Philosophy 405: Knowledge, Truth and Mathematics Hamilton College
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Reading Guide #17 - Field's Dispensabilism
Hartry Field, from *Science Without Numbers*

1. According to Field, what is the best argument for the claim that mathematical statements are true?
2. How does Field propose to show that we need not believe that mathematical statements are true?
3. What is nominalism? What problem arises for nominalism?
4. What is the standard nominalistic approach to mathematics? How does Field's fictionalism differ?
5. Describe the Quinean doublethink objection to fictionalism. How does Field avoid that criticism?
6. How is Field's nominalism not finitist, or operationalist?
7. Must each particular mathematical object be applicable in science for the indispensabilist to believe in its existence? Explain.
8. How are subatomic particles theoretically indispensable?
9. What are impure abstract entities? Why are they important in explaining the applicability of mathematics?
10. What is Principle C?
11. In what way, for Field, is mathematics empirical?
12. How is Field's view about mathematics like and unlike the positivists' view?
13. How is arithmetic useful in facilitating nominalistic inferences? (Consider the aardvark/bug example in Chapter 2).
14. What is a representation theorem? How does Hilbert's representation theorem facilitate inference within Euclidean geometry?
15. How might Hilbert's uses of space-time points seem troublesome for the nominalist? How does Field reply?
16. How is physical structure different from mathematical structure? Consider their differences regarding revisability.
17. Contrast substantivalism, reductive relationalism, and eliminative relationalism. Which view does Field hold, and why?
18. What is the logic of Goodmanian sums? Why is it important for Field's project?
19. What role does attractiveness play in Field's nominalistic reformulation of Newtonian gravitational theory?
20. Distinguish the metric and synthetic approaches to axiomatizing gravity. Which is precedental for Field's reformulation of Newtonian gravitational theory?
21. Why are synthetic formulations of physical theories more illuminating than metric approaches?
22. "The role [a real number] plays [in a scientific explanation] is as an entity *extrinsic to the process to be explained*...Surely then it would be illuminating if we could show that a purely intrinsic explanation of the process was possible, an explanation that did not invoke functions to extrinsic and causally irrelevant entities" (43). Explain.