The Other Logic. The Historical Background for a “Paradigm Shift” in Logic

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Overview

• Deduction: Carnap‘s „Logical Syntax“
• Induction: Carnap‘s logical probability
• Kant‘s transcendental logic and Hegel‘s logic
• Structure$^1$ and structure$^2$
• Husserl: „Zu den Sachen selbst“
• Carnap‘s „Aufbau“ as a logic of concepts
• Heidegger’s “productive logic”
• Conclusion
Deduction: Carnap‘s „Logical Syntax“

• Logical Empiricism is based on the so-called hypothetical-deductive method
• There is a formalized physicalistic language with purely logical L-rules (mathematics, logics) and some empirical P-rules (physics, empirical sciences)
• We can prove mathematical and logical theorems and we can derive empirical forecasts and confront them with reality
Induction: Carnap‘s logical probability

- Reichenbach‘s frequentist approach to induction failed (Goodman‘s „new riddle“, etc.)
- Carnap‘s approach to induction is logical probability: $c(h,e) \in [0,1]$ is the degree to which evidence e supports hypothesis h
- There are uncountably many possible c-functions
- The approach can deal with Goodman‘s riddle and other puzzles but there is an irreducible normative (subjective) factor
Induction versus concept formation

• Science (and every kind of “reasoning”) is based on deductive logic, inductive rules are important but not as essential

• Nevertheless there is a second question in science that is no less important than deduction

• This is not the question of induction but the question of concept formation

• Kant’s solution of “Hume’s Problem” is not based on a theory of induction but of concept formation
Kant’s transcendental logic

• Pure logic (i.e. deductive logic) needs a transcendental foundation
• The categories are the basic concepts of pure logic (forms of judgements)
• Transcendental logic explicates those basic concepts
• Transcendental logic provides a “deduction” of those pure concepts („transcendental deduction“)
Hegel‘s logic as a logic of concepts

• Unlike Kant‘s transcendental logic Hegel‘s logic provides an explication not only of some crucial concepts of pure logic and metaphysics but of every concept

• Hegel‘s logic describes the conceptual system of science which is formally organized as a tree of concepts

• Thus Hegel‘s logic is not a logic of propositions (and not a “paraconsistent” logic) but a logic of concepts
The third perspective: Intension, Extension, Structure

• In Leibniz’ logic of concepts (like in any other analytic logic of concepts) there are two perspectives of concepts: intension (i.e. properties) and extension (i.e. objects)

• The basis of Hegel’s logic of concepts, however, is a third perspective: structure

• Neither properties nor objects in Leibniz’ sense do have structure
Structure\(^1\) and structure\(^2\)

- Structure\(^1\): structure is a class of relations, a graph or „Pfeilstruktur“ (structure of arrows)
- Structure\(^2\): structure is totally non-formal. Relations are unable to represent directly this irreducible aspect of structure
- This is the core of the difference between „continental“ and analytic philosophy
Husserl: „Zu den Sachen selbst“

• Hegel’s logic fails because of its formalistic layout
• Concept formation can impossibly be a purely formal business (cf. characteristica universalis)
• Husserl: the formation of concepts must take place directly, in the sense of a material (and, yes, empirical) event
• Husserl’s “εποχή” is the act of concept formation
Carnap‘s „Aufbau“ as a logic of concepts

- The basic entities (atoms) of the „constitutional system“ of the “Aufbau” are Husserl‘s “Sachen selbst”
- The “Aufbau” is the first approach in the history of philosophy to a logic of concepts that combines the materialistic approach (Hegel, Husserl) with formal-deductive logic
- Unfortunately Carnap banish structure\(^2\) from his system in considering only relations of atoms and not the atoms in itself (“Quasi-Analyse”)
- Thus the “Aufbau” ultimately fails to provide a materialistic logic
Heidegger’s „productive logic“

• Husserl’s “εποχη” provides a too simple picture of concept formation
• The empirical process of concept formation must be reconstructed in a background theory – *fundamental ontology*
• Heidegger’s productive logic is non-formal, purely empirical: it is *pure materialistic logic*, logic of structure²
Conclusion

• The other logic = Carnap + Heidegger
• *Mind* is the only place where structure\(^2\) exists – structure\(^2\) *is transcendental and not formal*
• Logic is: formal-deductive logic plus transcendental psychology
• This *is psychologism* of a sort
• *That* kind of logic will also replace “inductive logic”
The other logic

formal and empirical

structure\(^1\)

absolutely formal

structure\(^2\)

absolutely empirical

Heidegger's productive logic
Husserl's phenomenology
Hegel's logic
The other logic
Carnap's "Aufbau"
Carnap's inductive logic
Carnap's "Logical Syntax"