Book Review

Évelyne Barbin, Marta Menghini, Klaus Volkert (eds): *Descriptive Geometry. The Spread of a Polytechnic Art (The Legacy of Gaspard Monge).*
International Studies in the History of Mathematics and its Teaching, Springer Nature Switzerland AG, Cham 2019, 437 p., ISBN 978-3-030-14807-2, 978-3-030-14808-9 (eBook).

This history of the spread of Gaspard Monge's way of treating and teaching Descriptive Geometry not only in Europe but worldwide collects 21 "local histories" written by different authors, thus covering the 19th and the beginning of the 20th century. In these distinct articles, the authors describe the influence of Gaspard Monge's book on Descriptive Geometry and of the French post-revolutionary school system (École Normale, École Polytechnique, École Supérieur de Commerce, École Militaire) in their own nations or states.

Due to the French conquests during the Napoleon wars, the French educational system spread fastest in Southern Europe, well due to their common Latin-based languages, which made translations less necessary. This area, namely the countries France, Spain, Italy, Portugal (and Brazil), and finally Greece, are considered at first and constitute Part I of the book. They are treated in eight essays. In Part II, ten articles concern the developments of teaching Descriptive Geometry in the German speaking countries, Russia, the Netherlands, Denmark, the Czech Republic (which at that time was part of the Austro-Hungarian Empire), Serbia, and finally, England, which already had its own well developed school system and therefore — and because of being outside the Empire of Napoleon — adopted the French ideas latest. Part III deals with the countries USA, Egypt, and Latin America in three articles. An epilogue in Part IV, Chapter 22, treats the increasing importance of polytechnical schools and the sprouting of universities of technology from these schools and high-schools. Part IV ends with an author index and a subject index.

The editors give an extended introduction to the book by justifying "the purpose of the book" and the splitting of its content into four parts. They conclude with a timeline mentioning the first translation of a (French) book on Descriptive Geometry, the first original textbook, and the first creation of a polytechnical school in the countries mentioned above.

The observant reader of this interesting part of the "history of mathematics and its education" will come to know about the first authors and developers of Descriptive Geometry, who did not all pay attention to the geometry courses. Many authors of the book emphasize the transformation of Descriptive Geometry from a simple and basic graphics tool for representing 3D objects, via adapting Projective Geometry, to a science incorporating mathematics, and, finally, becoming an important part of mathematics itself, stimulating the development of new mathematical concepts and disciplines, (see, e.g., Chapter 11, which explicitly points to this development).

In a book of more than 450 pages, it seems unavoidable that there occur a few misprints, which can be corrected in a 2nd edition. Some of them are mentioned below: The name 'Hjemlev' on page ix should be Hjelmslev. In the timeline the "k.k. Polytechnisches Institut" Vienna, founded in 1815, is not mentioned. On page xi, when stating that "only a few countries ... maintained Descriptive Geometry as a school subject", the author forgets to list Hungary, Czech Republic, Slovakia, and to mention the need for related teachers in schools providing vocational education, as for example carpentry and many more. To meet these demands, one

still finds established geometry courses at higher educational level in many countries. On page 144 'skew surfaces' mean 'ruled surfaces'.

When focussing on the epoch-making work of Gaspard MONGE, the editors do not explicitly clarify, what is so pioneering with the so-called *Monge-method* and, to which extend, there were precursors to MONGE. Of course, Renaissance painters already used Descriptive Geometric constructions for depicting 3D-objects and they communicated their developments in textbooks. Another branch of Descriptive Geometry can be found in cathedral works. In contrary to image producing methods of painters and architects, MONGE developed a simple way to reconstruct properties and measures of 3D-objects from two (or more) images, which he places in 'ordered position' in the drawing plane. Such statements, given already in the "Preface", could be helpful for a readers who are less familiar with Descriptive Geometry.

A presumptive reader who is interested in the history of science, will find a well elaborated analysis of the development of a special and important part of Mathematics during the century after the French Revolution. He cannot find such a rich detailed analysis at any other place. Besides the general educational aspect of the book, the book will be highly interesting for all "hardcore geometers", even so the book aims to a broader public.

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