**Leonardo Pisani Liber abbaci oder Lesevergnügen eines Mathematikers.** By Heinz Lüneburg. Mannheim/Leipzig/Wien/Zürich (BI Wissenschaftsverlag). 1992; second, corrected and enlarged printing 1993. 352 pp. DM 68.-

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Heinz Lüneburg (born 1935) is a rare case among contemporary German mathematicians: a research mathematician (his topics are computer-aided arithmetic,



This work shows his strengths clearly: he likes to prove each statement by an appropriate source quotation, to follow up every clue. He is never satisfied until all matters are clarified and all questions are answered. Reading Latin and Italian (and enjoying touring in Italy), he is the right person to present Fibonacci's famous *Liber abbaci* (1202, revised 1228) to other mathematicians who also are interested in the history of mathematics and to historians who are interested in a modern reappraisal of the work—if these two classes of people exist.

In fact, the latter question can be answered affirmatively because this nice book has just had its second printing after only one year. Lüneburg reads and describes the *Liber abbaci* from the point of view of a contemporary mathematician. But first he presents a series of detailed reports: on Baldassare Boncompagni (the editor of the 1857 issue of the *Liber*) and his family; on the Italian academies; on the surviving Codices of the *Liber abbaci*; on Leonardo of Pisa, Frederic II, and their times; and so on. In what follows, each page refers to the relevant page of the 1857 edition of the *Liber*. In some cases the texts of several codices are compared, and some mistakes of the copyists are corrected.

The author seizes each occasion for further investigation: he comments for instance, on the several meanings of the term "abacus," the history of the terms "al-sifr," "Ziffer," "zero," "chiffre," …, and the meanings of terms representing measures, coins, and trade goods that Leonardo mentions, all with the help of a thoroughly referenced, extensive secondary literature.

Thus, in the course of reading the book, the reader learns many things about life in the Middle Ages. An example is to be found on pp. 290–292, where Lüneburg gives a detailed report on medieval spinning. The reader learns at what time the spinning wheel was introduced, that its use was forbidden in the spinning of the warp because of the lesser durability of the wheel-made threads, etc.

The core of the book is the connection made by Lüneburg between some old mathematical techniques occurring in the *Liber abbaci* and such modern notions as algorithm, complexity, and dynamical storage. We cite some lines from pp. 87ff:

> It is in any case remarkable that, even today, one could use the *Liber abbaci*—assisted by such tools as set theory, induction, and recursion—to prepare a lecture on calculations in the

> ring of the integers and its quotient field.... I find it equally amazing that all the ingredients of that just now so topical subject of computer algebra are already in the *Liber abbaci*. Not only do algorithms and their verification appear there but there are at least two topics which may be interpreted as part of complexity theory.... Computation has always been a dynamical subject and so it will always be.

Lüneburg is fascinated by Leonardo's work, and he succeeds in transmitting this fascination to the reader. He does not like the usual reduction of Fibonacci's importance to the famous rabbit problem; this is equivalent, he says on p. 198, to the stereotyped reduction of Beethoven to the 'da–da–da–daa' of his Fifth Symphony. The author opens up to historians an idea of other ways to investigate and explore such mathematical texts.

The book contains a list of all surviving codices of the *Liber abbaci* and four coloured tables of selected pages from two of the codices, strikingly illustrating the visual beauty of the old manuscripts. At the end of the book there are some remarkable critical thoughts about the contemporary state of professional mathematics and professional history of mathematics. One example must suffice. In reading a mathematical text, one generally needs no further sources to know whether the proof is true or not. For an historical text, the determination of its truth requires the study of a chain of further sources, a chain that sometimes has no end.

**A History of Mathematics: An Introduction.** By Victor J. Katz. New York (Harper Collins). 1993. xiv+786 pp.

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"An increased interest in the history of the exact sciences manifested in recent years by teachers everywhere, and the attention given to historical inquiry in the mathematical class-rooms and seminaries in our leading universities, cause me to believe that a brief general History of Mathematics will be found acceptable to teachers and students" [1, v]. With these words, Florian Cajori opened his 1893 *History of Mathematics*, addressed in the main to U.S. college teachers, at a time when history was seen as a way to approach an understanding of an increasingly abstract and professional mathematical world.

Victor Katz's *A History of Mathematics* joins a number of other works of the past few decades which do for today's audience what Cajori did a century ago. Katz's book appears at a time when an interest in history is similarly in vogue, at least in the United States, and for similar reasons. Undergraduate study in mathematics is undertaken by students with a variety of aspirations and equally varied backgrounds, both mathematical and personal. (For the benefit of European readers who have never experienced average North American college students, it should be pointed

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