

Reading Guide #3 - Philosophy of Science

These questions are provided to assist you in your reading. I encourage you first to read the material through, then go back to answer the questions. You are not expected to hand in written answers. You are expected to have responses ready for class discussion. References are to pages in Steven M. Cahn, ed., *Philosophy for the 21st Century*, Oxford University Press, 2003.

David Hume, "An Enquiry Concerning Human Understanding," pp 241-5.

1. How does nature hide the powers and principles which guide cause and effect interactions?
 2. "We always presume, when we see like sensible qualities, that they have like secret powers, and expect that effects, similar to those which we have experienced, will follow from them" (242). Explain.
 3. What information does past experience give us? What does it not give us?
 4. "These two propositions are far from being the same, *I have found that such an object has always been attended with such an effect, and I foresee, that other objects, which are, in appearance, similar, will be attended with similar effects*" (242). Explain.
 5. What is Hume's distinction between relations of ideas and matters of fact? How do we learn propositions that are solely concerned with relations of ideas?
 6. What evidence do we use to explain knowledge of matters of fact? What relation helps us get this evidence?
 7. What do inferences about the future presuppose, as their foundation? Why can't experience establish this premise?
 8. "In vain do you pretend to have learned the nature of bodies from your past experience" (244). Why in vain?
 9. Does our practice refute Hume's skeptical doubts? Explain.
 10. How does Hume's example of a child pulling his hand away from a fire help show that it is not 'reason' which leads us to infer that the past will resemble the future?
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Brian Skyrms, "The Traditional Problem of Induction," pp 245-9.

1. What is inductive logic? How does it use epistemic probabilities?
2. On what does the epistemic probability of a statement depend?
3. What are inductively strong arguments? How do we rank inductive arguments according to strength?
4. What would make a system of inductive logic rationally justified?
5. Why can't we use deductive logic to make predictions? Why can't we use deductive logic to justify scientific induction?
6. How does using an inductively strong argument to justify induction beg the question?
7. What is the principle of uniformity of nature? How does it support inductive inferences?
8. How is specifying the principle of the uniformity of nature equivalent to justifying induction?

Rudolf Carnap, "The Experimental Method," pp 254-7.

1. What is the experimental method? How does it differ from the methods of earlier science?
 2. How do scientists devise experiments to focus only on relevant factors?
 3. Why do scientists search first for low-level laws? How do they attempt to generalize those laws?
 4. What problem arises for excluding irrelevant factors?
 5. How are Boyle's Law and Charles's law more general when taken together, as the law of gases?
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Carl Hempel, "Aspects of Scientific Explanation," pp 257-64.

1. How does science concern itself with why-questions?
 2. What is the difference between explanation-seeking why-questions and reason-seeking why-questions?
 3. Into what two groups do explanatory facts fall?
 4. What is the D-N model of explanation? In particular, how is it deductive?
 5. Why are general laws required for D-N explanations?
 6. What is a true explanation? When might we be concerned with explanations involving lawlike sentences that we did not think were true?
 7. What formal characteristics do many lawlike sentences share?
 8. Why is appeal to form insufficient to characterize lawlike sentences? (Consider counterfactual instances.)
 9. Why can't we characterize lawlike sentences as those which apply to certain number of instances?
 10. How is the concept of an instance of a general law problematic?
 11. Do lawlike sentences avoid reference to particular individuals? Explain.
 12. How may D-N explanations be used to explain laws?
 13. How might general laws provide only an approximate explanation of lower-level laws?
 14. What is a minimal covering law? How are minimal covering laws usually weaker than more general covering laws?
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Nelson Goodman, "The New Riddle of Induction," pp 269-273.

1. Why do we need to distinguish between lawlike and non-lawlike statements?
2. Are emeralds green or grue? Explain.
3. Is the difficulty of distinguishing between green and grue settled by admitting more evidence? Explain.
4. Is the difficulty of distinguishing between green and grue settled by disallowing references to specific objects from lawlike statements, or predicates? Explain.
5. What is the relationship between the old problem of induction and the problem of confirmation?
6. How does the new riddle of induction extend Hume's problem?