An Introduction to Historical Explanation

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Outline

1. Historical vs. Experimental Sciences
2. Narrative and Historical Explanations
3. History and Traces
4. The Role of Analogy
5. Historical Contingency

The take-home: Historical sciences like paleobiology, archaeology, and astronomy present unique challenges to traditional categories of explanation, argument, and evidence in philosophy of science.

Historical and Experimental Sciences

Stamp-Collecting

A Demarcation of Sorts

Historical sciences: paleobiology, archaeology, geology, planetary science, astronomy, astrophysics

Experimental sciences: everything else, but paradigmatically experimental physics, molecular biology

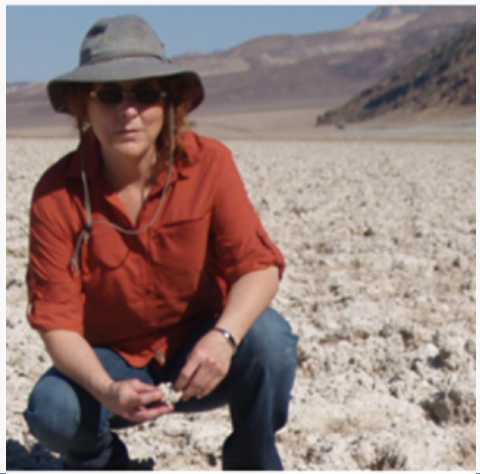
Cleland on Historical Science

Fundamental difference between historical and experimental sciences: time-asymmetry of causation

Control of causes $\Rightarrow_{\text{experiment}}$ Ignorance of effects

Knowledge of effects $\Rightarrow_{\text{historical inference}}$ Ignorance of causes

For more: Cleland (2002), *Philos Sci* 69:474



Inferiority Complex

Central to Cleland's framing: there's no sense in which historical sciences are *worse* than experimental, they simply operate under *different* epistemic constraints

Demarcation?

Historical/experimental need not be a real "demarcation" – fine if it's only varieties of epistemic tools fit to purpose

Narrative and Historical Explanation

Just-So Stories

Narratives

How do we understand the role of narratives in historical explanations?

A major worry: fitting token historical events into narratives is not *predictive* in the same sense as fitting them into natural laws or similar generalizations

Narrative and Mechanism

Swaim: A narrative gives us a possibility space and a causal mechanism.

A space of possibilities serves as our license proving that we have explored sufficient relevant alternatives; then a proposed causal mechanism allows us to discriminate between those alternatives

Philosophy of History

Notably, this puts this literature into contact with work throughout the philosophy of history – how do historical narratives explain, in general?

History and Traces

A “Smoking Gun”

Back to Cleland: Historical scientists are trying to use evidential traces to discriminate between many competing, possible common causes

A “Smoking Gun”

Causal Overdetermination

Events usually bear an asymmetric relation to their traces: one event produces many, many traces, each of which individually could be enough to infer its existence

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Causal Overdetermination

Historical science: attempt to deal with this fact by hunting for comparative evidence for the common causes of traces

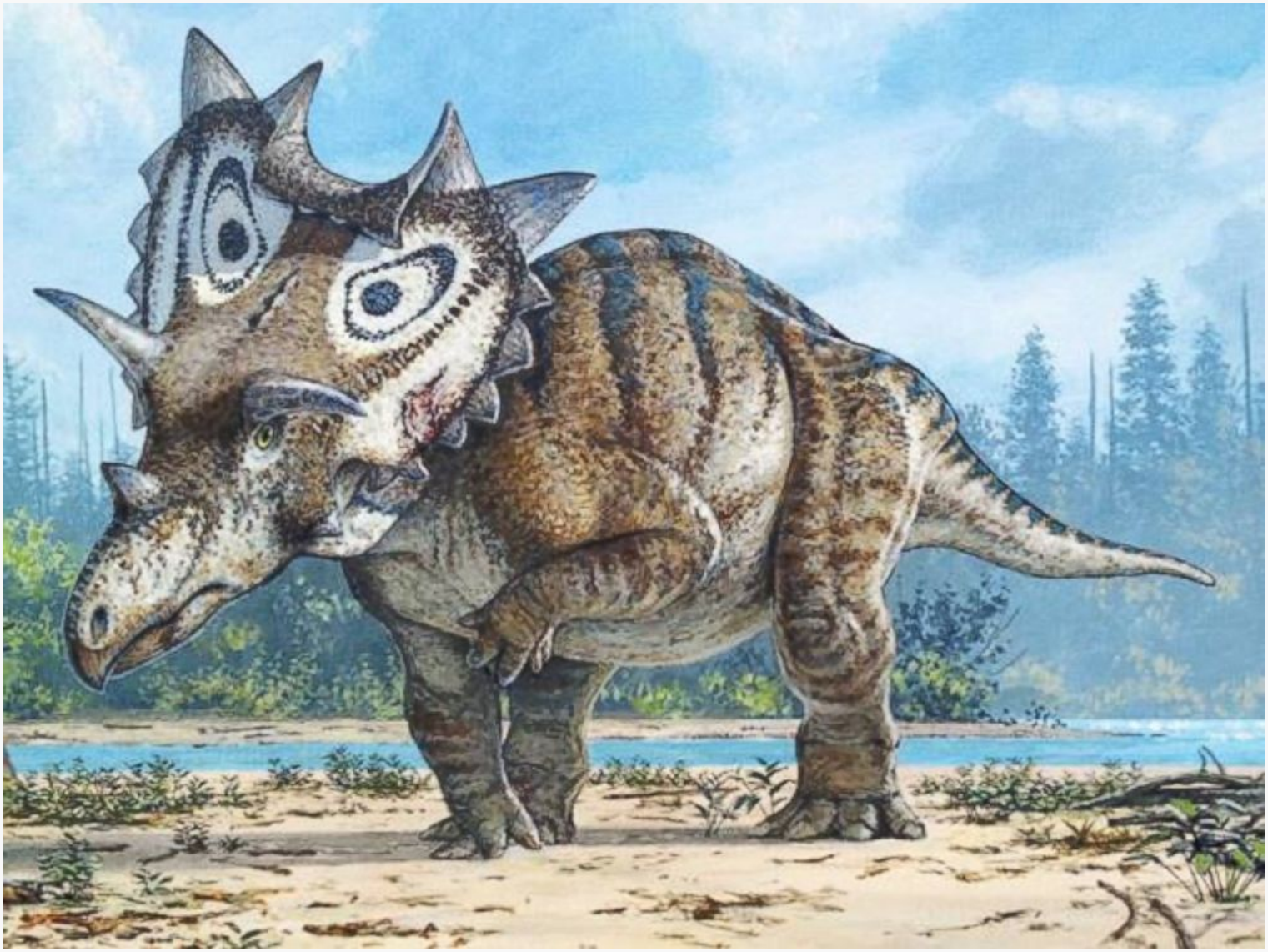
Experimental science: attempt to deal with the inverse problem, by carefully modifying experimental controls to exclude other possible confounding causes

But Wait!

Turner: These traces are *very often* destroyed, sometimes irrevocably – placing researchers not into a situation of overdetermination, but one of (perhaps irretrievable) local underdetermination!

In fact, our background theories tell us *just how* these processes destroy historical information.

But Wait!



Optimism

Currie: This is true in some, particular circumstances, but not enough to ground a global skepticism about method in historical science

Watch this space: Adrian may well visit this spring!

The Role of Analogy

A Brief Digression

Recall the classic, deductive-nomological model of scientific explanation:

1. Scientific explanations are (sound) deductive arguments, which
2. Make (essential, non-eliminable) use of laws of nature, and
3. Invoke induction only to establish their boundary conditions or to demonstrate (lesser, inferior) statistical claims

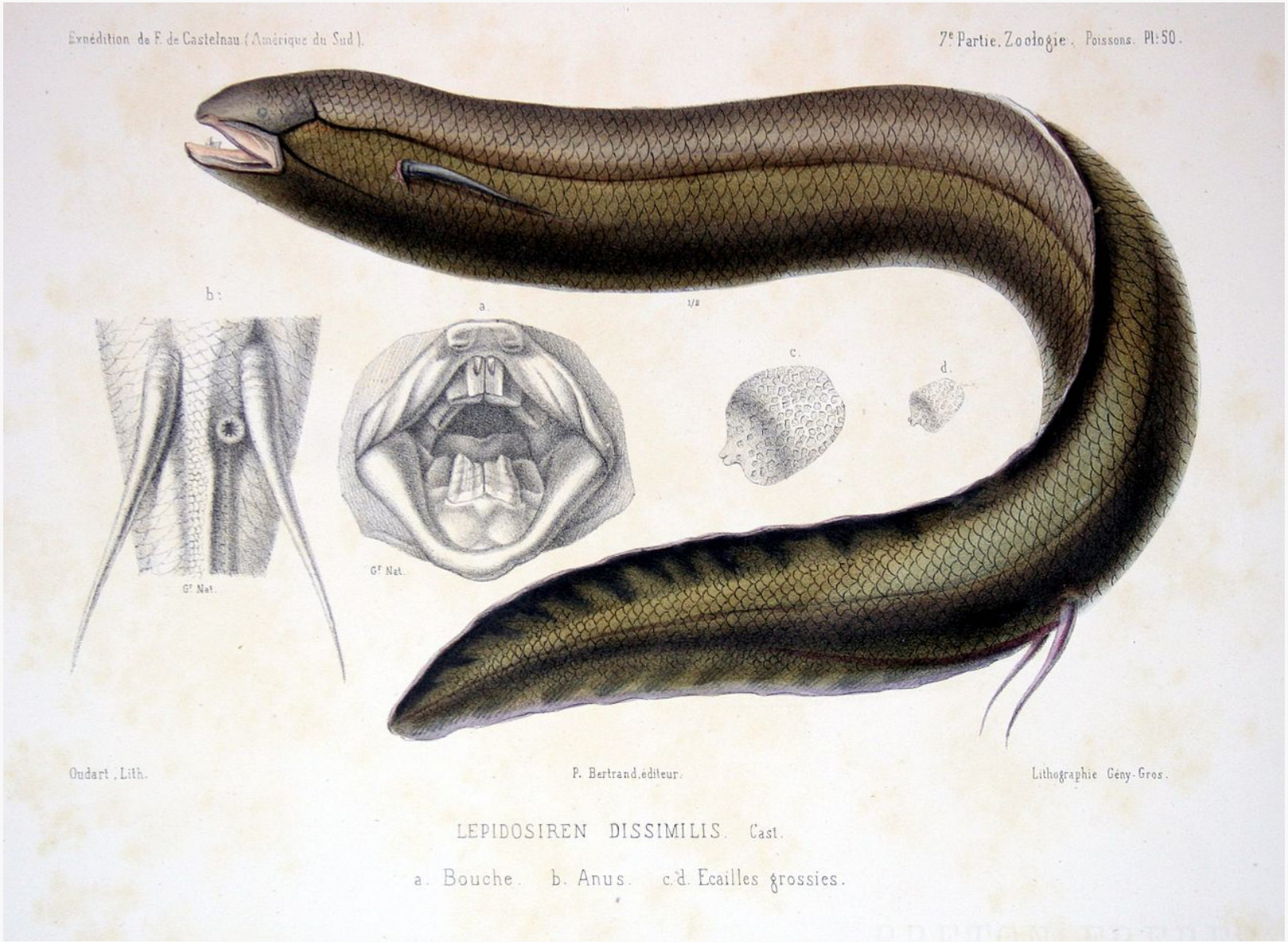
Another Digression: IBE

Cleland's search for a "smoking gun" clearly can't rely on anything like this kind of explanatory form. So what do we do instead?

Cleland's choice: opt for inference to the best explanation.

But! Problems abound: cf. van Fraassen's critique

Argument from Analogy



Argument from Analogy

What are they?

What are we doing when we offer an argument by analogy? Trying to use the analogy to build models of shared causal processes, with the aid of empirical examples of the instantiation of those processes (Currie).

What are they?

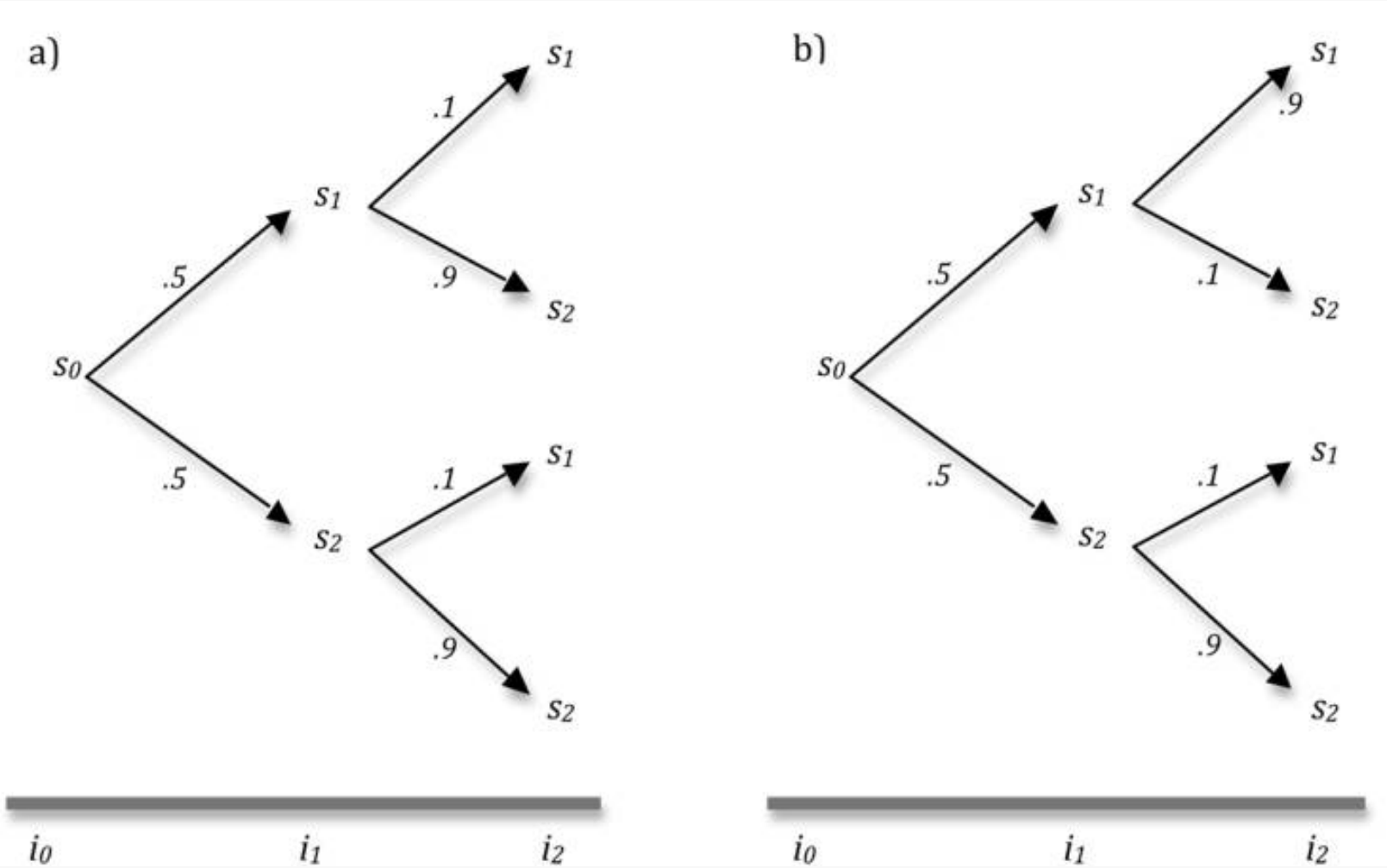
Here, then, we see the great importance of possessing a large stock of analogous instances or phenomena which class themselves with that under consideration, the explanation of one among which may naturally be expected to lead to that of all the rest. (Herschel 1830, §138)

But wait!

What if the past is too historically contingent to support analogous reasoning of this sort?

Historical Contingency

Path Dependence



Desjardins (2011), *Philos Sci* 78:731

Other Options

Complete convergence: If all paths eventually converge to the same end-state, then history is erased

Complete chanciness: If all paths scatter populations to a massive variety of outcomes in evolutionary space, then history is erased

Path Dependence

To summarize, both convergence and chance can erase history. When different populations adapt similarly to a given environment, history is erased because past differences in the value of a state variable ceases to exist. Chance on the other hand can make the derived populations more scattered and thus create a situation where it is impossible to see a relationship between changes in the initial states and the probability of different evolutionary outcomes. When this happens, having different evolutionary histories will not affect distinctively the probability of reaching one or another (set of) outcome(s). (Desjardins 2011, 347)

Path Dependence

The upshot: Whether or not history is preserved by an evolutionary process is an exceptionally subtle matter!

Contingency and Analogy

This will make the applicability of analogical reasoning *extremely* context-dependent. Some worries:

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1. What if we can't *know* whether an analogy will hold in a given case? How can we evaluate their quality?
2. Can we detect a signal of these varying impacts of contingency in examples drawn from scientific practice?
3. Surely the source and target of the analogy will also change its features; can we taxonomize these kinds of inferences?

Questions?

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