Against Counterfactual Miracles
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Definitions
P is an *intrinsic profile* $=_{df}$ P is an intrinsic property which necessitates every intrinsic property or its negation.

H is a *history-proposition* $=_{df}$ For some intrinsic profile P, H is the proposition that some initial segment of the history of the world has P.

Determinism $=_{df}$ Every true proposition follows, with metaphysical necessity, from any set of true propositions that contains every law of nature and at least one history-proposition.

Argument A
(A1) Necessarily, whenever x is an ordinary person at t, there is a true history-proposition H such that x has no choice at t about the truth of H.

(A2) Necessarily, whenever x is an ordinary person at t and p is a true law of nature, x has no choice at t about the truth of p.

(A3) Necessarily, whenever x is an ordinary person at t and p is a proposition metaphysically necessitated by a set of truths none of which which x has a choice about at t, x has no choice at t about the truth of p.

(A4) Necessarily, if determinism is true, then every truth is metaphysically necessitated by any set that contains all true laws of nature and at least one true history-proposition.

(A5) So necessarily, whenever x is an ordinary person at t and determinism is true, each true proposition p is such that, x has no choice at t about the truth of p.

Argument B
(B1) Necessarily, whenever x is an ordinary person at t, there is a true history-proposition H such that if x had blinked at t, H would still have been true.

(B2) Necessarily, whenever x is an ordinary person at t and p is a true law of nature, if x had blinked at t, p would still have been true.

(B3) Necessarily, whenever x is an ordinary person at t and p is a proposition metaphysically necessitated by a set of propositions each of which would have been true if x had blinked at t, then p would have been true if x had blinked at t.

(B4) Necessarily, if determinism is true, every truth is metaphysically necessitated by any set that contains all true laws of nature and at least one true history-proposition.

(B5) So necessarily, whenever x is an ordinary person at t and determinism is true, each true proposition p is such that if x had blinked at t, p would still have been true.

Accepting B5
An argument for the impossibility of determinism

Premise 1: Only qualitative propositions can be laws of nature.

Premise 2: Necessarily, there is some non-qualitative truth P and some true history-proposition H such that P is not necessitated by H together with the totality of qualitative truths

Conclusion: Determinism is impossible.

Qualitative determinism =$_{df}$ Every qualitative truth is metaphysically necessitated by any set of truths that contains all the laws of nature and at least one history-proposition.

(B5′) Necessarily if qualitative determinism is true, each true qualitative proposition p, ordinary person x, and time t during x's life are such that if x had blinked at t, p would still have been true.

Denying B3

MC: For any propositions p and q: if p is metaphysically necessitated by a set of propositions each of which would be true if q were true, then p would be true if q were true.

MC′ For any propositions p and q: if p is metaphysically necessitated by a **finite** set of propositions each of which would be true if q were true, **and q is metaphysically possible**, then p would be true if q were true.

Denying B2

(1) If we had put a glass of water on the lectern, Frank's whole career would have been devoted to a mistake.

(2) If we had put a glass of water on the lectern, that would have been the fifth debate in a row in which the speaker with the correct view was the one with a glass of water.

Causal decision theory ≃ You rationally shouldn't choose option O when, for some option O′, you estimate that things would be better (in the respects you care about) if you did O′ than if you did O.

Denying B1: Exact versus approximate match

(3) If John had forgotten to have breakfast this morning, that would have been the first time he did so in months.

Hold History Exactly Fixed: If it were that P(t), history substantially before t would have been exactly as it actually was.

Hold History Approximately Fixed: If it were that P(t), history substantially before t would have been only microscopically different from how it actually was.

> What is worse, there is no guarantee whatever that w_2 [a world where the actual laws are true and where Nixon presses the button] can be chosen so that the differences diminish and eventually become negligible in the more and more remote past. Indeed, it is hard to imagine how two deterministic worlds anything like ours could possibly remain just a little bit different for very long. There are altogether too many opportunities for little differences to give rise to bigger differences. (Lewis 1979: 45)

A widely applicable format for deterministic physics: we have a space of dynamical possibilities M and a *dynamical map* Φ: $\mathbb{R} \times M \to M$ (perhaps partial). The laws entail that whenever the universe is in state p at time t, it is in state $\Phi(x,p)$ x units of time after t.

Continuous dynamics: M has a topological structure, and Φ is continuous in both arguments, i.e. if x_1, x_2,…. converge to x in $\mathbb{R}$ and p_1, p_2,… converge to p in M, then if $\Phi(x_1,p_1)$, $\Phi(x_2,p_2)$, … exist, they converge to $\Phi(x,p)$.

Fact: if the notion of similarity at a time can be represented by a continuous distance metric d on M, then for every $p \in M$ and positive real numbers t and ε, there is an open neighbourhood O of p such that for every $p' \in O$, $d(\Phi(x,p'),\Phi(x,p)) < \varepsilon$ for all $x \in [0,t]$.

- Chaotic dynamics: 'Small differences blow up rapidly into much bigger differences'.
- A guiding assumption of statistical mechanics ≈ Conditional on the complete truth about the macrostate at t, propositions about the macrostate at times after t are (almost) *probabilistically independent* of propositions about the macrostate at times before t.

(4) If Fred were here right now, his career would have been devoted to a mistake.

(5) If Halley's Comet had hit Washington D.C. yesterday afternoon, the U.S.A. would be left leaderless.

Denying B1: Backwards causation
Sufficiency: Whenever E and C are disjoint events such that E wouldn't have occurred if C hadn't occurred, C is a cause of E.
The 'big miracle' view: when the antecedent of a counterfactual concerns an interval t and the consequent is entirely about history before t, the counterfactual is true iff the consequent is.

(6) If I had begun driving to Princeton at noon yesterday, I would have teleported *instantaneously* into the car from the kitchen.

(7) If I had begun driving to Princeton at noon yesterday, I would have crashed (because of my extreme surprise at my teleportation).

The 'huge miracle' view: hold history exactly fixed right up to t and then introduce a miracle that not only makes the antecedent true but erases all "records" of the sudden change.

(8) If I had begun driving to Princeton at noon yesterday, the portion of the video showing '11:59:59' would have shown an empty kitchen.

Morals