

# Logical Empiricism

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- **Hans Hahn, Otto Neurath, and Philipp Frank** regularly meet in Vienna coffee houses to discuss philosophy of science (1907-1912)

“After 1910 there began in Vienna a movement which regarded Mach’s positivist philosophy of science as having great importance for general intellectual life [...] An attempt was made by a group of young men to retain the most essential points of Mach’s positivism, especially his stand against the misuse of metaphysics in science. [...] To this group belonged the mathematician H. Hahn, the political economist Otto Neurath, and the author of this book [i.e. Frank], at the time an instructor in theoretical physics in Vienna. [...] We tried to supplement Mach’s ideas by those of the French philosophy of science of Henri Poincaré and Pierre Duhem [...]” (Philipp Frank, cited from Thomas Uebel (2003), p.70).

- meetings revived in 1922 by inclusion of **Moritz Schlick** (Chair of philosophy of the inductive sciences at U of Vienna)
- from 1926: **Rudolf Carnap**
- 1928: Ernst Mach Society officially established
- 1929: publication of Vienna Circle manifesto *The Scientific Conception of the World. The Vienna Circle*
- from 1933: dispersion of circles, most emigrated to USA
- 1936: Schlick is murdered by deranged student
- other prominent members included **Herbert Feigl, Kurt Gödel, Victor Kraft**
- associated: **Hans Reichenbach, Carl Gustav Hempel, Ludwig Wittgenstein**

# Main representatives logical empiricism



Moritz Schlick  
(1882-1936)



Rudolf Carnap  
(1891-1970)



Hans Reichenbach  
(1891-1953)

# Vienna Circle Manifesto (1929)

The scientific world-conception of the Vienna Circle is characterized

“essentially by two features. First it is empiricist and positivist: there is knowledge only from experience [...] Second, the scientific world-conception is marked by the application of a certain method, namely logical analysis.”

*(The Scientific Conception of the World. The Vienna Circle in Sarkar (1996), p. 331).*

# The analytic-synthetic distinction



- introduced by Immanuel Kant (1724-1804)
- **analytic statement** is true or false in virtue of its meaning alone, regardless of state of world (“All bachelors are unmarried”)
- truth of a **synthetic statement** depends on state of world (“All bachelors are bald”)
- a priori vs. a posteriori
- log positivism: logic and mathematics is a priori and analytic, empirical science a posteriori and synthetic

# Georg Wilhelm Friedrich Hegel (1770-1831)



“Reason [...] is substance, as well as infinite power, its own infinite material underlying all the natural and spiritual life [...] as also the infinite form, that which sets this material in motion.”

*(Philosophie der Geschichte, Einführung, p. 12)*

# Verificationism (“verifiability theory of meaning”)

## Thesis (The verification criterion of meaning)

*The (cognitive) meaning of a proposition consists in its method of verification (or refutation), and a proposition which cannot be verified (or refuted) is (cognitively) meaningless.*

## Remarks and qualifications:

- verifiability is **in principle**, not in practice
- “weak” verifiability is sufficient, i.e. possible for experience to render it more or less probable
- propositions don’t need to be conclusively falsifiable in order to be meaningful (holism!)
- statement can have **emotive** meaning even if it’s cognitively meaningless

- *a priori* statements excluded from criterion bc they are not genuine propositions, but only tautologies (= proposition that “says nothing,” merely repeats a definition)
- ⇒ tautologies and empirical hypotheses form entire class of significant propositions
- general definition of metaphysical sentence: “sentence which purports to express a genuine proposition, but does, in fact, express neither a tautology not an empirical hypothesis.” (171)
  - in other words, they are synthetic *a priori* propositions
  - synthetic *a priori* statements are (cognitively) meaningless, only analytic *a priori* and synthetic *a posteriori* statements are meaningful

## Meaningless:

- “the Nothing nihilates” (Martin Heidegger)
- “the Good is the class of the determinate conceived as a unity” (Plato)
- “there is an omnipotent God”
- “the State is the image of the divine on Earth” (Hegel)
- assertion that world of sense-experience is altogether unreal (and only apparent)
- dispute bw monism and dualism
- metaphysical debate bw realists and idealists
- metaphysics and theology quite in general, bc they consists of synthetic *a priori* propositions

# Context of discovery vs. context of justification

- introduced by Reichenbach
- study of logical structure of science  $\Rightarrow$  “context of justification”
- mathematical structure of special theory of relativity: axiom, theorems, interpretation; relationship to experimental results
- study of historical, psychological, sociological aspects of science  $\Rightarrow$  “context of discovery”
- example: Friedrich August Kekulé’s discovery of ring shape of benzene when dreaming of snake seizing its own tail

# The unity of science

- development of common language in which all scientific propositions can be expressed (“universal slang”)
- reduction of theories to another, more fundamental, theory
- collection called *Einheitswissenschaft (Unified Science)* (1933-1939)
- *International Encyclopedia of Unified Science* (starting in 1938, incomplete)
- apart from members of Vienna circle, authors include John Dewey, Bertrand Russell, Niels Bohr, Ernest Nagel, Carl Hempel, Thomas Kuhn (!)

- challenge from holism (Duhem, Quine): no hypothesis can be tested in isolation
- Quine: holistic theory of testing  $\Rightarrow$  holistic theory of meaning
- but logical positivists paid at least lip service to this: Ayer 1936, Carnap 1937, Feigl 1943
- Feigl: network of theoretical hypotheses connected with “soil” of experience

“No scientific assumption is testable in complete isolation. Only whole complexes of inter-related hypotheses can be put to the test.” (Feigl (1943), “Logical Empiricism”, p. 16)

$\Rightarrow$  replace verifiability theory of meaning with **holistic empiricist theory of meaning**