

Study Questions for Mid-term Examination

The Historical Background to Logical Empiricism

1. Why do empiricists traditionally have a problem explaining the nature of mathematical truth?
2. Sketch the developments in the foundations of geometry in the nineteenth century that had a bearing on the development of logical empiricism.
3. Sketch the kind of argument that Henri Poincaré employed to motivate his brand of conventionalism. What did Poincaré mean when he wrote that conventions are “disguised definitions”?
4. Sketch the kind of argument that Pierre Duhem employed to motivate his brand of conventionalism. In what sense is Duhem’s conventionalism a species of epistemological holism?
5. The task confronting logical empiricists in the early 1920s is said to have been that of developing a new form of empiricism capable of defending the empirical integrity of Einstein’s general theory of relativity in the face of neo-Kantian reactions to relativity. What was the issue under debate here?
6. In what ways do the logicist (Frege–Russell) and formalist (Hilbert) programs in the foundations of mathematics represent challenges to the Kantian view of the nature of mathematical truth?

The Vienna Circle and Its Friends

7. Moritz Schlick was well known in his pre-Vienna Circle days for advocating a “semiotic” theory of truth as “univocal” or “unambiguous” (“*eindeutige*”) coordination or correlation between proposition and fact. Explain what Schlick meant by the semiotic view of truth and contrast this view with both correspondence and coherence views of truth.
8. In the 1920s, two views emerged within the Vienna Circle regarding (a) the role of conventions in scientific theories and (b) the empirical content of scientific theories. We termed these views “epistemological holism” and (for want of a better term) “epistemological atomism.” Explain and contrast these two views.
9. What is the verifiability criterion of meaningfulness? What problems is it supposed to solve? What are the chief difficulties with the criterion?
10. In what sense is logical positivism or logical empiricism “logical”?
11. What was the protocol-sentence debate all about? Be sure to explain the positions of Otto Neurath and Moritz Schlick.
12. Give an outline of Carnap’s program of philosophy as logical syntax.

Explanation and Laws

13. What is the deductive-nomological (D-N) or covering-law model of explanation?
14. Give examples of (a) deductive, (b) statistical or probabilistic, (c) functional or teleological, and (d) genetic explanations. How might one argue for the claim that the deductive pattern of explanation represents the ideal toward which one should strive in all scientific domains?
15. What is meant by a “causal” law? Is it reasonable to insist that all acceptable scientific explanations make use of causal laws?
16. Some would argue that scientific laws are distinguished from accidental generalizations by virtue of the fact that laws support corresponding subjunctive conditionals whereas accidental generalizations do not. Explain this argument and then outline the more important issues involved in assessing the argument.
17. Why might one think that laws are necessary for scientific explanation?
18. Give a sketch of Dretske’s critique of the Humean notion of scientific law and his argument for a metaphysical analysis of laws.

Do Some Philosophy

19. What is your view of the nature of mathematical truth?
20. Hans Reichenbach argued that we should distinguish two aspects to the Kantian notion of the a priori: (a) the constitutive role of the a priori in cognition and (b) the apodictic character of the a priori. Reichenbach himself was happy to accept the former and reject the latter. Do you think it possible thus to disentangle the two aspects of the a priori? What kind of constitutive role (literally, how is the constituting done?) could a contingent a priori play in cognition?
21. Is scientific realism compatible with the view that theory choice is underdetermined by evidence?
22. We spoke in class about the question of the “gap” between the contents of subjective experience and putatively objective, scientific knowledge formulated propositionally. In your opinion, can this gap be bridged? If not, why not? If so, how? Or is the question itself perhaps not well posed?
23. Generally speaking, neo-positivism took as its aim the formal (perhaps even purely syntactical) definition of core methodological concepts and assumed that such definitions would have normative force across a variety of scientific disciplines. In your opinion, is this a reasonable way to conceive the task of a philosophy of science?
24. A corollary to Gödel’s first incompleteness theorem is that all first-order theories as powerful as or more powerful than elementary Peano arithmetic will be non-categorical, meaning that they will not determine for themselves a class of models all of the members of which are isomorphic to one another. We spoke in class about how this result may be read as implying the failure of the Marburg program. More generally, one often takes this to point to limits on the ability of theory to capture reality and, perhaps, as occasioning some deep questions about realism itself. On the other hand, one could also read it as implying that Hilbert was wrong in saying that to think clearly is to think axiomatically, or that one is wrong to press formal methods too far in epistemology. What do you think?

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16. Some would argue that scientific laws are distinguished from accidental generalizations by virtue of the fact that laws support corresponding subjunctive conditionals whereas accidental generalizations do not. Explain this argument and then outline the more important issues involved in assessing the argument.
17. Why might one think that laws are necessary for scientific explanation?
18. Give a sketch of Dretske’s critique of the Humean notion of scientific law and his argument for a metaphysical analysis of laws.

Do Some Philosophy

19. What is your view of the nature of mathematical truth?
20. Hans Reichenbach argued that we should distinguish two aspects to the Kantian notion of the a priori: (a) the constitutive role of the a priori in cognition and (b) the apodictic character of the a priori. Reichenbach himself was happy to accept the former and reject the latter. Do you think it possible thus to disentangle the two aspects of the a priori? What kind of constitutive role (literally, how is the constituting done?) could a contingent a priori play in cognition?
21. Is scientific realism compatible with the view that theory choice is underdetermined by evidence?
22. We spoke in class about the question of the “gap” between the contents of subjective experience and putatively objective, scientific knowledge formulated propositionally. In your opinion, can this gap be bridged? If not, why not? If so, how? Or is the question itself perhaps not well posed?
23. Generally speaking, neo-positivism took as its aim the formal (perhaps even purely syntactical) definition of core methodological concepts and assumed that such definitions would have normative force across a variety of scientific disciplines. In your opinion, is this a reasonable way to conceive the task of a philosophy of science?
24. A corollary to Gödel’s first incompleteness theorem is that all first-order theories as powerful as or more powerful than elementary Peano arithmetic will be non-categorical, meaning that they will not determine for themselves a class of models all of the members of which are isomorphic to one another. We spoke in class about how this result may be read as implying the failure of the Marburg program. More generally, one often takes this to point to limits on the ability of theory to capture reality and, perhaps, as occasioning some deep questions about realism itself. On the other hand, one could also read it as implying that Hilbert was wrong in saying that to think clearly is to think axiomatically, or that one is wrong to press formal methods too far in epistemology. What do you think?

Study Questions for Mid-term Examination

The Historical Background to Logical Empiricism

1. Why do empiricists traditionally have a problem explaining the nature of mathematical truth?
2. Sketch the developments in the foundations of geometry in the nineteenth century that had a bearing on the development of logical empiricism.
3. Sketch the kind of argument that Henri Poincaré employed to motivate his brand of conventionalism. What did Poincaré mean when he wrote that conventions are “disguised definitions”?
4. Sketch the kind of argument that Pierre Duhem employed to motivate his brand of conventionalism. In what sense is Duhem’s conventionalism a species of epistemological holism?
5. The task confronting logical empiricists in the early 1920s is said to have been that of developing a new form of empiricism capable of defending the empirical integrity of Einstein’s general theory of relativity in the face of neo-Kantian reactions to relativity. What was the issue under debate here?
6. In what ways do the logicist (Frege–Russell) and formalist (Hilbert) programs in the foundations of mathematics represent challenges to the Kantian view of the nature of mathematical truth?

The Vienna Circle and Its Friends

7. Moritz Schlick was well known in his pre-Vienna Circle days for advocating a “semiotic” theory of truth as “univocal” or “unambiguous” (“*eindeutige*”) coordination or correlation between proposition and fact. Explain what Schlick meant by the semiotic view of truth and contrast this view with both correspondence and coherence views of truth.
8. In the 1920s, two views emerged within the Vienna Circle regarding (a) the role of conventions in scientific theories and (b) the empirical content of scientific theories. We termed these views “epistemological holism” and (for want of a better term) “epistemological atomism.” Explain and contrast these two views.
9. What is the verifiability criterion of meaningfulness? What problems is it supposed to solve? What are the chief difficulties with the criterion?
10. In what sense is logical positivism or logical empiricism “logical”?
11. What was the protocol-sentence debate all about? Be sure to explain the positions of Otto Neurath and Moritz Schlick.
12. Give an outline of Carnap’s program of philosophy as logical syntax.

Explanation and Laws

13. What is the deductive-nomological (D-N) or covering-law model of explanation?
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