Fibonacci, Leonardo Bigollo Pisano
Liber abbaci. **Edited by Enrico Giusti and Paolo D'Alessandro.** (Latin, Italian, English)
Zbl 1457.01028
Biblioteca di Nuncius. Studi e Testi 79. Florence: Leo S. Olschki; Florence: Museo Galileo, Istituto e Museo di Storia della Scienza; Pisa: Università di Pisa (ISBN 978-88-222-6658-3/hbk). cxviii, 824 p. (2020).

Leonardo Pisano Fibonacci's *Liber abbaci* was more respected than worked on, in the centuries following upon its creation as well as in the historiography of mathematics – a sad but predictable consequence of its overwhelming length: some 250000 words. After having been so much forgotten that Jean Étienne Montucla believed it in 1758 to have been planned by its author but never written, it was rediscovered in the later 18th century and eulogized by Pietro Cossali in 1797–99; yet an edition of the full text (based on a single manuscript) was only produced by Baldassare Boncompagni in 1857. This edition was faithful to the manuscript, also to its mistakes; at most Boncompagni marked glaring errors by a "sic". For this reason, and since Boncompagni's bulky volume was not easy to get hold of before it landed on Google Books some 15 years ago, the need for a critical edition has long been as obvious as the importance of the work. The present reviewer was told about an already running editorial project in 1981. This project was still claimed to be in progress in 2000, but apparently it has been shelved by now. Another project was started in 2008 at the Federico II University in Naples, and has so far resulted in an edition of Chapters 1–4 with Italian translation (5% of the total work – ed. Giuseppe Germano & Nicoletta Rozza, Naples: Paolo Loffredo, 2019). Unfortunately, this edition is quite unsatisfactory, both editors being philologists specialized in Latin and Humanist Latin and deprived of adequate mathematical understanding (and even far from precise in the critical apparatus).

Now, however, Enrico Giusti, a mathematician who can add to his credentials almost four decades' work in the history of medieval and early modern mathematics, has produced a full edition with the support of Paolo d'Alessandro, philologist and linguist. The edition is based on all known and still accessible manuscripts (one, containing Chapters 14 and 15 and once the property of Boncompagni, disappeared a decade ago into the black hole of secret private property). It is provided with a double critical apparatus. One, following the pages of the text, contains the variants proper – as usually in critical editions omitting variants of orthography, while even such obvious synonyms as nihil-nil-nichil and virga-virgula are included; so are often instances of divergent grammatical gender and case. According to the reviewers occasional comparison with the Boncompagni edition (thus indirectly with Boncompagni's manuscript) and with the Vatican Library manuscript Pal. lat. 1343 it is highly reliable. A second apparatus of 132 pages, moved to an appendix, contains orthographic variants, obvious misreadings (e.g., condictione for cognitione, minorum for numerorum) and such non-technical synonyms as have been omitted from the main apparatus (e.g., supradictis-predictis).

The introduction appears first in Italian and then in English. It presents first what we know about Leonardo's person and name (showing that the convenient Fibonacci is an 18th-century contraction of the original identification "from the house of the Bonacci"). Next follows a discussion of the dating of Leonardo's *Liber*. The dating of its first version to 1202 is subject to no doubt (at most that the Pisan year 1202 started at Incarnation 1201 – 25 March – and lasted until Incarnation 1202). On the other hand, the habitual dating of the second (extant) version to 1228 is argued to be quite doubtful; later 1220s remains plausible.

The *Liber abbaci* itself is described briefly (3 pages), while two pages are dedicated to earlier reports about and editions and translations from 1754 until 2019. Pp. lxxvii–lxxxii describe the extant complete or partial manuscripts, and pp. lxxiii–c discusses the arrangement of these in families. All manuscripts are argued to descend from an archetype ω, since all "show a series of omissions and errors that cannot reasonably be attributed to the author" (p. lxxxiii). Therefore ω is supposed to be already secondary.

Another publication from *E. Giusti*'s hand [Boll. Stor. Sci. Mat. 37, No. 1, 9–216 (2017; Zbl 1372.01011)] contradicts this latter conclusion. In 2017, Giusti showed that the manuscript Florence, Biblioteca Mediceo-Laurenziana, Gaddi 36 contains an earlier version of Chapter 12 of the *Liber abbaci* – which can hardly be anything but its 1202 version. Careful reading of the critical apparatus of Giusti's edition of this chapter reveals that it shares the large majority of the ω-errors. This can only be explained if the

second "1228" version of the *Liber abbaci* was made as an updating of the 1202-manuscript conserving much of its text (leaving many of its errors undiscovered) and did not result from a complete rewriting: so to speak a cut-and-paste procedure, not too different from what the use of a word processor allows when a second edition is prepared today. Further analysis of the critical apparatus of the new edition might perhaps tell whether the different families reconstructed by Giusti descend from copies made from this evolving master copy at different moments of its history.

The text that is produced follows the ideal of rendering the author's intention, just as done in the case of literary classics. Only the very few would be interested in Ovid's or early copyists' misspellings even if these could be dug out of extant manuscripts; the same can clearly be argued when a mathematical text is reconstructed as long as we can reasonably assume (as we can in the present case) that its author understood what he was writing; it is of little interest for most users of the text if Fibonacci miswrote a number when transferring it from the dustboard to paper (or even when borrowing from some earlier work). For anybody interested in Leonardo the mathematician or the mathematics in the *Liber abbaci* (be it original or borrowed), Giusti's edition is thus a much better basis than the Boncompagni edition, useful though the latter has been for 122 years. Those who for whatever reason are interested in what the variants or mistakes might tell are well served by the critical apparatus (the reviewer can assert from proper experience).

Reviewer: Jens Høyrup (Roskilde)

MSC:

01A75 Collected or selected works; reprintings or translations of classics
01A35 History of mathematics in Late Antiquity and medieval Europe

Biographic references:

Fibonacci, Leonardo