

## RÓZSA PÉTER

World-famous logician **Rózsa Péter** (February 17, 1905 – February 16, 1977) was born Rósa Politzer in Budapest, Hungary. Eastern Europe has been called “the lands between,” that is, between German and Italian speaking countries, and the former Russian/Soviet Empire. At the beginning of the 20<sup>th</sup> century the five great international powers (excluding the United States, which was not actively involved in international affairs at the time) were Great Britain, France, Russia, Germany and Austria. All of the great empires had one thing in common – they were multi-ethnic.



Many of their people, for ethnic, religious, linguistic, and cultural reasons were becoming resentful of those who ruled them. Franz Joseph II of Austria-Hungary, Europe’s longest reigning monarch, had eleven different nations within his empire. The spark that would eventually lead to the collapse of the empires and allow ethnic feelings to rise to the surface was the assassination of Archduke Franz Ferdinand and his wife in Sarajevo on June 28, 1914. Five weeks later, an alliance of Germany, Austria-Hungary and the Ottoman Empire was at war with the rest of the world, and things would never be the same.

At the end of World War I, Hungary was compelled to sign the Treaty of Trianon ceding more than two-thirds of the country to Austria, Romania, Czechoslovakia, Yugoslavia, Poland and Italy. Like so many Hungarians in a country torn by civil strife, Rózsa Péter changed her German style name to one that sounded more Hungarian. In 1922, she enrolled at Loránd Eötvös University in Budapest with the intention of studying chemistry, but turned to mathematics after attending lectures by Leopold Fejér. She was also strongly influenced by fellow student László Kalmár, whom she always considered to be her mathematical mentor. Kalmár, who worked on mathematical logic and theoretical computer

science, promoted the development of computer science in Hungary. Péter and Kalmár maintained a close professional relationship all their lives. Kalmár introduced her to recursive functions, the area in which she would have her greatest mathematical impact. Recursion is breaking down a procedure into a sequence of repetitions of itself.

For 18 years after graduation Péter was unable to secure a suitable position. She survived by offering private tutoring lessons and finding occasional temporary high school teaching work. Kalmár brought Kurt Gödel's work on the subject of incompleteness to her attention, which led her to devise her own theory and proofs. She gave a paper on her work in the subject at the International Congress of Mathematicians in Zurich in 1932. This was followed by a series of such papers, and by the time she earned her doctorate in 1935, she was known as one of the founders of recursive function theory. Like many others, Péter was denied university teaching positions by Fascist laws passed in 1939, and she was briefly confined to the ghetto in Budapest. Despite this she continued her mathematical investigations.

Péter's name deserves to be grouped with those of Gödel, Alan Turing, Alonzo Church and Stephen Kleene as a founder of computational theory. If her name is not as well-known, it may be due to her gender, but it is more likely that she suffered the fate of other Eastern European scientists of the period, whose contributions were not given wide circulation in the West. Péter's monograph, *Recursive Functions* (1951) earned her Hungary's Kossuth Award.

After the war, Aunt Rózsa, as she affectionately was called by generations of students, found her first full-time position with the Budapest Teachers Training College. It was about this time that her

delightful book *Playing with Infinity*, written and printed in 1943, finally was given wide distribution. It consists of an exploration of how the concept of infinity enters into mathematics. Topics include number theory, logic, graphic representation of functions, combinations, prime numbers, logarithms and circular functions, analytic geometry, infinite lines, complex numbers, expansion of power series, metamathematics and the undecidable problem. In her preface, she states that the book is written for “intellectually minded people who are not mathematicians.” Péter’s informal presentation helps make the complex simple.

When the Teachers Training College closed in 1955, Péter became a professor at Loránd Eötvös University, remaining there until her retirement in 1975. Her last published book was *Recursive Functions in Computer Theory* (1976). In later editions of *Playing with Infinity* Péter memorialized her brother and many friends and fellow mathematicians who were killed during the war. She was troubled by the average person’s fear and dislike of science and mathematics. Believing the seeds of these feelings were sown from ages seven to eleven, she urged prominent scientists and mathematicians to visit elementary schools and share with the students their joy and fascination with their work. Rózsa Péter died of cancer in 1977.

Quotation of the Day: “I love mathematics not only for its technical applications, but principally because it is beautiful; because man has breathed his spirit of play into it, and because it has given him his greatest game – the encompassing of the infinite.” – Rózsa Péter