Logic Seminar Autumn 2014-2015

Sept. 30: Motivations, Orientation

References:

Volker Halbach, *Axiomatic Theories of Truth*, Chs. 1-3

(Review) http://ndpr.nd.edu/news/26148-axiomatic-theories-of-truth/

http://math.stanford.edu/~feferman/papers/AxTruthSchwiFest.pdf

Saul Kripke, "Outline of a theory of truth", http://philo.ruc.edu.cn/logic/reading/Kripke_%20Theory%20of%20Truth.pdf

See also the references on the syllabus page.

1. Philosophical theories of truth (correspondence, coherence, pragmatic, redundancy, deflationist, etc., etc.)
2. Logical theories of truth for formal languages: semantical, axiomatic
3. "Definitional" theories of truth. Is deflationism a definitional theory?
4. Why axiomatize? (a) Separate what's needed to justify a semantical definition from what's needed to justify its properties; (b) provide axiomatic theories for non-definitional theories; (c) compare axiomatic theories in strength; (d) both model theory and proof theory applicable to axiomatic theories; …
5. Of what is truth a predicate? Propositions vs. sentences
6. Natural language vs. formal languages
7. Naming sentences: quotation in natural languages, coding in formal languages
8. $\#\varphi$ (here and in slides) or corner quotes (Quine, Halbach) for formal sentences φ
9. Tx, $T(\#\varphi)$
10. <u>First desideratum</u>: disquotation sentences (aka Tarski biconditionals (TBs), Convention T) $T(\#\varphi) \leftrightarrow \varphi$
11. Disquotation rules as an alternative? $\varphi/T(\#\varphi)$, $T(\#\varphi)/\varphi$
12. Self-referential sentences in natural language and in the language of arithmetic

13. Tarski's undefinability theorem: if a language L contains the disquotation sentences and is closed under self-reference then it is inconsistent (assuming minimal logic).
14. Language L, "Metalanguage" L*, properties of truth in L_T
15. Typed theories of truth vs. untyped theories of truth
16. Why classical logic?
17. The choice of logical operators for classical logic: $\neg, \wedge, \vee, \forall, \exists$;
    define $\varphi \rightarrow \psi$ as $\neg\varphi \vee \psi$.
18. Operations on codes $\neg.x$, $x \wedge.y$, $x \vee.y$, $\forall.v(x)$, $\exists.v(x)$
19. Second desideratum: Compositionality
20. Compositionality of truth in natural language
21. Compositionality of truth for propositional operators in a formal language:
    $T(\neg.x) \leftrightarrow \neg Tx$, $T(x \wedge.y) \leftrightarrow (Tx) \wedge (Ty)$, etc.
22. What about compositionality for quantifiers? (a) when the intended model for L has a name for each individual (e.g. arithmetic); (b) when it doesn't (e.g., set theory)
23. Semantics of (a) substitutional theory of truth vs. (b) truth from satisfaction [= Tarski's solution in the *Wahrheitsbegriff*]
24. Working over Peano Arithmetic PA, language =, +, ×, other primitive recursive functions; induction axiom scheme. Induction in PAT
25. Compositionality for quantifiers in arithmetic. Formalise: $\forall x\varphi(x)$ is true iff $\varphi(n)$ is true for each n, iff $\varphi(t)$ is true for each closed term t; similarly for the existential quantifier
26. Kripke's definition of untyped truth over arithmetic; inductively define the "true" sentences S_1 and "false" sentences S_2 simultaneously
27. "Inner logic" vs. "Outer logic", i.e. the logic of those φ for which $T\varphi$ holds (i.e. φ in S_1) vs. the logic in which one reasons about truth
28. The inner logic of Kripke's definition is Kleene 3-valued, the outer logic is classical

29. Some axiomatic systems: (a) typed: TB, CT; (b) untyped: FS (Friedman-Sheard), KF (Kripke-Feferman). PKF (Partial KF)