition of "Retrodiction" as: "The hypothesis that some event happened in the past, as opposed to the prediction that an event will happen in the future."?

Yes

David Z. Albert

Frederick J. E. Woodbridge Professor of Philosophy; Director of Undergraduate Studies; Philosophical Foundations of Physics M.A. Program Director

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Columbia University New York

From Prof Kristian Camilleri:

10 Dec 2025

Dear [name removed for anonymity],

Let me address your questions in turn. But before I do, let me say that along with a many historians and philosophers of science today, I do not subscribe to the view that there is, or ever has been, a single scientific method, either in the historical sciences or non-historical sciences.

While I agree that the philosophy of historical sciences deserves far more attention than it has received to date, to construe the difference between the historical science and experimental sciences in methodological terms is misleading (though common) because the latter by no means incorporates all non-historical sciences. Taxonomists and morphologists do not always perform experiments. Nor do string theorists. Behavioural ecologists do not seek to test hypotheses in the lab, but must make observations in the field, where repeatability is often extremely difficult.

Moreover, even if we focus on experimental science, a variety of methods and epistemologies emerge. X-ray crystallographers employ their own methods in

determining the complex three-dimensional structure of a protein molecule (often involving thousands of atoms), which are not hypothetic-deductive in any straightforward sense. Moreover, the extensive literature on exploratory experiment suggests that there are many experiments do not test hypotheses.

One could add that the introduction of computer simulations and computational data techniques into many branches of science seriously complicates the sense there is anything like an experimental method.

Let me now address your questions in turn.

1 & 2. Dictionary definitions typically hold little water for academic philosophers, but my own sense of the term "retrodiction" is that it refers to a consequence of a theory or a model, which relates to the occurrence of an event or chain of events, or a process that happened in the past.

3 & 4. I do not know of any textbooks on Philosophy of Science that include the topic of The Historical/Retrodictive Sciences per se, but there are plenty of textbooks that focus on topics like "explanation", which often involve examples taken from the historical sciences.

5 & 6. I do think that university courses on Philosophy of Science should include the topic of The Historical/Retrodictive Sciences, and in fact I have done so before, drawing on the work of philosophers like Cleland, Currie and Turner. This is an important and exciting field of science, which adds greatly to our understanding of epistemology and the diversity of approaches and strategies employed in generating knowledge

7. I would say that the teaching of the Historical/Retrodictive Sciences is certainly part of science teaching at most universities, insofar as geology, cosmology, and evolutionary biology form part of the science curriculum, but it currently does not form

part of most Philosophy of Science courses. This is a serious problem because it omits a crucial form of reasoning in the sciences.

Kind regards,

Kristian

Kristian Camilleri:
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History and Philosophy of Science
School of Historical and Philosophical Studies
University of Melbourne
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From Prof Jeffrey Alan Lockwood:

9 Dec 2025

Dear [name removed for anonymity],

Here are some thoughts on a few of your questions:

1. Sure, this seems in the conceptual ballpark.
2. Definitions are rarely exhaustive, but this one works at the level of reasonableness and usefulness.
3. I think many/most textbooks allude to historical/retrodictive sciences insofar as they include examples from cosmology, evolution, and geology. That said, many/most don't explicitly discuss the term although they address explanation and causation which are elements of retrodictive reasoning.
4. I'd suggest scanning the indexes and chapter headings.
5. Of course.
6. Because cosmology, evolution and geology are, at their core, historical sciences, along with important elements of epidemiology and ecology (e.g., see pp. 44-47 of *Philosophical Foundations for the Practices of Ecology*)

7. If scientist seek to understand how the universe came to be as it is, how the Earth came to be as it is, how living organisms came to be as they are, and how human social/cultural systems came to be as they are, then it would behove us to teach the philosophy of the historical/retrodictive sciences.

Jeff Lockwood

Philosophy & Religious Studies | Creative Writing program
University of Wyoming
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From Prof Vincenzo Fano:

8 December 2025

1. YES
2. THIS IS THE AIM OF AN OBJECTIVE HISTORICAL SCIENCE
3. ERNST NAGEL, THE STRUCTURE OF SCIENCE
- 4.
5. YES
6. BECAUSE HISTORY IS A PART OF COMPREHENSION OF REALITY
7. HISTORY HELPS US TO UNDERSTAND OUR PAST CHOICES

REGARDS

Vincenzo Fano
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From Prof Lars-Göran Johansson

6 December 2025

1. Yes. I discussed this topic with a Swedish historian, Göran B. Nilsson at Linköping University, and he did exact that. In his studies of Swedish history he made

retrodictions of voting in Riksdagen (the Swedish parliament) based on MPs earlier positions and upon check these retrodictions was confirmed. It is an exemplary instance of the hypothetico-Deductive method. (You cannot contact Göran, he died a couple of years ago.)

2. What you can do is to study records and make hypotheses about possible events that you don't know about, but which may be documented in so far not studied records.

3. Well, I touch upon the topic in section 3.5 of my *Philosophy of Science for Scientists*, Springer, 2016. But I do not use the term 'retrodiction'. I have not seen it in other books.

5. Yes

6. As I argue in my book mentioned above, I see the hypothetic-deductive method as the least common core of activities rightfully called science. And the humanities, including history, are sciences. The common idea that there is sharp distinction between hermeneutics/interpretation on the one side and hypothesis testing on the other side, is in my view false. Interpretation is testing hypotheses about intentions, meanings and actions. And these can be tested by observations of past events, i.e. the behavioural components of actions.

7. See answer above.

Cheers

Lars-Göran

I support your endeavour!

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References

- Anjum, Rani, and Rocca, Elena. 2024. *Philosophy of Science*. Germany: Springer International Publishing.
- Cleland, Carol. 2001. "Historical science, experimental science, and the scientific method." *Geology*, (2001) 29 (11): 987–990.
[https://doi.org/10.1130/0091-7613\(2001\)029<0987:HSESAT>2.0.CO;2](https://doi.org/10.1130/0091-7613(2001)029<0987:HSESAT>2.0.CO;2)
- Cleland, Carol. 2002. "Methodological and Epistemic Differences between Historical Science and Experimental Science." *Philosophy of Science*, 69(3) 2002, 474-496.
<https://doi.org/10.1086/342455>
- Cleland, Carol. 2011. "Prediction and Explanation in Historical Natural Science.", *The British Journal for the Philosophy of Science*. 62:551–582 (DOI:10.1093/bjps/axq024).
- Currie, Adrian, Turner, Derek. 2016. Introduction: Scientific knowledge of the deep past. *Studies in History and Philosophy of Science* 55 (2016) 43e46
- Currie, Adrian. 2017. "Hot-Blooded Gluttons: Dependency, Coherence, and Method in the Historical Sciences." *The British Journal for the Philosophy of Science* 68:4, 929-952 (<https://www.journals.uchicago.edu/doi/10.1093/bjps/axw005>).
- Currie, Adrian. 2018. *Rock, Bone, and Ruin: An Optimist's Guide to the Historical Sciences*. United Kingdom: MIT Press Limited.
- Currie, Adrian. 2019. *Scientific Knowledge and the Deep Past: History Matters*. Cambridge University Press, 2019.
- Forber, Patrick, and Eric Griffith. 2011. "Historical Reconstruction: Gaining Epistemic Access to the Deep Past." *Philosophy, Theory, and Practice in Biology* 3 2013:0604 (DOI 10.3998/ptb.6959004.0003.003.)

- Gray, Ron E. 2025. "Reconstructing the Past Scientific Reasoning in the Historical Sciences Through the Lens of Endosymbiotic Theory." *Science & Education* 14 June 2025
(<https://doi.org/10.1007/s11191-025-00664-x>)
- Grim, Patrick, Robert Rosenberger, Adam Rosenfeld, Brian Anderson and Robb Eason. 2013. "How Simulations Fail." *Synthese* 190:2367–2390. (<https://doi.org/10.1007/s11229-011-9976-7>)
- Hutton, James. 1795. *Theory of the Earth, With Proofs and Illustrations, Volume 1 and 2*. Edinburgh: Creech. (gutenberg.org/ebooks/12861 and gutenberg.org/ebooks/14179)
- Jeffares, Ben. 2008. "Testing Times: Regularities in the Historical Sciences." *Studies in History and Philosophy of Biological and Biomedical Sciences*, 39 (2008) 469-475.
(<https://doi.org/10.1016/j.shpsc.2008.09.003>)
- Nola, Robert and Sankey, Howard. 2014. *Theories of Scientific Method: An Introduction*. United Kingdom: Taylor & Francis.
- Page, Meghan. 2021. "The Role of Historical Science in Methodological Actualism." *Philosophy of Science*, 88 (July 2021) pp. 461–482.
- Popper, Karl. 1978. "Natural Selection and the Emergence of Mind." *Dialectica* 32:339-355.
(<http://www.jstor.org/stable/42970324>)
- Turner, Derek. 2005. "Local Underdetermination in Historical Science." *Philosophy of Science*, 72 (January 2005) pp. 209–230.
- Turner, Derek. 2007. *Making prehistory: Historical science and the scientific realism debate*. Cambridge University Press.