Wittgenstein's Influence on Carnap
(The Case of Inductive Logic)

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Project Information

Talk(s):

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Introduction

In this talk, we discuss the relation between the philosophies of Ludwig Wittgenstein and Rudolf Carnap.

Wittgenstein: It's one of plagiarism.

Carnap: When not credited, I discussed topics he did not discuss (in detail).

There are several approaches regarding the historical accuracy.

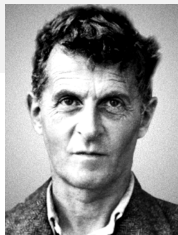Our approach is to provide a hindsight assessment, combining systematic and historical considerations.
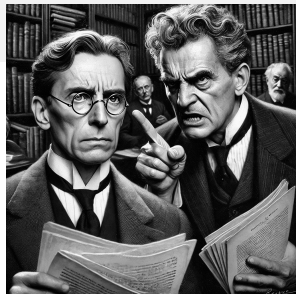
Contents

Ludwig and Rudolf

Wittgenstein's *Tractatus*

- 1889–1951
- 1906/1908: Aeronautics in Berlin/Manchester
  ⇒ obsession for (meta-)mathematics
- 1911: visits Frege several times and starts to study with Russell
- 1913: Norway retreat: *Logik* ("Every tautology itself shows that it is a tautology.")
- 1914–1918: WWI
- 1918: Finishing the *Tractatus* (*Der Satz*)
- 1921: Publication of the *Tractatus* (Routledge: 1923); considered all the major problems of philosophy to be solved –method:
  1. Having a metaphysical position
  2. Reading the *Tractatus*
  3. Clearing the metaphysical position
  4. Meta-discourse about the *Tractatus*: Ladder-metaphor, ethics-purpose etc.
- 1919–1926: Teaching career;
- 1926–1928: Architecture project in Vienna
- 1929+: Return to Cambridge (finally PhD) with intermediate visits to Austria

Carnap's Philosophy
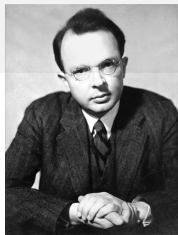
- 1891–1970
- 1917+: Studied physics and philosophy in Berlin and Jena
- 1920: Attends a course of Frege on the *Begriffsschrift*
- 1921: PhD; a philosophical investigation of *Space*
- 1923: Meeting of Reichenbach and Schlick at a conference
- 1925+: Carnap gets appointed at the University of Vienna
- 1928: Publication of the *Aufbau*
- 1930+: Foundational debates of the Vienna Circle (VC;Protokollsatzdebatte)
- 1932+: Phenomenologistic Position ⇒ Physicalism
- 1934: *Logical Syntax of Language*
- 1945+: Probability and inductive reasoning

Points of Interaction

- 1922: Moritz Schlick gets appointed at the University of Vienna
- 1922: Hans Hahn (mathematician) holds a seminar on Russell and Whitehead's *Principia Mathematica* (1910–1913), where also the *Tractatus* is discussed
- 1924: Schlick Circle begins (interdisciplinary discussion group): Hahn, Otto Neurath, Friedrich Waismann (assistant of Schlick); Wittgenstein never attended any of these Thursday night meetings
- 1924-25: Detailed reading of the *Tractatus* with Carnap
- 1926: First meeting of Schlick and Wittgenstein; Waismann joins
- 1927: Meetings of Schlick-Waismann-Carnap-Wittgenstein (Carnap: 5×)
- 1929+: Waismann planned to write a book on Wittgenstein's philosophy based on their meetings (including e.g. also "Wittgenstein's principle of verifiability")
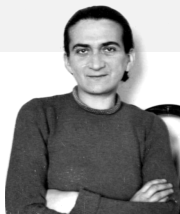- 1932: Priority dispute Wittgenstein/Carnap ⇒ part 2&3 of the talk

The *Tractatus* Reception of the VC: Seminar

Detailed in 1924–1925, discussion until 1932/33:

(Stadler 2023, p.26)

The *Tractatus* Reception of the VC: Waismann

Waismann and Wittgenstein met from 1926–1934:

- Friedrich Waismann (1897–1959) took minutes and created reports of meetings with Wittgenstein

- Waismann reported often about Wittgenstein's philosophy in front of the *Vienna Circle*, sometimes also at conferences (e.g. 1930 in Königsberg)

- Problems: Wittgenstein ...
  - ... changed his mind very often
  - ... got very impatient if felt misunderstood
  - ... had *priority issues*

- End:
  "The last meeting between Waismann and Wittgenstein took place during Easter time in 1934. [...] This split was preceded by Wittgenstein's accusation that Waismann made unauthorized use of his ideas in his "Über den Begriff der Identität" (On the Concept of Identity, 1936)." (Stadler 2023, pp.9f)

- result: Book on recorded conversations with Wittgenstein was only published posthumously (1967)

The *Tractatus* Reception of the VC: Wings

In principle, we find the full spectrum of attitudes of VC members towards Wittgenstein and his philosophy (cf. Stern 2007):

The *Tractatus* Reception of the VC: Key Takeaways

As the compilation of Rose Rand (1903–1980) shows, many topics of the *Tractatus* were considered highly relevant for *Logical Positivism*: definitions, verification etc.

In hindsight, most commentators stress at least the following two key takeaways:

1. **Linguistic Turn**: A focus on the study of language rather than "metaphysical reality".

2. **(Empiricist) Salvation of Logic** (cf. Carus 2007, pp.185f):
   - "Where did the principles of logic come from? All Carnap's great role models in logic had answered this last question by gesturing toward a special source of knowledge, different from the empirical [such as Frege's third realm]."
   - Wittgenstein:
     - "They were true simply by virtue of rearranging other true statements."
     - Logical symbols are not about some objects in reality; they are only a representational tool;

The *Tractatus* Reception of the VC: Relevant Deviations

We find ample evidence for deviations in the compilation of Rand.

Carnap most relevantly deviated from implications of the *Tractatus* (picture theory) regarding our grasp of logic.

Wittgenstein: Logic is only shown, not said. Reason:

1. Talking about logic would amount to taking an outside stance that relates something (logical symbols) with something else (logical objects).

2. However, logical symbols are not mapping something in reality or logical objects; rather they are tools to generate sentences.

3. Hence, we cannot take in such an outside stance.

4. Hence, we cannot really speak about logic.

Carnap's idea: We can *Hilbert style* stay within a system, and speak within logic about logic: *Metalogik* (preliminary title of his *Syntax*).

Wittgenstein was critical of reasoning within systems due to Russell's paradox.

Carnap was optimistic about reasoning within a system because of Gödel's constructions.

Ludwig's Apple Tree

Carnap's 1931 Offprint

1931: Carnap publishes "Die physikalische Sprache als Universalsprache der Wissenschaft".

Sends 1932 an offprint to Wittgenstein

Wittgenstein is outraged. Plagiarism! L.W.
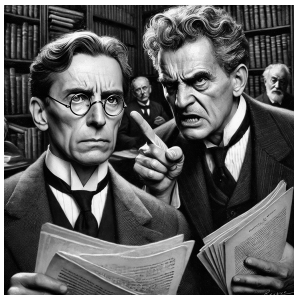
Wittgenstein's Complaint

"I see myself as drawn against my will into what is called "the Vienna Circle." In that Circle there prevails a community of property, so that I could e.g. use Carnap's ideas if I wanted to but he could also use mine. But I don't want to join forces with Carnap and to belong to a circle to which he belongs. If I have an apple tree in my garden, then it delights me and serves the purpose of the tree if my friends (e.g. you & Waismann) make use of the apples; I will not chase away thieves that climb over the fence, but I am entitled to resent that they are posing as my friends or alleging that the tree should belong to them jointly.' (Letter from Wittgenstein to Schlick, May 6, 1932; translation based on Hintikka 1989/1996, 131)"

Further Development of the Relationship

Hintikka (1996, p.133):

"Carnap was bitterly disappointed but behaved with admirable restraint. One finds it easy to agree with Schlick's statement in his letter to Carnap on 24 August 1932: 'Welch ein Glück, dass Du so ein ruhiger und verständiger Mensch bist!'."

Stadler (2023, p.11):

"In an unpublished portion of his autobiography Carnap later recalled this strange episode as follows: 'Years later some of Wittgenstein's students at Cambridge asked him for permission to send transcripts of his lectures to friends and interested philosophers. He asked to see the list of names, and then approved all but my own. In my entire life, I have never experienced something remotely similar to this hatred directed against me. I have no adequate explanation; probably only a psychoanalyst could offer one. . . . But that in no way alters the fact that he was a spirit with genuine creative genius, to whom philosophy is greatly indebted'."

The Accusations/Stolen Apples

The points of complaint of Wittgenstein as listed by Schlick (cf. Stern 2007, pp.323f):

1. top of p. 433 (the nature of philosophy); [Carnap 1934a, p. 33]

2. bottom of p. 435 and following (ostensive defining does not lead us outside language); [Carnap 1934a, p. 39ff.]

3. top of p. 440 (the character of laws of nature, where hypotheses are characterized by means of their peculiar logical form, which differs from ordinary propositions); [Carnap 1934a, pp. 48–9]

4. furthermore the passages where pseudo-problems are eliminated by means of the "formal mode of speech" (p. 452, note, p. 456), for in fact this is after all W[ittgenstein]'s basic idea. [Carnap 1934a, footnote on p. 74; pp. 82–4] (Letter from Schlick to Carnap, July 10, 1932; translation from Hintikka 1989/1996, 134.)

5. the claim that physicalism is in the Tractatus;

Carnap's Reaction

Carnap's 1931 paper was a turning point in the VC.

Phenomenological Basis $\Rightarrow$ Physicalism

Thesis of physicalism: "All sentences contain spatiotemporal termini."

Main reason for the shift: objectivity of science

Predecessor: Neurath (also credited in a footnote of the paper)

Carnap to Schlick: Wittgenstein doesn't discuss physicalism in the *Tractatus*

Interpretations: Hintikka, Uebel, Stern, Creath

Hintikka: Carnap is very close to Wittgenstein, but there is a psychological reason for why he did not credit him. Wittgenstein (according to Feigl):

"If he can't smell it, I can't help him. He just has got no nose!"

Uebel, Stern, Creath: there are different forms of physicalism at play.
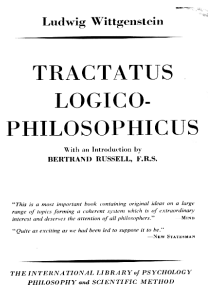
Interpretations: Rose Rand's Minutes

Rudolf and the Case of Induction

Relevance of Carnapian Topics

In hindsight, we can say that the most relevant parts of Carnap's philosophy concern:

1. the linguistic turn as performed in his *Aufbau*

2. his methodological account of explication

3. his programme of logical probabilities

Ad 2: Wittgenstein had no influence here (rather influential were Kaufmann—a legal theorist— and Menger—a mathematician—and Carnap credits the latter).

Ad 1 and 3: Wittgenstein was highly influencial and Carnap credits him.

Carnap's Crediting
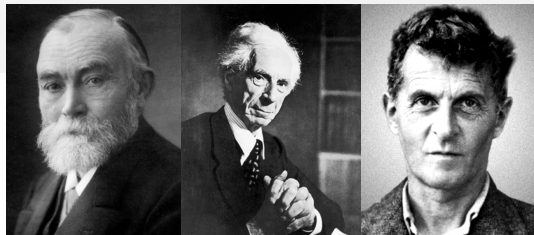
Carnap (1963, p.25):

- "For me personally, Wittgenstein was perhaps the philosopher who, besides Russell and Frege, had the greatest influence on my thinking."

- "The most important insight I gained from his work was the conception that the truth of logical statements is based only on their logical structure and on the meaning of the terms. Logical statements are true under all conceivable circumstances; thus their truth is independent of contingent facts of the world. On the other hand, it follows that these statements do not say anything about the world and thus have no factual content."

The Case of Induction: Carnap's Inductive Logic

The programme of an inductive logic sees an important continuity with respect to deductive and inductive reasoning.

Traditionally: A is a logical consequence of B iff for all interpretations $\mathfrak{I}$ it holds that if B is true at $\mathfrak{I}$, so is A.

A machinery of deductive and inductive logic on the basis of propositional (modal) logic semantics:

- *possible world*: a maximally consistent set of formulæ of some propositional (modal) language $\mathfrak{L}$
- *state description*: a set of formulæ of $\mathfrak{L}$ such that if φ is any atomic formula in $\mathfrak{L}$, a state-description for $\mathfrak{L}$ must either affirm or deny φ
- $\mathfrak{Z}$: let $\mathfrak{Z}$ of $\mathfrak{L}$ be the set of all state descriptions of $\mathfrak{L}$.
- *range* of a formula φ in $\mathfrak{L}$: the class of those elements of $\mathfrak{Z}$ in $\mathfrak{L}$ in which φ holds

The Case of Induction: Carnap's Inductive Logic

It is often said that in a deductive inference, the "content" of the conclusion is already contained in the "content" of the premiss.

In our setup, we can express this explicitly via the range: If we take the "content" of a formula as the range-conditions (intension) and the range of a formula as its extension.
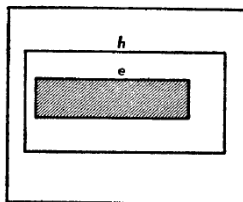
Deductive Logic

'e L-implies h' means that the range of e is entirely contained in that of h.
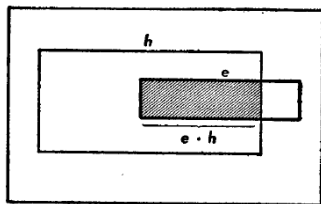
Inductive Logic

'c(h,e) = 3/4' means that three-fourths of the range of e is contained in that of h.

The Case of Induction: Carnap's Inductive Logic

Let us illustrate this by the help of an example. Take, e.g., the two formulæ p_1 and $p_1 \& p_2$. It is clear that p_1 is a logical consequence of $p_1 \& p_2$ but not vice versa. We can see this by the help of a simple truth table:

i	p_2	p_1	$p_1 \& p_2$
1	0	0	0
2	0	1	0
3	1	0	0
4	1	1	1

Whenever $p_1 \& p_2$ is true, so is p_1 but not vice versa. The "range" of $p_1 \& p_2$ (line 4) is contained in the "range" of p_1 (lines 2 and 4).

The Case of Induction: Carnap's Inductive Logic

So much for the direction from $p_1 \& p_2$ to p_1.

But what about the other direction, from p_1 to $p_1 \& p_2$?

Here is where inductive logic seeks to pop in. The idea is to fine-grain the range-inclusion claim from included/not included to stating a degree of inclusion.

How much of A is included in B:

$$Pr(A|B) = \frac{|\{s_i : \mathfrak{I}_i(A) = 1 = \mathfrak{I}_i(B)\}|}{|\{s_i : \mathfrak{I}_i(B) = 1\}|}$$

Example:

$$Pr(p_1 \& p_2|p_1) = \frac{|\{s_i : \mathfrak{I}_i(p_1 \& p_2) = 1 = \mathfrak{I}_i(p_1)\}|}{|\{s_i : \mathfrak{I}_i(p_1) = 1\}|} = 0.5$$

The Case of Induction: Wittgenstein on Induction

The idea presented above can be found already in the *Tractatus* (§5.15).

However, it is a general idea we find in early accounts of logical probability, so we have no particular priority of Wittgenstein here. Credits in general the camp of logical probability for this (e.g. Harold Jeffreys).

The notion of a *range* is, however, particular to Wittgenstein and Waismann. And Carnap gives also credit to them.

The Case of Induction: Wittgenstein on Induction

Waismann (1979):

- p.99 (22 March 1930, at Schlick's house): "Distinctions between 'statements' and 'hypotheses': An hypothesis is not a statement, but a law for constructing statements."

- p.100 (22 March 1930, at Schlick's house): "A natural law cannot be verified or falsified. Of a natural law you can say that it is neither true nor false but 'probable,' and here 'probable' means: simple, convenient."

- p.254 (Appendix B, Theses by Friedrich Waismann (ca. 1930)): "Induction appears in the form of hypotheses. By an *hypothesis* we here mean not a statement but rather a law for constructing statements. Only particular statements can be true or false, an hypothesis cannot. Its justification lies in what it accomplishes, i.e. in the simplification it leads to. [...] Simple, plausible, probable–with respect to a hypothesis these words mean the same.."

Example: ideal gas law:

$$p \cdot v = const$$

The Case of Induction: Overlaps

We find relevant overlap regarding . . .

- the notion of *probability*
- the notion of *range*

And Carnap provides adequate credit for this.

The Wittgenstein/Waismann idea of induction=hypothesis is not taken over by Carnap (for him also statements have probabilities—aligned with their logical structure).

There are, however, two further loose relations regarding . . .

- Carnap's dealing with universal statements ($\forall x(Rx \rightarrow Bx)$) in his systems of inductive logic and Wittgenstein's dealing with hypotheses (instances)
- Carnap's cashing out of simplicity for justifying inductive reasoning and Wittgenstein's equating of probability with simplicity

However, this seems to be not a relevant case of crediting (different sources—like analogy in biological evolution) and too general.

Wittgenstein might have used his Plagiarism! mace, when pointed out these similarities.

Summary

In general, it seems to us that different standards (of crediting) are relevant for different purposes (philosophical programme such as the linguistic turn vs a detailed account of induction).

- Wittgenstein's plagiarism claim is
  - *psychologically understandable* (Hintikka) but
  - *historically hardly tenable* (Uebel, Stern, Creath).
- We argued that in hindsight it is not relevant.
- Regarding the programme of logical positivism, Carnap provided adequate credit.
- Also in his detailed studies (on induction), he provided adequate credit (if there was a detailed enough point of reference).
- Still, there might be further apples (role of universal statements, simplicity in induction), Ludwig might consider to be stolen by Rudolf.

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