

Anti-metaphysics: 1. *Agnosticism (q.v.)*. 2. *Logical Positivism* (see *Scientific Empiricism* (1)) holds that those metaphysical statements which are not confirmable by experiences (see *Verification* 4, 5) have no cognitive meaning and hence are pseudo-statements (see *Meaning, Kinds of*, 1, 5).
— R.C.

Basic Sentences, Protocol Sentences: Sentences formulating the result of observations or perceptions or other experiences, furnishing the basis for empirical verification or confirmation (see *Verification*). Some philosophers take sentences concerning observable properties of physical things as basic sentences, others take sentences concerning sense-data or perceptions. The sentences of the latter kind are regarded by some philosophers as completely verifiable, while others believe that all factual sentences can be confirmed only to some degree. See *Scientific Empiricism*. — R.C.

Formal: 1. In the traditional use: valid independently of the specific subject-matter; having a merely logical meaning (see *Meaning, Kinds of*, 3). 2. Narrower sense, in modern logic: independent of, without reference to meaning (compare *Semiotic*, 3). — R.C.

Intersubjective: Used and understood by, or valid for different subjects. Especially, i. language, i. concepts, i. knowledge, i. confirmability (see *Verification*). The i. character of science is especially emphasized by Scientific Empiricism (*g. v.*, 1 C). — R.C.

Meaning, Kinds of: In semiotic (*q. v.*) several kinds of meaning, i.e. of the function of an expression in language and the content it conveys, are distinguished. 1. An expression (sentence) has *cognitive* (or theoretical, assertive) meaning, if it asserts something and hence is either true or false. In this case, it is called a cognitive sentence or (cognitive, genuine) statement; it has usually the form of a declarative sentence. If an expression (a sentence) has cognitive meaning, its truth-value (*q. v.*) depends in general upon both (a) the (cognitive, semantical) meaning of the terms occurring, and (b) some facts referred to by the sentence. 2. If it does depend on both (a) and (b), the sentence has *factual* (synthetic, material) meaning and is called a factual (synthetic, material) sentence. 3. If, however, the truth-value depends upon (a) alone, the sentence has a (merely) *logical* meaning (or formal meaning, see Formal 1). In this case, if it is true, it is called *logically true or analytic (q. v.)*; if it is false, it is called *logically false or contradictory*. 4. An expression has an *expressive meaning* (or function) in so far as it expresses something of the state of the speaker; this kind of meaning may for instance contain pictorial, emotive, and volitional components (e.g. lyrical poetry, exclamations, commands). An expression may or may not have, in addition to its expressive meaning, a cognitive meaning; if not, it is said to have a merely expressive meaning. 5. If an expression has a merely expressive meaning but is mistaken as being a cognitive statement, it is sometimes called a *pseudo-statement*. According to logical positivism (see *Scientific Empiricism*, IC) many sentences in metaphysics are pseudo-statements (compare *Anti-metaphysics*, 2). — R.C.

Physicalism: The thesis, developed within Scientific Empiricism (*q. v.*, II B), that every descriptive term in the language of science (in the widest sense, including social science) is connected with terms designating observable properties of things. This connection is of such a kind that a sentence applying the term in question is intersubjectively (*q. v.*) confirmable by observations (see *Verification*). The application of physicalism to psychology is the logical basis for the method of behaviorism (*q. v.*). See papers by O.

Neurath, R. Carnap, C. G. Hempel, in *Erkenntnis*, 2, 1931; 3, 1932; 4, 1934; *Scientia* 50, 1931; *Rev. de Synthèse* 10, 1935; *Phil. Science* 3, 1936; S. S. Stevens in *Psych. Bull.* 36, 1939. — R.C.

Science of Science: The analysis and description of science from various points of view, including logic, methodology, sociology, and history of science. One of the chief tasks of the science of science is the analysis of the language of science (see *Semiotic*). *Scientific empiricism* (q.v.) emphasizes the rôle of the science of science, and tries to clarify the different aspects. Some empiricists believe that the chief task of philosophy is the development of the logic and methodology of science, and that most of the problems of traditional philosophy, as far as they have cognitive meaning (see *Meaning, Kinds of*, 1, 5), may be construed as problems of the science of science. — R.C.

Scientific Empiricism; Unity of Science Movement: A philosophical movement originated by the movement of Logical Positivism but including many other groups and persons (see II below).

I. *Vienna Circle; Logical Positivism; Logical Empiricism*.

A. The *Vienna Circle*, founded by M. Schlick (q.v.) in 1924, ending with his death in 1936. Among its members: G. Bergmann, R. Carnap, (q.v.), H. Feigl, Ph. Frank (q.v.), K. Gödel (q.v.), H. Hahn (d. 1934), O. Neurath, F. Waismann.

B. Seen historically, the movement shows influences from three sides: (1) the older empiricism and positivism, especially Hume, Mill, Mach; (2) methodology of empirical science, as developed by scientists since about the middle of the 19th century, e.g., Helmholtz, Mach, Poincaré, Duhem, Boltzmann, Einstein; (3) symbolic logic and logical analysis of language as developed especially by Frege, Whitehead and Russell, Wittgenstein. Russell (q.v.) was the first to combine these trends and therefore had an especially strong influence.

C. The views developed in the V. C. have been called *Logical Positivism* (A. E. Blumberg and H. Feigl, *J. Phil.* 28, 1931); many members now prefer the term "Logical Empiricism". Among the characteristic features: emphasis on scientific attitude and on co-operation; hence emphasis on intersubjective (q.v.) language and unity of science. Empiricism: every knowledge that is factual (see *Meaning, Kinds of*, 1), is connected with experiences in such a way that verification or direct or indirect confirmation is possible (see *Verification*).

The emphasis on logical analysis of language (see *Semiotic*) distinguishes this movement from earlier empiricism and positivism. The task of philosophy is analysis of knowledge, especially of science; chief method: analysis of the language of science (see *Semiotic; Meaning, Kinds of*).

D. Publications concerning the historical development of this movement and its chief views: *Wissenschaftliche Weltauffassung: Der Wiener Kreis*, Wien 1929 (with bibliography). O. Neurath, *Le Développement du Cercle de Vienne, et l' Avenir de l'Empirisme Logique*, 1935. C. W. Morris, *Logical Positivism, Pragmatism, and Scientific Empiricism*, Paris 1937. E. Nagel, "Impressions and Appraisals of Analytic Philosophy in Europe", I, II, *tic Empiricism in Germany, and the Present State of its Problems*. Ibid. E. Nagel, "The Fight for Clarity: Logical Empiricism", *Amer. Scholar*, 1938. Many papers by members of the group have been published in "Erkenntnis" since 1930, now continued as "Journal of Unified Science".

Compare M. Black, "Relations between Logical Positivism and the Cambridge School of Analysis", *J. Un. Sc.* 8, 1940.

II. *Scientific Empiricism*. A wider movement, comprising besides Logical Empiricism other groups and individuals with related views in various countries. Also called *Unity of Science Movement*.

Among its members: W. Dubislav (1937), K. Grelling, O. Helmer, C. G. Hempel, A. Herzberg, K. Korsch, H. Reichenbach (*q.v.*), M. Strauss.

A. Many members of the following groups may be regarded as adherents of Scientific Empiricism: the Berlin Society for Scientific Philosophy, the Warsaw School, the Cambridge School for Analytic Philosophy (*q.v.*), further, in U. S. A., some of the representatives of contemporary Pragmatism (*q.v.*), especially C. W. Morris, of Neo-Realism (*q.v.*), and of Operationalism (*q.v.*).

Among the individual adherents not belonging to the groups mentioned: E. Kaila (Finland), J. Jørgensen (Denmark), A. Ness (Norway); A. J. Ayer, J. H. Woodger (England); M. Boll (France); K. Popper (now New Zealand); E. Brunswik, H. Gomperz, Felix Kaufmann, R. V. Mises, L. Rougier, E. Zilsel (now in U. S. A.); E. Nagel, W. V. Quine, and many others (in U. S. A.).

B. The general attitude and the views of Scientific Empiricism are in essential agreement with those of Logical Empiricism (see above, 1). Here, the *unity of science* is especially emphasized, in various respects (1) There is a logical unity of the language of science; the concepts of different branches of science are not of fundamentally different kinds but belong to one coherent system. The unity of science in this sense is closely connected with the thesis of *Physicalism* (*q.v.*). (2) There is a practical task in the present stage of development, to come to a better mutual adaptation of terminologies in different branches of science. (3) There is today no unity of the laws of science. It is an aim of the future development of science to come, if possible, to a simple set of connected, fundamental laws from which the special laws in the different branches of science, including the social sciences, can be deduced.

C. Here also, the *analysis of language* is regarded as one of the chief methods of the science of science. While logical positivism stressed chiefly the logical side of this analysis, it is here carried out from various directions, including an analysis of the biological and sociological sides of the activities of language and knowledge, as they have been emphasized earlier by Pragmatism (*q.v.*), especially C. S. Peirce and G. H. Mead. Thus the development leads now to a comprehensive general theory of signs or *semiotic* (*q.v.*) as a basis for philosophy.

D. The following publications and meetings may be regarded as organs of this movement.

1. The periodical "*Erkenntnis*", since 1930, now continued as "*Journal of Unified Science*".

2. The "*Encyclopedia of Unified Science*", its first part ("Foundations of the Unity of Science", 2 vols.) consisting of twenty monographs (eight appeared by 1940). Here, the foundations of various fields of science are discussed, especially from the point of view of the unity of science and scientific procedure, and the relations between the fields.

Thus, the work intends to serve as an introduction to the science of science (*q.v.*). 3. A series of *International Congresses* for the Unity of Science was started by a preliminary conference in Prague 1934 (see *report, Erkenntnis* 5, 1935). The congresses took place at Paris in 1935 ("*Actes*", Paris 1936; *Erkenntnis* 5, 1936); at Copenhagen in 1936

(Erkenntnis 6, 1937); at Paris in 1937; at Cambridge, England, in 1938 (Erkenntnis 7, 1938); at Cambridge, Mass., in 1939 (J. Unif. Sc. 9, 1941); at Chicago in 1941.

Concerning the development and the aims of this movement, see O. Neurath and C. W. Morris (for both, see above, 1 D), further H. Reichenbach, *Ziele und Wege der heutigen Naturphilosophie*, 1931; S. S. Stevens, "Psychology and the Science of Science", *Psych. Bull.* 36, 1939 (with bibliography). Bibliographies in "Erkenntnis": 1, 1931, p. 315, p. 335 (Polish authors); 2, 1931, p. 151, p. 189; 5, 1935, p. 185, p. 195 (American authors), p. 199 (Polish authors), p. 409, larger bibliography: in *Encycl. Unif. Science*, vol. II, No. 10 (to appear in 1942). — R.C.

Semiosis: The process in which something functions as a sign. It involves that which acts as a sign (the sign vehicle), that which the sign refers to (the designatum), and that effect upon some interpreter in virtue of which the thing in question is a sign to that interpreter. See also *Semiotic*.

Semiotic; Theory of Signs: A general theory of signs and their applications, especially in language; developed and systematized within Scientific Empiricism (*q.v.* 11 C). Three branches: pragmatics, semantics, syntactics.

1. *Pragmatics*. Theory of the relations between signs and those who produce or receive and understand them. This theory comprehends psychology, sociology, and history of the use of signs, especially of languages. 2. *Semantics*. Theory of the relations between signs and what they refer to (their "designata" or "denotata"). This theory contains also the theory of truth (*q.v.*, semantical definition) and the theory of logical deduction. 3. *Syntactics*. Theory of the formal relations (see *Formal* 2) among signs. *Logical Syntax* is syntactics applied to theoretical language (language of science); it contains the theory of formal calculi (*q.v.*), including formalized logic. Compare C. W. Morris, *Foundations of the Theory of Signs*, 1938; R. Carnap, *Foundations of Logic and Mathematics*, 1939. — R. C.

Verification, Confirmation: 1. *Verification*: the procedure of finding out whether a sentence (or proposition) is true or false. 2. A sentence is *verifiable* (in principle) if a (positive or negative) verification of it is possible under suitable conditions, leaving aside technical difficulties. 3. Many philosophical doctrines (e.g. Scientific Empiricism, *q.v.*) hold that a verification is replaced here by the concept of *confirmation*. A certain hypothesis is said to be confirmed to a certain degree by a certain amount of evidence. The concept of *degree of confirmation* is closely connected or perhaps identical (Reichenbach) with the statistical concept of probability (*q.v.*). 4. A sentence is *confirmable* if suitable (possible, not necessarily actual) experiences could contribute positively or negatively to its confirmation. 5. Many empiricists (see e.g. *Scientific Empiricism* 1C) regard either verifiability (e.g. Wittgenstein, the Vienna Circle in its earlier phase) or confirmability as a *criterion of meaningfulness* (in the sense of factual meaning, see *Meaning, Kinds of*, 2). This view leads to a rejection of certain metaphysical doctrines (see *Anti-metaphysics*, 2). — R.C.