

■ Obituary

Anatol Rapoport (May 22, 1911–January 20, 2007): Pioneer of Systems Theory and Peace Research, Mathematician, Philosopher and Pianist

Anatol Rapoport was one of the great universal thinkers of the 20th century.



As the author of approximately 500 publications of which about 25 are books available in 10 languages, he spearheaded many scientific innovations, among them the use of mathematical research methods first in biology and later in the social sciences. Beyond that, Rapoport was one of the rare thinkers who contributed significantly to ‘marrying’ philosophy and science. The originality and rigour of his thinking make his theoretical oeuvre not only fecund but also unique in its ethical and aesthetic stature.

Rapoport was a pioneer and leading figure of the systems sciences, studies in conflict and cooperation and peace research. He operated from a multidimensional background of experience and study, embodied a deeply humanistic commitment and practiced a profoundly systemic way of thinking.

Born in Lozovaya, in today’s Ukraine, on 22 May, 1911, Anatol Rapoport came to the U.S.A. in 1922, where he attended public schools. Later he studied music in both Chicago and Vienna (1929–1934), concluding his studies of composition, piano and conducting at the State Academy of Music and Performing Arts (Staatssakademie für Musik und darstellende Kunst).

Thereafter he had an international career as a concert pianist, both performing and lecturing on the semantics of music in Europe and the Americas.

In 1941, Rapoport received a Ph.D. degree in mathematics at the University of Chicago. During World War II he served in the U.S. Air Force in Alaska and India. Shortly after the War he became a member of the Committee on Mathematical Biology at the University of Chicago (1947–1954) and of the Center for Advanced Studies in the Behavioral Sciences (Stanford, California) during the initial years of its existence. In this phase, he concentrated on mathematical biophysics, founded by his teacher Nicolas Rashevsky. In his first publication, Rapoport developed a mathematical method for modelling parasitism and symbiosis. This pioneer study dealt with phenomena analogous to what, in the context of human and social systems, would occupy him for most of his professional life: Conflict and cooperation.

Early on his interest was very much a meta-theoretical, epistemological one. This led to his books *Science and the Goals of Man* (1950) and *Operational Philosophy* (1953), which addressed the question of whether human or social values can have a common basis, independently of modes of thoughts or feelings originating from different cultures. A lifelong inquiry into this question (see also: *The Origins of Violence*, 1989) led Rapoport to postulate that a universally shared view of what is ‘good’ and ‘true’ is possible, thereby refuting the arguments of cultural relativism.

In his search for invariants Rapoport extensively cultivated the dialogue across disciplines. In 1954, together with the biologist Ludwig von Bertalanffy, the physiologist Ralph Waldo Ger-

ard, and the economist Kenneth Boulding, he founded the *Society for General Systems Research*, later renamed *International Society for the Systems Sciences*. Essentially this society has aimed at overcoming the growing isolation of specialized disciplines. The discourse that grew out of this transdisciplinary effort eventually led to remarkable achievements by Rapoport's associates and colleagues, typically based on the connection of illuminating metaphors with rigorous scientific analysis (e.g., James Grier Miller, *Living Systems*; Karl Deutsch, *The Nerves of Government*).

From 1955 to 1970, Rapoport was Professor of Mathematical Biology and Senior Research Mathematician at the University of Michigan, Ann Arbor. That phase bred seminal contributions to game theory, condensed into six books which included *Fights, Games, and Debates* (1960), probably his most widely read opus.

From his first publications Rapoport derived two principles, (a) that cooperation among individuals can be stable or unstable, and (b) that cooperation can breed a 'dividend'. Based on these principles, he carried out extensive theoretical and empirical studies (in part together with Albert M. Chammah), with special emphasis on non-zero-sum-games, which are typical for the economic domain. One of the theoretical 'harvests' of this work is a general strategy of interaction for iterated Prisoner's Dilemma games. This strategy, denominated *Tit-for-Tat*, is based on the combined principles of cooperativeness ('goodwill'), retaliation and forgiveness. Although classified as 'semi-weak', it won two tournaments against multiple other strategies, outperforming all the other aggressive ('strong') as well as 'weak' counterparts. Although the *Tit-for-Tat* strategy cannot possibly win the iterated Prisoners' Dilemma in an encounter with another single strategy, none the less it has—following the principle that 'weakness is strength'—the best chance to come out as overall victor in a tournament of all against all (for details, see Robert Axelrod. *The Evolution of Cooperation*, 1984; Anatol Rapoport, *Paradoxe der Entscheidungstheorie*, 1995¹). Rapoport points out

that this result corroborates Jesus's prophecy in the Sermon on the Mount that 'the meek... shall inherit the earth' (Matthew 5.5; cf.: Anatol Rapoport, *Gewissheiten und Zweifel*, 1994: 255).

From 1970 onwards, the University of Toronto was Rapoport's academic base, where he served as both Professor of Psychology and Mathematics and as Professor for Peace and Conflict Studies.

On the one hand, much of his earlier work was deepened during his Canadian tenure, for example, work in

- the application of mathematical methods to the humanities (*Mathematische Methoden in den Sozialwissenschaften*, 1983; *Mathematical Methods in the Social and Behavioral Sciences*, 1984;)
- general semantics, treated from an evolutionist perspective (*Semantics*, 1975)
- game theory (*The 2 × 2 Game*, with M. Geyer and D. Gordon, 1976)
- systems theory (*General System Theory*, 1984)
- decision theory (*Decision Theory and Decision Behavior*, 1989 and 1998)

On the other hand, his game theoretical studies in a systemic framework almost naturally led Rapoport's research endeavour into issues related to ecology (*Conflict in Man-made Environment*, 1974), and, most prominently, into peace research (*The Origins of Violence*, 1989; *Peace, an Idea Whose Time has Come*, 1993). He went on publishing and teaching widely on theories and techniques of conflict resolution, in particular on the international and ideological levels, as well as building up the initiative 'Science for Peace'. For many years he worked on what he considered to be the crucial global problem: Aggression in general and the confrontations of superpowers in particular. Rapoport also served in a wide variety of capacities as speaker and consultant to scientific institutions and conferences all over the world. He was a guest professor at universities in Austria, Denmark, Germany, Japan and Switzerland, and also served as the Director of the Institute of Advanced Studies in Vienna (1980–1984).

Anatol Rapoport was the editor of *General Systems*, an associate editor of the journals

¹Published in: Martinsen R., ed. 1995. *Das Auge der Wissenschaft. Zur Emergenz von Realität*, Baden-Baden: Nomos.

Behavioral Science, Journal of Conflict Resolution, ETC.: A Review of General Semantics, and member of the editorial boards of at least 10 journals. He was also active in numerous scientific associations and initiatives.²

Finally, Rapoport has been awarded the following high honours: the Lenz International Peace Research Prize, the Harold D. Lasswell Award for Distinguished Scientific Contributions to Political Psychology, and a wide array of honorary doctorates: of Humane Letters (University of Western Michigan), of Laws (University of Toronto), of Science (Royal Military College) and of Sociology (University of Bern).

Anatol Rapoport's titanic work is an exceedingly rich testimony to his sustained and infatigable commitment to the highest of ethical standards. Throughout that work he implicitly advocated for the underprivileged and fought all kinds of, violence, exploitation, corruption and the manipulation of persons—never in the naive modes of reductionism, but always on systemic-holistic grounds and in terms of cogent theoretical argumentation.

In his theoretical models he creatively explored new dimensions of rationality and therewith opened hitherto unknown paths towards higher quality of life, peace and the survival of humanity, for example, by

- reframing 'absolute' and 'relative' as complementary, not antagonistic concepts;
- cogent differentiation between the logics of individual and collective rationality;
- developing a theoretical framework for unifying philosophy/ethics and science;
- elaborating innovative systemic strategies for conflict and cooperation.

Rapoport's theory building was achieved by an intriguing combination of unorthodox yet rigorous (although never rigid) conceptual thinking

²American Academy of Arts and Sciences; Council Study Committee on Ethics and Responsibilities of Scientists (chairman 1966–1968), American Association for the Advancement of Science, American Mathematical Society, Mathematical Association of America, the Biometric Society, Society for General Systems Research (president 1966), International Society for General Semantics (president 1953–1955), Canadian Peace Research and Education Association (president 1972–1975), Science for Peace (president 1984–1986).

and thorough empirical testing throughout. Besides their substantiality and innovativeness, one of the extraordinary qualities conveyed by Anatol Rapoport's publications is their jargon-free style. In his later works the sensitive reader will 'hear' a scientist, a philosopher and an artist speaking with one and the same voice. This is the case, for example, in his last book (*Conversations with Three Russians*, 2005), 'a fascinating sum of insights'³ and synthesis of his thinking.

Anatol Rapoport died in Toronto, on January 20, 2007, in his 96th year.

Publications by Anatol Rapoport

Books

Science and the Goals of Man, 1950

Operational Philosophy, 1953 (also in German)

Fights, Games, and Debates, 1960 (in several languages)

Strategy and Conscience, 1964

Prisoner's Dilemma (with A.M. Chammah), 1965

Two-Person Game Theory, 1966

N-Person Game Theory, 1970

The Big Two. Soviet American Perceptions of Foreign Policy, 1971

Conflict in Man-made Environment, 1974

Semantics, 1975 (also German)

The 2 × 2 Game (with M. Geyer and d. Gordon), 1976

Mathematische Methoden in den Sozialwissenschaften, 1983

Mathematical Methods in the Social and Behavioral Sciences, 1984

General System Theory, 1986 (also in German)

The Origins of Violence, 1989 (also in German)

Decision Theory and Decision Behavior, 1989 (second revised edition 1998)

Canada and the World (with Anthony Rapoport), 1992

Peace, an Idea Whose Time Has Come, 1993 (also in German and Russian)

³Felix Philipp Ingold, Professor of Russian Language and Culture, in his endorsement to the book.

Gewissheiten und Zweifel, 1994 (also in Russian and English,—see below)

Certainties and Doubts, 2000

Skating on Thin Ice, 2002

Conversations with Three Russians—Tolstoy, Dostoevsky, Lenin. A Systemic View on Two Centuries of Societal Evolution, 2005

Books by Anatol Rapoport have been translated into Chinese, Dutch, French, German, Italian, Japanese, Portuguese, Russian and Spanish.

Edited Volumes and Translations

Clausewitz, C. von, *On War*, 1968

Game Theory as a Theory of Conflict Resolution, ed. by Anatol Rapoport, 1974

The Structure of Awareness, translation of *Kofliktuyushchie Struktury* by V.A. Lefebvre, 1977

Non-antagonistic Games, translation of *Igry s Nieprotivopolozhnymi Interesami* by Yu.B. Germeier, 1986

Journal articles: about 400

Entries in encyclopedias: about 10

Chapters contributed to books: about 40.

Markus Schwaninger
University of St. Gallen, Switzerland

Anatol Rapoport (May 22, 1911-January 20, 2007): pioneer of systems theory and peace research, mathematician, philosopher and pianist. Anatol Rapoport, from the department of Mathematical Biophysics, spoke often at the regular meetings and also at special lectures. Ed MacNeal -- General Semantics Then and Now. Heppner, "Considerations of quasi-stationarity in electrophysiological systems," The Bulletin of Mathematical Biophysics, vol. On the inverse EEG problem for a 1D current distribution. Encyclopedia browser ? One may be tempted to ask whether it is possible to also talk about isomorphisms of maps instead of equalities, so that objects and morphisms are treated more on an equal footing. This is exactly the subject of higher category theory, in which one can talk about morphisms between morphisms, and so on. Higher category theory is very helpful, for example, in algebraic geometry and algebraic topology. The nLab is the standard online wiki on this subject. Anatol Rapoport (May 22, 1911 – January 20, 2007) was a Russian-born American Jewish mathematical psychologist. He was one of the founders of the general systems theory. He also contributed to mathematical biology and to the mathematical modeling of social interaction and stochastic models of contagion. The behavior of two individuals, consisting of effort which results in output, is considered to be determined by a satisfaction function which depends on remuneration (receiving part of the output) and Anatol Rapoport - 1961 - Philosophy and Phenomenological Research 22 (2):271-272.details. No categories. Direct download (2 more).Â Experiments with Cooperative 2 X 2 Games. Anatol Rapoport - 1977 - Theory and Decision 8 (1):67.details. No categories. Direct download (3 more).Â Net Theory as a Tool in the Study of Gross Properties of Nervous Systems. Anatol Rapoport - 1965 - Perspectives in Biology and Medicine 9 (1):142-164.details. Philosophy of Cognitive Science.