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SPECIAL ISSUE DEDICATED TO DISCRETE AND COMPUTATIONAL GEOMETRY

PART I

Guest Editors: GÁBOR FEJES TÓTH and JÁNOS PACH

Foreword

"Down with Euclid! Death to the triangles!" — burst out Jean Dieudonné, a leading geometer of our times, at a meeting in Réaumont in 1959.

This century has brought about an extraordinary new synthesis of analysis, algebra, and geometry. Geometric models and ideas have permeated vast areas of mathematics. At the same time, the meaning of the term "geometry" has widened beyond recognition, pushing classical objects such as regular solids somewhat to the fringes and putting the powerful unifying concepts of topology on center stage.

"It is curious that almost all aspects of geometry relevant to the man of the street are ignored by our educational system" — meditated Branko Grünbaum and Geoffrey Shephard in the preface of their recently published book on tilings. "Geometry has been almost squeezed out of school and university syllabuses, and what little remains is rarely of any use to people who wish to apply geometric ideas in their work — engineers, scientists, architects, artists, and the like." The famous Soviet geometer and teacher, I. M. Yaglom complains that the geometry textbooks of A. N. Kolmogorov used in high schools of the U.S.S.R. "are arranged in such a way that they almost completely lack substantial geometric problems".

The neglect of elementary geometry in education witnessed in the last fifty years is in sharp contrast to its popularity in the arts. Paul Cézanne even went to the extreme of declaring that "Nature should be considered as a perspective collection of cylindrical, spherical, and pyramidal shapes, and should be depicted with all the planes, all sides of the objects directed towards the centre".

This is not to say that artists were the only people to persue elementary concepts of geometry. At the turn of the century H. Minkowski discovered that a geometric representation can be very helpful in solving diophantine problems in number theory. His famous book "Geometrie der Zahlen" became a source of inspiration not only for number theoreticians; its new focus on packings and coverings of convex sets inaugurated a new discipline called Discrete Geometry.

When more than half a century ago Paul Erdős began asking questions even Euclid would understand, he initiated a revival of the most elementary concepts of geometry. Line segments, right triangles, and other conventional shapes of Euclidean geometry came to new life as objects of combinatorial study. Combinatorial Geometry the new field created by Erdős's questions, added curious new flavors to Discrete Geometry.

The proliferation of computers presented a powerful new source of inspiration for discrete algorithmic methods and has, among others, led to the birth and rapid growth of Computational Geometry. Combined with the — by now powerful — machinery of combinatorics, this fascinating new area has greatly contributed to the vigorous recent progress in Discrete Geometry as well.

In this Special Issue of *Combinatorica* we hope to give a convincing sample to illustrate the variety of problem areas and the wealth of new ideas, often of combinatorial flavor or relevance, characteristic of contemporary Discrete and Computational Geometry.

Solicited by invitation, all papers in this Special Issue have been refereed according to the usual procedure of COMBINATORICA. The enthusiastic response by the authors made it impossible to accommodate all the remarkable material received in a single issue; it now occupies issues 10/2 and 10/3.

We are grateful to the referees for all their hard work, and above all to the authors who responded to the invitation and filled these pages with exciting fresh ideas.

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