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ABSTRACT

B3 Historical and sociological aspects in the philosophy of science

From Pragmatism to Cybernetics, via Qinghua University. Remarks on Norbert Wiener's epistemological thought

by Leone Montagnini

Biblioteche di Roma, Rome - Istituto di Cibernetica "E. Caianiello" of CNR, Naples, Italy

Seventy-one years ago (Fall 1935 - Summer 1936), Qinghua University welcomed a very special visiting professor, Norbert Wiener, one of the most outstanding mathematicians of the Twentieth Century, as well as a brilliant philosopher . At Qinghua he actually taught in the Departments of Electrical Engineering and Mathematics. It was just there that he carried out a crucial technical test that persuaded him to abandon the analogical strategy in automatic computation and to adopt the digital one, as shown in a 1940's a memorandum on digital computers. But it was also at Qinghua that he wrote *The Role of the Observer* (1936), most likely his most important philosophical work before his book *Cybernetics* (1948).

In my paper I'd like indicate the place of that article in Wiener's philosophical itinerary that I outlined in my book *Le Armonie del Disordine. Norbert Wiener Matematico-Filosofo del Novecento,* Venezia*,* Istituto Veneto di Science, Lettere ed Arti, 2005.

Wiener (1894-1964) got his B.S. in mathematics (he was just fourteen), but he got his Ph.D. in philosophy. James, Santayana, Royce and Bridgman were the thinkers who influenced him the most in that period. From 1913 to 1915, he was at Cambridge (UK) for a postdoctoral period in modern logic and philosophy of mathematics, Bertrand Russell becoming his real mentor. From 1914 to 1919 he wrote several philosophical articles, the major being *Relativism* (1914) and *Is mathematical certainty absolute?* (1915). In this work he tried to conciliate the rigor of mathematics and logic with a firm pragmatist conviction about the impossibility of an absolute foundation of every type of knowledge, including mathematics. On the contrary he did not accept proposals to create any alternative sciences, as Bergson and others had considered necessary doing.

When in 1919 Wiener became an MIT mathematician, until his dead, he broke off any relation with professional philosophers, but his philosophical ideas formed the epistemological background of a really original scientist, believing in the "essential irregularity of the universe", as shown as far back his earliest researches on Brownian motion.

Between the two wars his philosophical thought formed a sort of "carsic river" springing out, before *Cybernetics*, only in a few articles, whose *The Role of the Observer* is certainly the most important. Here Wiener faced with the gnoseological implications of the Heisenberg Indeterminacy Principle and the Gödel Proof, two findings, as he noticed, which confirmed his previous gnoseological ideas. On their the basis he made some critical remarks about the strict rigour of Neopositivism, demanding more loose criteria in consideration of the needs of the discovery activity. Indeed he always remained a fervent advocate of operationalism, never embracing the ideas of Neopositivism.

It is just this operationalism to emerge in a really fascinating way in *The Role of the Observer* when discussing a J.B.S. Haldane's theory about the quantum mechanical nature of universals and of the human brain. It was in fact the very beginning a strategy of thinking still alive today, as shown by Roger Penrose's recent books. Wiener did not agree completely with Haldane and preferred to leave the thesis undecided. On the other hand, he proposed to reconsider the role of time in scientific conceptualization. According to him, the concrete logic of today's science deals always with a notion characterized by various degrees of vagueness and mutability. Therefore any kind of classical logic systems, in which always perfectly clear-cut and eternal universals can be found, are only regulative ideals. The degree of precision of a concrete universal would depend, instead, on the time that is "consumed" - as he wrote - in scientific activity.

The idea of a concrete and temporalized logic became also clearer and consistent in his following works, in particular when Wiener began to understand the radical difference between information and energy. In *Cybernetics* he will insist on the concrete and temporalized nature of the logic of computers and brains.