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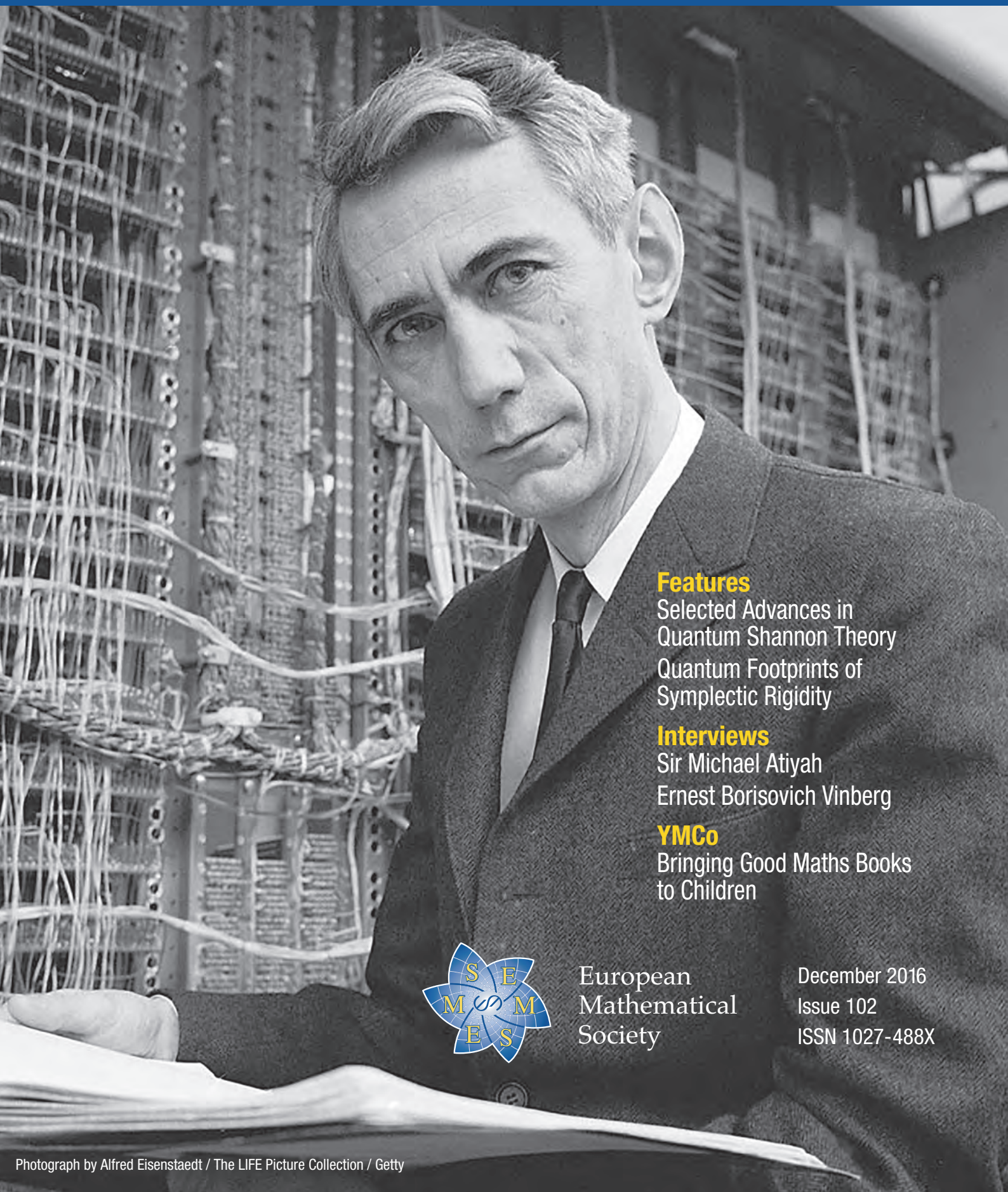

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Herbert Bruderer

Meilensteine der Rechentechnik. Zur Geschichte der Mathematik und der Informatik

De Gruyter, 2015
XXXII, 818 p.
ISBN 978-3-11-037547-3

Reviewer: Steven Deckelman

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This impressive new book by Herbert Bruderer is an extensive in-depth scholarly history of mathematics and computer science with a focus on computing technology in German lands. Computing technology is defined in the most general sense. Under this definition can be included any tool that facilitates computation. This runs the gamut from tallying sticks and bones to fingers, pebble stones, pencil and paper, slide rules and to machines, including both mechanical, electronic and even quantum devices. Also, ideas (algorithms) relating to computation and the books that preserved and transmitted them are included among these tools. For example, the Liber Abaci of Leonardo of Pisa as well as John Napier's logarithms would be included.

As a work by a professional historian, the book poses questions, presents evidence (in the form of historical machines, documents, drawings and pictures) and proposes interpretations as well as raises further research questions. Some of the historical questions include

What kind of device is it?
What was the origin of the device?
How old is the device?
How did the device work?
What technology was the device based on?
For whom and for what purpose was the device used?
How was the device discovered?

among others.

The book consists of 818 pages with 8 chapters along with an extensive 225 page multi-lingual biography exceeding 3000 entries, mostly from the German, French and English literature. It is very rich in detailed historical references. There are many pictures, tables and timelines. The book also includes new primary source material on recently discovered computing devices since 2009 and of new documents on the relationship between German computing pioneer Konrad Zuse and the ETH Zurich concerning Z4 and Ermeth (Elektronische Rechenmaschine der ETH).

This book will be of particular interest to historians of mathematics and computer science. Those who teach undergraduate history of mathematics and possibly ethnomathematics courses and who would like to supplement their course with some episodes from the history of computer science will also find a wealth of material for student projects. For example, students may find it interesting to learn about the Curta, a high quality mechanical calculator invented by Buchenwald concentration camp inmate Curt Herzstark as a possible gift for the Führer, or about the many forms of the slide rule, or abacus, and how they were used. This book contains detailed instructions about how the Curta actually worked.

As a non-expert reviewing this book, I found it both surprising and fascinating how many open questions there are even about relatively recent (twentieth century) history. For example John Von Neumann's 1945 paper introducing Von Neumann architecture contains no reference to Alan Turing's 1936 paper on the universal Turing machine. Was Von Neumann influenced by Turing or were these discoveries independent? Von Neumann was at the Institute for Advanced Study during the time Turing was at Princeton. With whom do the distinctions between control unit, ALU, memory, as well as input and output devices, originate? Prior to Von Neumann this had already been anticipated by Charles Babbage and Konrad Zuse. Who wrote the first computer program? Ada Lovelace was certainly the first woman programmer but whether she was the first programmer is in dispute among historians, some of whom argue it was Charles Babbage. In chapter 4, at least a dozen such open historical questions are mentioned.

One topic that I would have liked to have seen but which was omitted was a detailed description of Chebyshev's calculating machine. But given the 818 pages as well as its stated focus on German lands, perhaps that was a reasonable omission. Chebyshev's machine is mentioned and references are given.

This book is a must-have for anyone interested in the history of mathematics and computer science as well engineering (especially mechanical and electrical), technology and the history of science.

Steven Deckelman is a professor of mathematics at the University of Wisconsin-Stout, where he has been since 1997. He received his Ph.D from the University of Wisconsin-Madison in 1994 for a thesis in several complex variables written under Patrick Ahern. Some of his interests include complex analysis, mathematical biology and the history of mathematics.

[1] http://www.maa.org/press/maa-reviews/meilensteine-der-rechentechnik