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mathematics, mathematical logic, philosophy of mathematics, computer science.

László Kalmár was the youngest child of Zsigmond Kalmár and Róza Krausz Kalmár. His father was an estate bailiff on a manor situated in Transdanubia, about 30 kilometers from Lake Balaton. About the beginning of World War I, Kalmár moved with his widowed mother to Budapest, where he attended secondary school. His outstanding mathematical abilities were already evident; he had read and understood Cesàro's calculus text when he was only thirteen. He studied mathematics and physics at the University of Budapest between 1922 and 1927. Despite unhappy circumstances (his mother had died earlier), he was very successful in his studies and was considered by his fellow students as their master in mathematics. During his university years he studied under such eminent mathematicians as József Kürschák and Lipót Fejér. After obtaining a Ph.D. he accepted a faculty position at the University of Szeged, where he remained until his retirement in 1975. He was an assistant to Alfréd Haar and Frigyes Riesz from 1930 to 1947. He was promoted in 1947 to full professor. He married Erzsébet Árvay in 1933. Three of their four children survived him.

Kalmár was elected a corresponding member of the Hungarian Academy of Sciences in 1949 and as a full member in 1961. He was awarded the highest orders in Hungary for scientific activity: the Kossuth Prize in 1950 and the State Prize in 1975. He was honorary president of the János Bolyai Mathematical Society and the John von Neumann Society for Computer Science. In spite of his age, he continued his research with full energy until the last day of his life.

One of the fields in which his contribution is of greatest importance is mathematical logic. His interest in logic was aroused on a visit to Göttingen in 1929. He gave simplified proofs of several fundamental results: Bernays and Post's theorem on the completeness of the propositional calculus, Gentzen's theorem on the consistency of elementary number theory, Löwenheim's theorem on the satisfiability of any first-order sentence in a countable set, and Post and Markov's theorem on the algorithmic unsolvability of the word problem of associative systems. He analyzed carefully the possibilities for stating generally and proving straightforwardly Gödel's celebrated incompleteness theorem. He studied the interrelations and significance of the incompleteness results of Church and Gödel. Concerning Church's famous thesis in which the heuristic concept of effective calculability is identical to the precise notion of general recursivity, he advocated the view that the limits of effective calculability become ever broader, and that therefore this concept cannot be identified permanently with an unalterably fixed notion. He wrote, partly with János Surányi, a series of articles on the reduction theory of the so-called *Entscheidungsproblem* (the decision problem of mathematical logic).

Kalmár also was extensively involved in theoretical computer science. He concerned himself from the mid 1950's with the mathematics of planning and programming electronic computers. He dealt with adapting the usual mathematical formula language and the programming languages to each other and with questions of mathematical linguistics. In addition, he wrote papers on defining the field of cybernetics, the use of computers, and the applicability of cybernetical ideas in various sciences.

It is common knowledge that mathematics can be applied widely in more practical fields. Kalmár often expressed his conviction that the connection with other domains of science is important to both sides, because the influence of more empirical sciences may be the source of permanent inspiration for the development of mathematics. He wrote a large number of articles popularizing mathematics. Some of his articles, written in Hungarian, are so constructed that the paper begins with a broad survey of a branch of logic before concluding with his own results.

Kalmár's scholarly personality was vivid and well rounded. His work cannot be discussed adequately by considering only his published works. He was enthusiastically inclined toward various sorts of personal contacts in his profession: regular teaching of university students, informal discussions with colleagues, lectures to general audiences. He taught primarily calculus, beginning with integral and then continuing with differential calculus, and foundations of mathematics (set theory and mathematical logic). His ideas on teaching calculus were explained in a posthumous book compiled by his pupils.

In the Department of Mathematics at the University of Szeged, he was the founder and first occupant of the Chair for Foundations of Mathematics and Computer Science. He also founded the Cybernetical Laboratory, which bears his name, and the Research Group for Mathematical Logic and Automata Theory at the university.

He was member of several scientific committees and editorial boards of scientific journals. The journals *Acta cybernetica* and *Alkalmazott matematikai lapok* were founded by him.

The names of Hungarian mathematicians whose scientific activity was essentially promoted by Kalmár would fill a long list. Of these, the following four persons are most noteworthy. Rózsa Péter was Kalmár's contemporary. Her basic contributions to the theory of recursive functions was close to one of the research areas of Kalmár. Among his younger colleagues, he was the teacher of the set theorist Géza Fodor. The algebraists Tibor Szele and Andor Kertész were also extensively encouraged and guided by him.

From the viewpoint of the development of the sciences in Hungary, Kalmár will probably be remembered most for his ceaseless effort in promoting the development of computer science and the use of computers in his country.

BIBLIOGRAPHY

I. Original Works.' A Hilbert–féle bizonyításelmélet célkitüzései, módszerei és eredményei' (The purposes, methods, and results of the Hilbertian Proof Theory), in *Matematikai és fizikai lapok*, **48** (1941), 65–119:'Quelques formes genérales du théoréme de Gödel, 'in *Comptes rendus de l'Academic des sciences* (Paris), **229** (1949), 1047–1049; "Ein direkter Beweis für die allgemein–rekur– sive Unlösbarkeit des Entscheidungsproblems des Prädikatenkalküls der ersten Stufe mit Identität.' in *Zeitschrift für mathematische Logik and Grundlagen der Mathematik*, 2 (1956), 1–14; "An Argument Against the Plausibility of Church's The sis, in A.Heyting, ed., *Constructivity in Mathematics* (Amsterdam, 1959), 72–80; "Über einen Rechenautomaten, der eine mathematische Sprache versteht," in *Zeitschrift für angewandte Mathematik und Mechanik*, **40** (1960), T64–T65: "A kvalitatív, információelmélet problémái' (The problem of qualitative information theory), in Magyar tudományos akadémia Matematikai és fizikai, **12** (1962), 293–301; "Foundations of Mathematics–Whither Now?" in Imre Lakatos, ed., *Problems in the Philosophy of Mathematics* (Amsterdam, 1967), 187–207;'Meaning, Synonymy, and Translation, ' in *Computational Linguistics*, **6** (1967), 27–39; *Bevezetes a matematikai analízisbe* (Introduction to mathematical analysis; Budapest, 1982).

II. Secondary Literature. For a systematic treatment of the reduction theory of the *Entscheidungsproblem*, including a number of Kalmár's results in this area, see János Surányi, *Reduktionstheorie des Entscheidungsproblems im Prädikatenkalkül der ersten Stufe* (Budapest, 1959). See also R. Péter, ' Kalmár László matematikai munkássága' (the mathematical activity of László Kalmár), in *Matematikai lapok*, **6** (1955 (, 138–150; A. Ádám, ' Kalmár László matematikai munkásságáról' (On the mathematical activity of László Kalmár), *ibid*., **26** (1975), 1–10, which includes a detailed bibliography. Brief obituaries appeared in *Acta scientiarum mathematicarum*, **38** (1976), 221–222, and *Alkalmazott matematikai lapok*, 2 (1976), 151–155 (with bibliography).

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