Translator's Preface

In the late 1890s Gaston Darboux was named as the editor of a set of text-books, resources for the teaching of mathematics (*Cours Complet Pour la Classe de Mathématiques Élémentaires*). Darboux commissioned several mathematicians to write these materials. Jacques Hadamard, having taught on the high school (*lycée*) level,[1] was asked to prepare the materials for geometry. Two volumes resulted: one on plane geometry in 1898 and a volume on solid geometry in 1901.

Hadamard clearly saw this work as important, as he revised it twelve times during his long life, the last edition appearing in 1947. (Hadamard died in 1963 at the age of 97.)

The present book is a translation of the thirteenth edition of the first volume, first printed by Librarie Armand Colin, Paris, in 1947 and reprinted by Éditions Jacques Gabay, Sceaux, in 1988. It includes all the materials that this reprint contains. The volume on solid geometry has not been included here.

A companion volume to this translation, not based on the work of Hadamard, includes solutions to the problems as well as ideas for classroom use.

Hadamard's vision of geometry is remarkably fresh, even after the passage of 100 years. The classical approach is delicately balanced with modern extensions. The various geometric transformations arise simply and naturally from more static considerations of geometric objects.

The book includes a disk for use with the Texas Instruments TI-NSpire™ software[*]. This disk is not meant to exhaust the possibilities of applying technology to these materials. Rather, it is meant to whet the appetite of the user for exploration of this area.

The same can be said about all the materials in the companion volume: Hadamard's book is a rich source of mathematical and pedagogical ideas, too rich to be exhausted in one supplementary volume. The supplementary materials are intended to invite the reader to consider further the ideas brought up by Hadamard.

A word is in order about the process of translation. Hadamard was a master of mathematics, and of mathematical exposition, but not particularly of the language itself. Some of his sentences are stiffly formal, others clumsy, even ambiguous (although the ambiguity is easily resolved by the logic of the discussion). In some cases (the appendix on Malfatti's problem is a good example) footnotes or dependent clauses seem to have been piled on as afterthoughts, to clarify a phrase or logical point. This circumstance presents an awkward dilemma for the translator.

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[1]The best account of Hadamard's life, including those episodes alluded to in this preface, can be found in the excellent book by Vladimir Maz'ya and Tatyana Shaposhnikova, *Jacques Hadamard, A Universal Mathematician*, American Mathematical Society, Providence, Rhode Island, 1998.

[*]TI-Nspire is a registered trademark of Texas Instruments.

Does he make the English elegant and accessible? Or does he convey to the reader the flavor of the original? I have resolved this problem on a case-by-case basis, hoping that the result reads smoothly without distorting the spirit of the original.

In this work, I have received invaluable help from an initial translation prepared by Hari Bercovici, of Indiana University. While most of his work has been altered and fine-tuned, the core of it remains, and Bercovici made significant contributions to the resolution of a number of difficult problems of translation. In addition, the illustrations—faithful copies of Hadamard's own—are almost entirely the work of Bercovici. I am grateful for this opportunity to thank him for generously allowing me access to his work. In return, I take on myself the responsibility for any errors that may have crept in, and that the patient reader will doubtless find.

Others to whom I am grateful for help in this work include Wing Suet Li, Florence Fasanelli, Al Cuoco, Larry Zimmerman, and Sergei Gelfand. My wife, Carol Saul, a great supporter of everything I do, has been immeasurably tolerant of my preoccupation with this work.

Hadamard's career as a high school teacher does not seem to have ended successfully. He did not stay long in the profession, and there exist notes by his superiors testifying to his difficulties in getting along with his students.[2] However, he seems to have learned from his experiences how to approach them intellectually, thus allowing other teachers, with other skills, the benefit of his own genius.

It is in this spirit of combining the skills of the teacher and the mathematician that I offer these materials to the field.

Mark Saul   May 2008

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[2] Hadamard's mentoring of Maurice Fréchet, which started in the latter's high school years, is a notable exception to this circumstance.