

LOGICAL POSITIVISM (also known as logical empiricism or logical neopositivism) was a philosophical movement risen in Austria and Germany in 1920s, primarily concerned with the logical analysis of scientific knowledge, which affirmed that statements about metaphysics, religion, and ethics are void of cognitive meaning and thus nothing but expression of feelings or desires; only statements about mathematics, logic and natural sciences have a definite meaning. Its members included Rudolf Carnap (1891-1970), considered the leading figure of logical positivism, Herbert Feigl (1902-88), Philipp Frank (1884-1966), Kurt Grelling (1886-1942), Hans Hahn (1879-1934), Carl Gustav Hempel (1905-97), Victor Kraft (1880-1975), Otto Neurath (1882-1945), Hans Reichenbach (1891-1953), Moritz Schlick (1882-1936), Friedrich Waismann (1896-1959).

History. Einstein's theory of relativity exerted a great influence over the origin of logical positivism. Logical positivists were very interested in clarifying the philosophical significance of the theory of relativity. Schlick wrote in 1915 and 1917 two essays on relativity, Reichenbach attended Einstein's lectures on the theory of relativity at Berlin University in 1917 and wrote in 1920s four books on relativity, and Carnap's first work was an essay about the theory of space published in 1922. Also quantum mechanics was a major subject of philosophical investigations. Works about quantum mechanics were published by Schlick and Reichenbach. Another influence over logical positivism was exerted by the development of formal logic. Carnap attended three courses on logic under the direction of Gottlob Frege, the father of modern logic. Logical positivism had extensive contacts with the group of Polish logicians (mainly Jan Lukasiewicz, Kazimierz Ajdukiewicz, and Alfred Tarski) which developed several branches of contemporary logic, like the algebra of logic, many-valued propositional calculus, and the semantics for logic.

In 1930s logical positivism was a prominent philosophical movement, known in USA and Europe, very active in advertising its new philosophical ideas. Several meetings on epistemology and philosophy of science were organized: Prague (1929), Königsberg (1930), where Kurt Gödel presented the theorems asserting the completeness of first-order predicate calculus and the incompleteness of formal arithmetic, and Prague (1934). The First Congress of Scientific Philosophy was held in Paris (1935), followed by Copenhagen (1936), Paris (1937), Cambridge, U.K. (1938), and Cambridge, Mass. (1939). The political attitudes of logical positivists were progressive, democratic and sometimes socialist, and aroused the hostility from Nazism. After Hitler seizure of power in 1933, many logical positivists were persecuted and forced to emigrate from Austria and Germany; two of them (Schlick and Grelling) were murdered. Neurath and Waismann sought refuge in England. USA became the new home for Carnap

(he taught at the University of Chicago and at the University of California at Los Angeles), Feigl (University of Iowa and University of Minnesota), Frank (Harvard University), Hempel (Yale University, Princeton University, and University of Pittsburgh), and Reichenbach (University of California at Los Angeles).

Meaning. According to logical positivism, all meaningful statements can be divided in two classes, one containing the statements that are true or false in virtue of their logical forms or in virtue of their meaning (these statements are called analytic a priori), the other containing the statements whose truth or falsity can be ascertained only by means of the experience (called synthetic a posteriori). Logic and mathematics belong to the class of analytic a priori statements, since they are true in virtue of the meaning ascribed to the logical constants (the words 'and', 'or', 'not', 'if') and to the mathematical terms. The class of synthetic a posteriori statements includes all genuine scientific statements, like those of physics, biology, psychology. A statement is meaningful if and only if it can be proved true or false, at least in principle, by means of the experience or in virtue of its meaning. Moreover, the meaning of a statement is its method of verification; that is, we know the meaning of a statement only if we know the conditions under which the statement is true or false (this assertion is called the verifiability principle). Thus statements about metaphysics, religion and ethics are meaningless and must be rejected as nonsensical. Also traditional philosophy is often regarded as meaningless. Many alleged philosophical problems, like the controversy between realists and instrumentalists, are indeed pseudoproblems, the outcome of a misuse of language. They do not concern matters of fact, but the choice between different linguistic frameworks. Thus the logical analysis of language was regarded by logical positivism as a major instrument in resolving philosophical problems. Characteristic of this aspect was the intense analysis of scientific language performed by Carnap and Hempel.

Scientific language. A scientific theory, according to logical positivism, is an axiomatic system which acquires an empirical interpretation from suitable statements, called coordinative definitions (or principles of coordination or axioms of connection), which establish a correlation between real objects or processes and the abstract concepts of the theory. The language of a scientific theory includes three kinds of terms: logical, observational and theoretical. Logical terms denote the logical constants and the mathematical objects, observational terms denote objects or properties that can be directly observed or measured, and theoretical terms denote objects or properties we cannot observe or measure but we can only infer from direct observations. Examples of theoretical terms are 'electron', 'atom', 'magnetic field'. The early logical positivism believed that all theoretical terms were definable with the help of the observational terms. Further researches, performed by Carnap and Hempel, showed that theoretical

terms cannot be defined by observational ones, and thus theoretical terms are indispensable in a scientific theory.

Pragmatic aspects of scientific research were not considered by logical positivism, which was not interested in the real process of discovering, but was concerned with the rational reconstruction of scientific knowledge, that is the study of the logical (formal) relationships between statements, hypothesis, and empirical evidence.

Ethics. The logical positivist most interested in ethics was Schlick. He endeavored to give an account of ethics in agreement with the philosophical principles of logical positivism. Schlick maintained that ethics is a descriptive scientific theory. Statements about ethics are not normative statements prescribing how people ought to behave, because in this case they were meaningless, in virtue of the verifiability principle. Statements about ethics are indeed descriptive statements relating to the origin and the evolution of the ethical principles in human society. Schlick asserted that human beings naturally prefer conditions that do not produce pain and do produce pleasure; thus, in a first time, good is simply whatever that gives pleasure and no pain, and the very first ethical principle is an egoistic one. However, human behavior is subject to the natural evolution which sometimes selects an altruistic and cooperative way of action as more adapted than a purely egoistic one. This is particularly true in a complex human society, where we can find a struggle between an egoistic behavior, suggested by the human nature, and a social behavior, generated by the natural evolution.

Bibliography.

- Barone, Francesco. *Il neopositivismo logico*. Bari: Laterza, 1977.
- Beckwith, Burnham Putnam. *Religion, Philosophy, and Science; an Introduction to Logical Positivism*. New York: Philosophical Library, 1957.
- Carnap, Rudolf. *An Introduction to the Philosophy of Science*. New York: Basic Books, 1974.
- Erkenntnis orientated: a Centennial Volume for Rudolf Carnap and Hans Reichenbach*. Dordrecht: Kluwer Academic Publishers, 1991.
- Friedman, Michael. *Reconsidering Logical Positivism*. Cambridge, U.K.: Cambridge University Press, 1999.
- Logic, Language, and the Structure of Scientific Theories: Proceedings of the Carnap-Reichenbach Centennial, University of Konstanz, 21-24 May 1991*. Pittsburgh: University of Pittsburgh Press, 1991.
- Logical Empiricism - Historical and Contemporary Perspectives*. Pittsburgh: University of Pittsburgh Press, 2003.
- Nagel, Ernest. *The Structure of Science*. New York: Harcourt, Brace & World, 1961.
- Reichenbach, Hans. *Philosophical Foundations of Quantum Mechanics*. Berkeley and Los Angeles: University of California Press, 1944.
- *The Philosophy of Space and Time*. New York: Dover Publications, 1958.

Mauro Murzi
mauro@murzim.net