



Photograph by W. Kuperberg



Foreword

In his book entitled *The God Particle*, Nobel laureate Leon Lederman repeated the old myth about Hungarian scientists, which probably originated in Los Alamos: “The production of scientists and mathematicians in Budapest in the early 20th century was so prolific that many otherwise calm observers believe Budapest was settled by Martians in a plan to infiltrate and take over the planet Earth.” Indeed, under a fast changing and often hostile political climate, Hungary contributed an extraordinary number of great individuals to the history of science and mathematics, including Lipót Fejér, Theodor von Kármán, John von Neumann, György Pólya, Frigyes Riesz, and Eugene Wigner. They made significant discoveries in various mathematical disciplines. Yet only few of them inspired dozens of young researchers to work in their field and left a flourishing scientific school behind. One of these rare few, László Fejes Tóth, passed away 2 years ago, at the age of 90.

He was born in 1915. In his university years he was strongly influenced by Lipót Fejér. He started working in analysis but always liked geometry, and a simple and natural geometric question by Dezső Lázár changed his mathematical interest forever. The essence of the question was to find the densest packing of congruent circles in the plane. Unaware of Thue’s earlier work, László Fejes Tóth solved this problem, and, more importantly, he fell in love with discrete geometry. This love affair lasted for well over six decades.

His central interest within discrete geometry was packings and coverings by disks, balls, and other convex sets in two or three dimensions. Apart from some scattered results by Kershner and Thue, all previous work in this area concerned lattice packings and lattice coverings. Although lattices are a basic concept in the geometry of numbers and number theory, restricting investigations to lattice arrangements is an artificial constraint from the geometric point of view. Fejes Tóth’s new idea was that the solution to many extremal problems should remain the same without the lattice condition. He showed, for instance, that the densest packing of congruent copies of a centrally symmetric convex set in the plane is necessarily lattice-like. He proved, in the same spirit, that most regular polytopes can be obtained as the unique solution to a natural extremal problem. A neat example of this phenomenon is the fact that among all three-dimensional convex polytopes of unit surface area with 12 facets the regular dodecahedron has maximal volume. This point of view in geometry can be considered the “genetics” of symmetric objects. László Fejes Tóth summarized his results in the seminal books *Lagerungen in der Ebene, auf*

der Kugel und im Raum and *Regular Figures*. It is hard to overestimate the impact of these monographs. Of the first, C. A. Rogers wrote the following: “Until quite recently, the theory of packing and covering was not sufficiently well developed to justify the publication of a book devoted exclusively to it. After the publication of L. Fejes Tóth’s book in 1953, there would be no need for a second book on the subject. . . .”

László Fejes Tóth was not only a superb mathematician, he was also a master of raising beautiful and inspiring problems. He regularly came up with simply stated questions from discrete geometry that had an aesthetic appeal and could be explained to the layman. He also knew exactly who the right person was to ask a particular question of. He was very generous with these problems and was always happy when one of his questions was answered. Because of his generosity, his straightforward and modest style, and his warm personality, he became one of the most influential geometers of the last century. Yet most of all, it is the love of mathematics that radiated from him. This is how he described it in an interview: “An enthusiastic mathematician is completely captivated by mathematics. Especially as a young man, I was thinking of some mathematical problem simply all the time. I could not get rid of it even in my dreams. Not that I wanted to. For me, this activity has been the source of joy and happiness, inner satisfaction, and pleasure.”

The editors of this special issue started working at the Mathematical Institute of the Hungarian Academy of Sciences at the time it was headed by László Fejes Tóth. Their work has been strongly influenced by Fejes Tóth’s ideas, way of thinking, and beautiful open problems. They consider themselves privileged to belong to Fejes Tóth’s school of discrete geometry, and to have enjoyed his support and help for decades.

They dedicate the present issue of *Discrete & Computational Geometry* to László Fejes Tóth’s memory, as do the editors-in-chief of the journal, who are proud that László Fejes Tóth’s final paper was published in *DCG* in 1999.

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