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The Finnish Tradition of Philosophy of Science

Ilkka Niiniluoto

Logic has a long academic tradition in Finland as a subfield of Theoretical Philosophy. Logicians have always had an interest in the scientific method, but the study of the philosophy of science in the modern sense was started in Finland in the 1920s by Eino Kaila. In the 1950s his successful students made Helsinki an important centre of analytic philosophy, philosophical logic, philosophy of language, and philosophy of science. This work has now been vigorously continued by several generations.

Historical Background

When the first university in Finland was established in 1640 as the Royal Academy of Turku, its Faculty of Arts had two chairs in Philosophy: Theoretical (teaching logic and metaphysics) and Practical (teaching ethics and politics). Thereby the learned community, in spite of its lack of originality, was able to follow important intellectual trends like scholastic and Ramistic logic, Cartesianism, Bacon´s experimental methods, Locke's empiricism, Wolff's rationalism, and Kant's transcendental idealism.

In 1809 Finland was separated from Sweden to become a Grand Duchy of the Russian empire, and in 1828 the Academy was moved to the new capital Helsinki. The Imperial Alexander University in Helsinki adopted the Humboldtian model of university education. This period was dominated by Hegel's doctrines, with Johan Vilhelm Snellman as the main representative. His 1842 theory of the state, based upon Hegelian principles, provided a theoretical foundation to the national awakening of Finland. In 1852 all chairs in philosophy in the Russian empire were closed as politically dangerous, and in 1856 Snellman was invited to the renamed chair of "ethics and the system of the sciences".

As the only professor in philosophy in Finland, Snellman was succeeded in 1869 by his student Thiodolf Rein. He founded in 1873 the Philosophical Society of Finland, and wrote the first textbooks on logic and psychology in Finnish in the 1880s. His logic includes classical ideas about the scientific method. Rein's work as professor of Theoretical Philosophy was continued in 1905 by his nephew Arvi Grotenfelt, a specialist in German neo-Kantian philosophy of history, influenced by the method of *Verstehen*. Edward Westermarck, who was at the same time professor of Practical Philosophy in Helsinki and professor of Sociology at the London School of Economics, studied the origins and evolution of moral ideas along the lines of British empiricism and naturalism.

In 1917 Finland gained its independence, and the Philosophical Society of Finland (chaired by Grotenfelt) started to publish its yearbook with the title *Ajatus* ("Thought") in 1926 and a monograph series *Acta Philosophica Fennica* in 1935.

Eino Kaila's Logical Empiricism

Eino Kaila, who wrote his doctoral dissertation in experimental psychology in 1916, had broad interests in philosophy. His early essays are critical reviews of Haeckel, Bergson,

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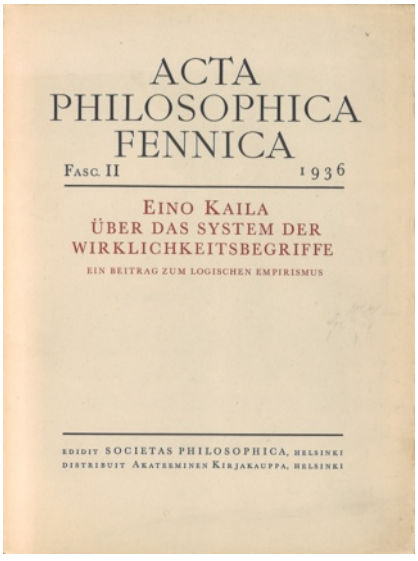
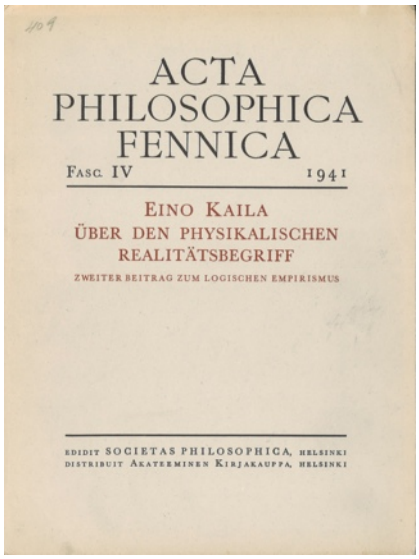
and James. In 1920 he argued, against vitalism, that mental life is a biological phenomenon. As an anti-reductionist monist, Kaila was attracted by Mach's ideas, but concluded that the phenomenalist position has to be replaced by critical realism which accepts the reality of both ordinary physical objects and atoms. A radical defence of Mach came from Rolf Lagerborg, a student and friend of Westermarck's.

In the mid-1920s Kaila sough contacts by correspondence with Reichenbach, Schlick, and Carnap. As the first professor of philosophy at the new Finnish University of Turku, he started a series of monographs in German on causality, probability logic, deduction, and philosophy of nature. Already in 1926 Kaila characterized his position as "logical empiricism", as a contrast to psychological empiricism. In 1929-34 he made three longer visits to the Vienna Circle. This association with the new movement with exact methods was a major change of Finnish philosophy. Kaila was an active participant in the international conferences of the unity of science. As professor of Theoretical Philosophy in Helsinki in 1930-48, Kaila introduced to his academic audience symbolic logic, modern epistemology and philosophy of science, and Gestalt psychology. However, he never accepted the narrowly positivist views of some members of the Vienna Circle, but wished to solve the riddle of reality. In his German monographs in 1936 and 1942, and in his widely read Finnish textbook *Inhimillinen tieto* (Human Knowledge, 1939), he tried to analyze the concept of reality by means of the concept of invariance.

Eino Kaila





Kaila, who succeeded Grotenfelt as the president of the Philosophical Society of Finland in 1936-52, was elected as one of the twelve members of the Academy of Finland in 1948. In the same year psychology was separated from Theoretical Philosophy at the University of Helsinki. Kaila continued to his death in 1958 the "synthetic" task of philosophy in formulating a realist and comprehensive world outlook on the basis of best scientific theories, especially holistic "field theories" like quantum physics and Gestalt psychology. But his work was isolated from the new Anglo-Saxon school of philosophy of science: Kaila did not publish in English, and the first translations of his studies appeared in 1974 in a volume *Experience and Reality* in the Vienna Circle Collection. But it was through Kaila's successful students that the analytic tradition became the dominant school in Finland.

Georg Henrik von Wright wrote his doctoral dissertation in 1941 on the logical problem of induction, and continued with important contributions to probability and eliminative induction. The young von Wright's period as Wittgenstein's successor at the University of Cambridge in 1948-51 was the real international breakthrough of Finnish philosophers. After returning to Finland von Wright was elected in 1961 as a member of the Academy of Finland. He wrote studies in philosophical logic, modal logic, and action theory, and became the founder of modern deontic logic. In 1971 he published his *Explanation and Understanding*, which departs from the logical empiricist thesis of the unity of science by its claim that the explanation of action cannot be given by the deductive-nomological model but human actions have to be intention-

ally understood by practical reasoning. He also defended a manipulation notion of causality. This work on analytic hermeneutics forged connections between analytic philosophy and Continental trends.

As an Academician, von Wright did not have teaching duties, but he chaired in Helsinki an important research seminar for foreign visitors and younger scholars.

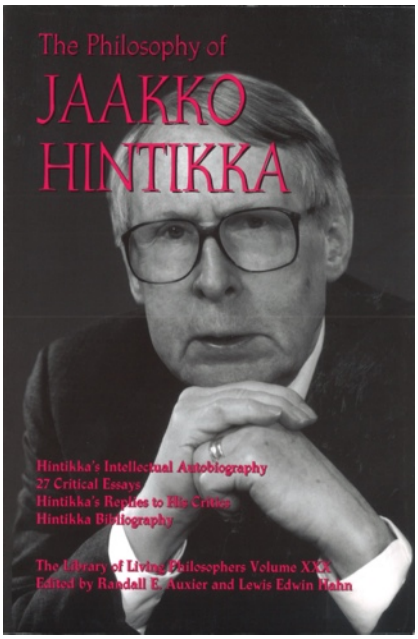
Georg H. von Wright

Oiva Ketonen studied proof theory in 1938-39 in Göttingen with Gerhard Gentzen. His doctoral dissertation in 1944 contained an invertible system of sequence calculus, which was a remarkable improvement of Gentzen's results. Ketonen became Kaila's successor in Theoretical Philosophy in 1951-77. During his visit in 1949-50 to the United States he had met Hempel at Yale and Nagel at Columbia University (New York). With these influences he gave annually a course on philosophy of science which included the standard view of analytic philosophy of science. Ketonen did not have original results in philosophy of science, but his role as a teacher of many generations of students was highly significant.

Erik Stenius, Swedish-language professor of philosophy in Helsinki, made his main contributions in logic and the philosophy of language, but his careful "critical essays" included topics related to the philosophy of mathematics and physics.

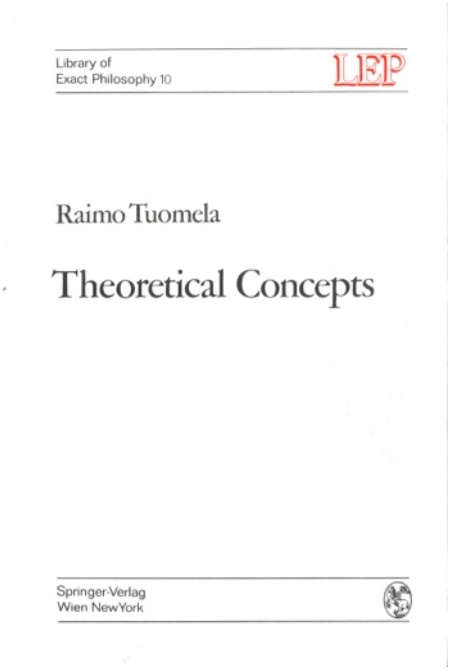
Jaakko Hintikka and his Students

G. H. von Wright's student Jaakko Hintikka wrote his dissertation in 1953 on distributive normal forms in first-order logic. In 1957 he discovered (independently of the Swedish logician Stig Kanger) the possible worlds semantics, and in 1962 he published his pioneering study of epistemic logic, *Knowledge and Belief*. After a fellowship at Harvard University in 1956-59, Hintikka was appointed professor of Practical Philosophy in Helsinki 1959, and in the 1960s he shared his time between Helsinki and Stanford University. In 1965 he published an improvement of Carnap's system of inductive logic by showing how universal generalizations may receive non-zero probabilities in infinite universes. Later Hintikka worked in Helsinki as a Research Professor at the Academy of Finland, but after 1980 he has been mostly active in the United States (Tallahassee, Boston). Hintikka has been one of the most successful editors of philosophical journals (*Synthese*) and monograph series (*Synthese Library*). Besides his studies in the philosophy of mathematics, philosophy of language, and game-theoretical semantics, he has developed an interrogative model of scientific inquiry, based on information- seeking questions.



Hintikka has been extremely active in stimulating and supervising research work in logic and philosophy, and many of his students have become university professors in Finland. Risto Hilpinen (professor in Turku, later in Miami), Juhani Pietarinen (professor in Turku), and Ilkka Niiniluoto (Ketonen's successor in Helsinki) wrote their doctoral dissertations on inductive logic, thus continuing "the Finnish school of induction" started already by Kaila and von Wright. Raimo Tuomela (professor of the methodology of the social sciences in Helsinki) applied distributive normal forms to study the methodological gains due to theoretical concepts. Later he concentrated in philosophical issues of social action. Veikko Rantala (professor in Tampere) wrote important studies on theories and theory-change with David Pearce. Juha Manninen (professor of General History of Ideas in Oulu) has studied

Kaila's relations to the Vienna Circle. Matti Sintonen (acting professor of Theoretical Philosophy in Helsinki while Niiniluoto has been on leave in 2003-13) has worked on scientific explanation and the interrogative model of inquiry. Jan von Plato (Swedish-language professor of Philosophy in Helsinki) worked on the history and foundations of probability theory before turning to structural proof theory. Martin Kusch, a German philosopher educated in Finland, worked with Hintikka on the philosophy of language, and wrote a Finnish textbook on hermeneutics. Kusch's later career has been in Edinburgh, Cambridge, and Vienna.



Tuomela's chair in methodology was included in 1970 in Practical Philosophy which belongs to the Faculty of the Social Sciences, while Theoretical Philosophy belongs to the Faculty of Arts. This means that philosophy of science is taught in two faculties in Helsinki. Tuomela's defence of "causal internal realism" and Niiniluoto's development of "critical scientific realism" made Helsinki a well-known centre of scientific realism.

Niiniluoto's work on truthlikeness has been continued by Ilkka Kieseppä. Sami Pihlström (director of the Helsinki Collegium for Advanced Studies) has written on the problem of realism in relation to classical and new pragmatism. Studies of Peirce's logic have been conducted by Ahti-Veikko Pietarinen (professor of Semiotics in Helsinki), and the Nordic Pragmatism Network is coordinated by scholars at the University of Helsinki.

Recent Trends

Besides the University of Helsinki, philosophy of science is part of the curriculum in the universities in Turku, Tampere, and Jyväskylä. The Philosophical Society of Finland, chaired since 1975 by Niiniluoto after Ketonen and von Wright, has actively promoted philosophy of science in many conferences and publications.

Kaila's student K. V. Laurikainen, professor of Nuclear Physics at the University of Helsinki, founded in 1988 the Finnish Society for Natural Philosophy. Laurikainen's studies on Wolfgang Pauli had partly a religious motivation, but the Society has continued an open dialogue between different special sciences.

Philosophy of physics has been studied by Pekka Lahti in Turku and Paavo Pylkkänen in Helsinki. Pylkkänen's inspiration comes from his personal contacts with the famous quantum theorist David Bohm. Philosophy of biology has been investigated by Sintonen.

The Finnish Society for Science Studies was founded in 1985 to promote the co-operation between philosophers, sociologists, historians, and psychologists of science. Today the focus of the Society includes also technology and innovation studies. It has published the journal *Science Studies* (now *Science and Technology Studies*) since 1987. Besides the work of Niiniluoto and Timo Airaksinen (professor of Practical Philosophy in Helsinki) on the philosophy of technology, innovation processes have been studied by Reijo Miettinen in Helsinki and Antti Hautamäki in Jyväskylä. Multidisciplinary science studies have been supported by the Research Center for Knowledge, Science, Technology and Innovation Studies in Tampere (TaSTI) and the Helsinki Institute of Science and Technology Studies (HIST). Petri Ylikoski, a philosopher studying explanation and modeling in the human and social sciences, has been appointed professor of Science Studies in Helsinki in 2012.

Tuomela's student Uskali Mäki, one of the leading experts in the philosophy of economics and a defender of realism about economical theories and models, worked in Rotterdam as professor of Philosophy and Economics. Returning to Finland, he became in 2012 Tuomela's successor in Practical Philosophy and the di-

rector of a centre of excellence in the philosophy of the social sciences, with a focus on issues of interdisciplinarity. Mäki's unit TINT (Trends and Tensions in Intellectual Integration) is an active research community which hosts the EPSA 2013 congress in Helsinki. Besides Tuomela and Ylikoski and many foreign visitors, its members include Tarja Knuuttila, who has studied the nature and role of models in various disciplines, Jaakko Kuorikoski and Aki Lehtinen, who are interested in causality and economic models.

Von Wright's studies in the logic of norms and practical inference influenced Aulis Aarnio's work on the philosophy of law. Besides Tuomela, Mäki and Ylikoski, philosophy of the social sciences is studied by Eerik Lagerspetz (professor of Practical Philosophy in Turku). Kristina Rolin has investigated issues about social and feminist epistemology and the role of values in scientific research. Philosophical problems of business economics have been studied by Marja-Liisa Kakkuri-Knuuttila (professor of Philosophy of Management at the Helsinki School of Economics, now part of the Aalto University).

Ethical issues about science and technology were raised by von Wright and Ketonen in their essays in Finnish and Swedish. Ethical problems of medicine and bioethics are studied in Turku by Juha Räikkä and Veikko Launis and in Helsinki by Airaksinen's students Heta Gylling (former Häyry) and Matti Häyry (former professor of Bioethics and Philosophy of Law at the University of Manchester, now Kakkuri – Knuuttila's successor in Aalto University).

ABOUT THE AUTHOR Ilkka Niiniluoto (b. 1946) has studied and worked in the University of Helsinki. His Master degree in 1968 was in Applied Mathematics (with a thesis on Bayesian statistics), and Ph.D. in 1974 in Theoretical Philosophy (with a dissertation on induction and scientific theories). After working in 1973-77 as associate professor of Mathematics (logic and foundations), he has been professor of Theoretical Philosophy. Niiniluoto has chaired the Philosophical Society of Finland since 1975 and edited *Acta Philosophica Fennica* since 1980. In 2003-08 he served full time as the Rector and in 2008-13 as the Chancellor of the University of Helsinki. His main works are *Is Science Progressive?* (1984), *Truthlikeness* (1987), and *Critical Scientific Realism* (1999).
Personal Website: http://www.helsinki.fi/theoreticalphilosophy/staff/Niiniluoto.htm