

Vienna Circle

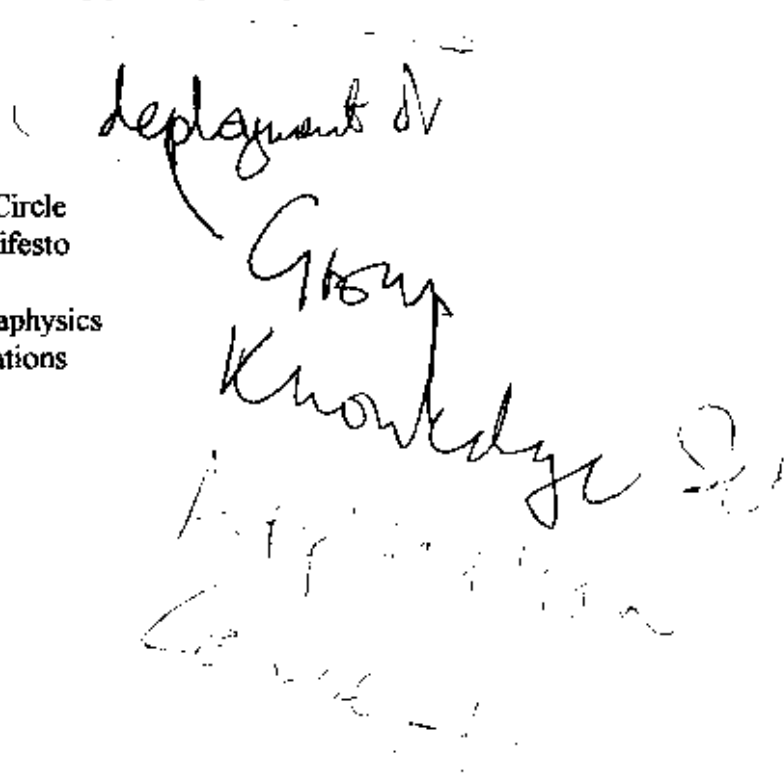
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For the esoteric circle see Vienna Circle (esoteric)

The **Vienna Circle** (in German: **der Wiener Kreis**) was a group of philosophers who gathered around Moritz Schlick when he was called to the Vienna University in 1922, organized in a philosophical association named **Verein Ernst Mach (Ernst Mach Society)**. Among its members were Moritz Schlick, chairman of the Ernst Mach Society, Gustav Bergmann, Rudolf Carnap, Herbert Feigl, Philipp Frank, Kurt Gödel, Hans Hahn, Victor Kraft, Karl Menger, Marcel Natkin, Otto Neurath, Olga Hahn-Neurath, Theodor Radakovic, and Friedrich Waismann. With the exception of Gödel, members of the Vienna Circle had a common attitude towards philosophy, characterized by two main beliefs: first, experience is the only source of knowledge; second, logical analysis performed with the help of symbolic logic is the preferred method for solving philosophical problems.

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History of the Vienna Circle

The prehistory of the Vienna Circle began with meetings on the philosophy of science and epistemology from 1907 on, promoted by Philipp Frank, Hans Hahn and Otto Neurath.

Hans Hahn, the oldest of the three (1879-1934), was a mathematician. He received his degree in mathematics in 1902. Afterwards he studied under the direction of Ludwig Boltzmann in Vienna and David Hilbert, Felix Klein and Hermann Minkowski in Göttingen. In 1905 he received the Habilitation in mathematics. He taught at Innsbruck (1905-1906) and Vienna (from 1909).

Otto Neurath (1882-1945) studied sociology, economics and philosophy in Vienna and Berlin. From 1907 to 1914 he taught in Vienna at the Neuen Wiener Handelsakademie (Viennese Commercial Academy). Neurath married Olga, Hahn's sister, in 1911.

Philipp Frank, the youngest of the group (1884-1966), studied physics at Göttingen and Vienna with Ludwig Boltzmann, David Hilbert and Felix Klein. From 1912, he held the chair of theoretical physics in the German University in Prague.

Their meetings were held in Viennese coffeehouses from 1907 onward. Frank remembered:

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, and also to connect them with the investigations in logic of such authors as Couturat, Schröder, Hilbert, etc.

– Uebel, Thomas, 2003, p.70).

Presumably the meetings stopped in 1912, when Frank went to Prague, where he held the chair of theoretical physics left vacant by Albert Einstein. Hahn left Vienna during World War I and returned in 1921. The following year Hahn, with the collaboration of Frank, arranged to bring into the group Moritz Schlick, who held the chair of philosophy of the inductive sciences at the University of Vienna. Schlick had already published his two main works *Raum und Zeit in die gegenwärtigen Physik* (*Space and Time in contemporary Physics*) in 1917 and *Allgemeine Erkenntnislehre* (*General Theory of Knowledge*) in 1918. A central work for the newly founded discussion group was the *Logisch-Philosophische Abhandlung* (*Tractatus Logico-Philosophicus*), published by Ludwig Wittgenstein in 1918.

Under the direction of Schlick, a new regular series of meetings began. In 1926 Schlick and Hahn arranged to bring in Rudolf Carnap at the University of Vienna. In 1928 the *Verein Ernst Mach* (Ernst Mach Society) was founded, with Schlick as chairman. In 1929 the Vienna Circle manifesto *Wissenschaftliche Weltauffassung. Der Wiener Kreis* (*The Scientific Conception of the World. The Vienna Circle*) was published. The pamphlet is dedicated to Schlick, and its preface was signed by Hahn, Neurath and Carnap. In the appendix is a list of the members of the Vienna Circle.

The Vienna Circle was dispersed when the Nazi party came to power in Germany; many of its members emigrated to USA, where they taught in several universities. Schlick remained in Austria, but in 1936 he was killed by a Nazi sympathizer student in the University of Vienna.

The Vienna Circle manifesto

It states the scientific world-conception of the Vienna Circle, which 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, Sahotra, 1996, p. 331 – hereinafter *VC*).

Logical analysis is the method of clarification of philosophical problems; it makes an extensive use of symbolic logic and distinguishes the Vienna Circle empiricism from earlier versions. The task of

philosophy lies in the clarification - through the method of logical analysis - of problems and assertions.

Logical analysis shows that there are two different kinds of statements; one kind includes statements reducible to simpler statements about the empirically given; the other kind includes statements which cannot be reduced to statements about experience and thus they are devoid of meaning. Metaphysical statements belong to this second kind and therefore they are meaningless. Hence many philosophical problems are rejected as pseudo-problems which arise from logical mistakes, while others are re-interpreted as empirical statements and thus becomes the subject of scientific inquiries.

One source of the logical mistakes that are at the origins of metaphysics is the ambiguity of natural language. "Ordinary language for instance uses the same part of speech, the substantive, for things ('apple') as well as for qualities ('hardness'), relations ('friendship'), and processes ('sleep'); therefore it misleads one into a thing-like conception of functional concepts" (*VC* p. 329). Another source of mistakes is "the notion that *thinking* can either lead to knowledge out of its own resources without using any empirical material, or at least arrive at new contents by an inference from given states of affair" (*VC* p. 330). The latter notion is typical in Kantian philosophy, according to which there are synthetic statements a priori that expand knowledge without using the experience. Synthetic knowledge a priori is rejected by the Vienna Circle. Mathematics, which at a first sight seems an example of necessarily valid synthetic knowledge derived from pure reason alone, has instead a tautological character, that is its statements are analytical statements, thus very different from Kantian synthetic statements. The only two kinds of statements accepted by the Vienna Circle are synthetic statements a posteriori (i.e. scientific statements) and analytic statements a priori (i.e. logical and mathematical statements).

However, the persistence of metaphysics is connected not only with logical mistakes but also with "social and economical struggles" (*VC* p. 339). Metaphysics and theology are allied to traditional social forms, while the group of people who "faces modern times, rejects these views and takes its stand on the ground of empirical sciences" (*VC* p. 339). Thus the struggle between metaphysics and scientific world-conception is not only a struggle between different kinds of philosophies, but it is also – and perhaps primarily – a struggle between different political, social and economical attitudes. Of course, as the manifesto itself acknowledged, "not every adherent of the scientific world-conception will be a fighter" (*VC* p. 339). Many historians of the Vienna Circle see in the latter sentence an implicit reference to a contrast between the so called 'left wing' of the Vienna Circle, mainly represented by Neurath and Carnap, and Moritz Schlick. The aim of the left wing was to facilitate the penetration of the scientific world-conception in "the forms of personal and public life, in education, upbringing, architecture, and the shaping of economic and social life" (*VC* p. 339-340). In contrast, Schlick was primarily interested in the theoretical study of science and philosophy. Perhaps the sentence "Some, glad of solitude, will lead a withdrawn existence on the icy slopes of logic" (*VC* p. 339) is an ironic reference to Schlick.

The manifesto lists Walter Dubislav, Josef Frank, Kurt Grelling, Hasso Härlen, Eino Kaila, Heinrich Loewy, F. P. Ramsey, Hans Reichenbach, Kurt Reidermeister, and Edgar Zilsel as "Those sympathetic to the Vienna Circle" and Albert Einstein, Bertrand Russell and Ludwig Wittgenstein as "Leading representatives of the scientific world-conception".

Unified science

The final goal pursued by the Vienna Circle was unified science, that is the construction of a "constitutive system" in which every legitimate statement is reduced to the concepts of lower level which refer directly to the given experience. "The endeavour is to link and harmonise the achievements of individual investigators in their various fields of science" (*VC* p. 328). From this aim follows the search for clarity, neatness, intersubjectivity, and for a neutral symbolic language that eliminates the problems arising from

the ambiguity of natural language. The Vienna Circle published a collection, called *Einheitswissenschaft* (*Unified science*), edit by Rudolf Carnap, Philipp Frank, Hans Hahn, Otto Neurath, Joergen Joergensen (after Hahn's death) and Charles W. Morris (from 1938), whose aim was to present a unified vision of science. After the publication in Europe of seven monographs from 1933 to 1939, the collection was dismissed, because of the problems arising from the World War II. In 1938 a new series of publications started in USA. It was the International Encyclopedia of Unified Science, an ambitious project never completed devoted to unified science. Only the first section *Foundations of the Unity of Sciences* was published; it contains two volumes for a total of twenty monographs published from 1938 to 1969. As remembered by Rudolf Carnap and Charles Morris in the *Preface* to the 1969 edition of the International Encyclopedia of Unified Science:

The *Encyclopedia* was in origin the idea of Otto Neurath. It was meant as a manifestation of the unity of science movement [...] Original plans for the Encyclopedia were ambitious. In addition to the two introductory volumes, there was to be a section on the methodology of the sciences, one on the existing state of the unification of sciences, and possibly a section on the application of the sciences. It was planned that the work in its entirety would comprise about twenty-six volumes (260 monographs)

– *Foundations of the Unity of Sciences*, vol. 1, The University of Chicago Press, 1969, p. vii.

The well known Thomas Kuhn's work, *The Structure of Scientific Revolutions*, was published in this Encyclopedia in 1962, as the number two in the second volume.

The elimination of metaphysics

The attitude of Vienna Circle towards metaphysics is well expressed by Carnap in the article 'Überwindung der Metaphysik durch Logische Analyse der Sprache' in *Erkenntnis*, vol. 2, 1932 (English translation 'The Elimination of Metaphysics Through Logical Analysis of Language' in Sarkar, Sahotra, ed., *Logical empiricism at its peak: Schlick, Carnap, and Neurath*, New York : Garland Pub., 1996, pp. 10-31). A language – says Carnap – consists of a vocabulary, i.e. a set of meaningful words, and a syntax, i.e. a set of rules governing the formation of sentences from the words of the vocabulary.

Pseudo-statements, i.e. sequences of words that at first sight resemble statements but in reality have no meaning, are formed in two ways: either meaningless words occur in them, or they are formed in an invalid syntactical way. According to Carnap, pseudo-statements of both kinds occur in metaphysics.

A word *W* has a meaning if two conditions are satisfied. First, the mode of the occurrence of *W* in its elementary sentence form (i.e. the simplest sentence form in which *W* is capable of occurring) must be fixed. Secondly, if *W* occurs in an elementary sentence *S*, it is necessary to give an answer to the following questions (that are – according to Carnap – equivalent formulation of the same question):

- (1.) What sentences is *S* deducible from, and what sentences are deducible from *S*?
- (2.) Under what conditions is *S* supposed to be true, and under what conditions false?
- (3.) How *S* is to verified?
- (4.) What is the meaning of *S*?

(Carnap, 'The Elimination of Metaphysics Through Logical Analysis of Language' in Sarkar, Sahotra, cit., pp. 12)

An example offered by Carnap concerns the word 'arthropod'. The sentence form "the thing x is an arthropod" is an elementary sentence form that is derivable from " x is an animal", " x has a segmented body" and " x has jointed legs". Conversely, these sentences are derivable from "the thing x is an arthropod". Thus the meaning of the words 'arthropod' is determined.

According to Carnap, many words of metaphysics do not fulfil these requirements and thus they are meaningless. As an example, Carnap considers the word 'principle'. This word has a definite meaning, if the sentence " x is the principle of y " is supposed to be equivalent to the sentence " y exists by virtue of x " or " y arises out of x ". The latter sentence is perfectly clear: y arises out of x when x is invariably followed by y , and the invariable association between x and y is empirically verifiable. But – says Carnap – metaphysicians are not satisfied with this interpretation of the meaning of 'principle'. They assert that no empirical relation between x and y can completely explain the meaning of " x is the principle of y ", because there is something that cannot be grasped by means of the experience, something for which no empirical criterion can be specified. It is the lacking of any empirical criterion – says Carnap – that deprives of meaning the word 'principle' when it occurs in metaphysics. Therefore, metaphysical pseudo-statements such as "water is the principle of the world" or "the spirit is the principle of the world" are void of meaning because a meaningless word occurs in them.

However, there are pseudo-statements in which occur only meaningful words; these pseudo-statements are formed in a counter-syntactical way. An example is the word sequence "Caesar is a prime number"; every word has a definite meaning, but the sequence has no meaning. The problem is that "prime number" is a predicate of numbers, not a predicate of human beings. In the example the nonsense is evident; however, in natural language the rules of grammar do not prohibit the formation of analogous meaningless word sequences that are not so easily detectable. In the grammar of natural languages, every sequence of the kind " x is y ", where x is a noun and y is a predicate, is acceptable. In fact, in the grammar there is no distinction between predicate which can be affirmed of human beings and predicate which can be affirmed of numbers. So "Caesar is a general" and "Caesar is a prime number" are both well-formed, in contrast for example with "Caesar is and", which is ill-formed. In a logically constructed language – says Carnap – a distinction between the various kinds of predicate is specified, and pseudo-statements as "Caesar is a prime number" are ill-formed. Now, and this is the main point of Carnap's argument, metaphysical statements in which do not occur meaningless words, are indeed meaningless because they are formed in a way which is admissible in natural languages, but not in logically constructed languages. Carnap attempts to indicate the most frequent sources of errors from which metaphysical pseudo-statements can arise. One source of mistakes is the ambiguity of the verb 'to be', which is sometimes used as a copula ("I am hungry") and sometimes to designate existence ("I am"). The latter statement incorrectly suggests a predicative form, and thus it suggests that existence is a predicate. Only modern logic, with the introduction of an explicit sign to designate existence (the sign \exists), which occurs only in statements such as $\exists xP(x)$, never as a predicate, has showed that existence is not a predicate, and thus has revealed the logical error from which pseudo-statements such as "cogito, ergo sum" has aroused.

Another source of mistakes is type confusions, in which a predicate of a kind is used as a predicate of another kind. For example the pseudo-statements "we know the Nothing" is analogous to "we know the rain", but while the latter is well-formed, the former is ill-formed, at least in a logically constructed language, because 'Nothing' is incorrectly used as a noun. In a formal language, 'Nothing' only means $\neg \exists x$, such as "there is nothing which is outside", i.e. $\neg \exists xO(x)$, and thus 'Nothing' never occurs as a noun or as a predicate.

What is the role of metaphysics? According to Carnap, although metaphysics has not theoretical content, it has content indeed: metaphysical pseudo-statements express the attitude of a person towards life.