Causal Explanation

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The most natural way to deal with things like the Flagpole-Shadow case and the Barometer case is to appeal to a direction of causation.

Lewis

Every event is the outcome of a vast causal nexus.

- Often we speak of 'the cause' of the event but Lewis just takes this to be pragmatic
  - Consider *the cause of the forest fire was the camper not properly extinguishing the campfire*. We can extend this explanation both 'horizontally' and 'vertically'.
- But there are reasons to focus on one cause, at least in some contexts.

Main claim: To explain an event is to provide information about its causal history.

How does this deal with the problems that the DN account faces?

- Providing information is, for Lewis, a matter of ruling out possibilities. So A gives information about B when A rules out possible causal histories of B.
- This is an extremely minimal requirement.
- In another way it's somewhat restrictive. It only allows causal explanations.

How minimal? What are extremely uninformative things that still rule out possible causal histories?
What does this rule out?

Lewis thinks that it's not too minimal. He distinguishes explanation in the communicative sense and in the ontological sense. He is giving an account of explanation in the ontological sense.

- Lots of ontological explanations might be inappropriate to communicate because of pragmatic reasons.

What is causation?

That's the simplest possible causal account. We will consider more complicated ones in later weeks. But first, what is causation?
Strevens notes that the relation needs to be *asymmetric* and *particular* in order to fit with an account of causal explanation.

> An influence relation between events is particular to the degree to which it relates very finely individuated aspects of the world. An influence relation that is not particular at all might simply relate the complete state of the world at one time to its complete state at a later time.

Why is this condition required? And is causation intuitively very fine grained?

Conserved Quantity/Mark Transfer Views

> Two objects-at-times are causally connected just in case a line can be drawn in space-time from one to the other that at every point either (a) follows the world

> line of a single object, or (b) switches from the world line of one object to the world line of another at a point where the lines intersect and where the two objects exchange a conserved quantity. (Dowe, 2000)

The intuition is that genuine causal processes 'leave marks'. And that we can precisify this idea of what a 'mark' is by appealing to conserved quantities.[1]
How is this asymmetric?

[1] Things like momentum, energy, charge, etc.

> The direction of causation, usually but not always forwards in time, is not determined by the nature of either persistence or interaction, but by a separate element of the account based on one of Reichenbach's ideas, which I will not describe here.

It's to do with *screening-off*.
How is this particular? That's not obvious since 'the parts of the barometer exert a minute gravitational influence on the parts of atmospheric whole that is the storm.'

Counterfactual Theories

Very roughly, an event c causes an event e just in case, had c not occurred, e would not have occurred.[2]
This notion of causation is more selective than Dowe's process view. So it can more easily deal with the barometer case.
Causation in this sense doesn't reduce all higher-level causation directly to fundamental level causation.
This view famously has *lots* of counterexamples.

[2] The counterfactuals here are 'non-backtracking'.

Manipulability Views

Woodward claims that causation is, in effect, in-principle manipulability. 'To say that flagpole height causes shadow length is to say that the length of a shadow can be changed by manipulating the height of the corresponding flagpole.'

> The manipulation account declares c to be a cause of e just in case the following counterfactual is true for some putative causal path between c and e: if because of an intervention c had not occurred, and had all variables not on the putative path been held constant, e would not have occurred.

The value of explanations consists in telling us about possible manipulations — this is a very practical conception of understanding.
This account ends up not really being reductive.