Book Review

Mark E. Saul: *Hadamard's plane geometry: a reader's companion.* American Mathematical Society, Providence, Rhode Island, and Education Development Center, Inc., Newton, MA, 2010. 347 p., ISBN 978-0-8218-4368-0.

Jacques Hadamard (1865–1963) was among the greatest mathematicians of the twentieth century. But he was also an engaged teacher, and in this function he wrote a comprehensive two-volumes textbook on plane and solid geometry for French pre-college teachers: *Leçons de Géométrie Elémentaire I, II*, 1898 and 1901. The English translation of Vol. I, *Lessons in Geometry, I. Plane Geometry,* was published 2008 by the American Mathematical Society, Providence, RI, and the Education Development Center, Inc., in Newton, MA.

Hadamard was a master in posing problems. Hence a series of "exercises" is an integral part of his two geometry books. The exercises are of different levels ranging, e.g., from a proof of Pascal's theorem for circles to the question for the shortest chord of a circle passing through a given point inside the circle.

The book under review is a companion to Hadamard's Volume I as it presents on 347 pages 342 of Hadamard's problems on plane geometry and their solutions. The problems are subdivided into the four books, entitled 'On the Straight Line', 'On the Circle', 'On Similarity', and 'On Areas'.

M.E. Saul's collection of solved exercises requires from the reader the background of high school geometry. However, it addresses not only high school teachers but all "lovers of classical synthetic geometry". Another aspect of this companion volume is pedagogical: It encourages to learning by doing — in particular to software exploration using dynamic geometry software. Each exercise includes a figure and a well-written description of the solution. Sometimes it is structured by different lemmas. Often Notes on different strategies or on the background of the problem are inserted.

The problems cover a wide spectrum of plane geometry, from order properties to metrical statements and transformations. But they also deal with affine geometry and with the projective extension of the Euclidean plane. The solutions avoid methods of analytic geometry. The author himself mentions that he got support from various mathematicians. Hence, this work is an extraordinary, rich and comprehensive collection of problems on plane geometry, thus a very stimulating treasure-house for everybody interested in the so-called elementary geometry.

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