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Deschauer, Stefan

The arithmetic books of Riga. Reflection of a local mathematical tradition in the Baltic Sea area. (Die Rigischen Rechenbücher. Spiegel einer lokalen mathematischen Tradition im Ostseeraum.) (German)

Algorismus 73. Augsburg: ERV Dr. Erwin Rauner Verlag. ix, 230 p. EUR 24.50 (2010). ISBN 978-3-936905-41-0/pbk

From the conquest by a crusade in the initial 13th and until the end of the 19th century, Riga was a German trading town, irrespective of whether it was an autonomous member of the Hanseatic League or subjected to Poland-Lithuania, Sweden or Russia. Thanks to the absence of intimate links to courtly, noble and university life, Riga therefore provides an interesting view on autonomous commercial culture – almost a socio-cultural experiment.

Deschauer's book presents one particular – and central – aspect of this culture, the mathematical tradition carried by textbooks of commercial arithmetic, from the mid-17th to the early 19th century.

The book falls into two parts. The first of these analyses the algebra sections of the books under scrutiny; these, so to speak, illustrate the development of the mathematical tradition per se, since this algebra had no practical utility for commerce (nor for anything else, its problems being either totally artificial or more easily solved without algebra). The second looks at genuine commercial arithmetic (and some non-algebraic solutions to "recreational" problems), clearly linked to actual commercial practice (for instance, introducing relevant Russian metrologies after the Russian conquest, and decimal fractions after the introduction of Russian decimally based money). In the first part, Deschauer follows the development from one author/book to the next; the second is arranged according to mathematical topic or problem type.

Riga algebra can be seen to have remained within the cossic tradition. Neither Cardano's solution of cubics and quartics nor Cartesian symbolism have left any traces. True, a number of higher-degree problems do turn up – but their solutions are always just postulated (the problems being constructed from known solutions). While the primary unknown quantity is designated in cossic style, a second and even a third unknown may turn up, being then designated by a and b (the actors of a problem may also, though rarely, be designated A and B – a habit which seems to have emerged in Germany already in the 15th century).

That does not mean that "Riga algebra" was identical with cossic algebra as represented by the famous books of the 16th century (e.g., Rudolff, Stifel). Firstly, it is repeatedly requested that some unknown number be a polygonal number (perhaps an echo of Faulhaber's Numerus figuratus from 1613). Secondly – more important than this piece of pure decoration – is that all algebraic calculations are inserted in schemes, similar to those presented by for instance Rudolff and Stiefel in their introductions but not used by them in the solution of problems. Since this schematic presentation is present already in Wedemeier's book from 1647 (probably already in the earlier editions from 1627 and 1637, now lost), it is hardly a local development; (something very similar is

indeed found in Anthonius Schultze's Arithmetica oder Rechenbuch, printed in Liegnitz in Silesia in 1600, and in Nicolaus Raimarus Ursus' Arithmetica analytica, vulgo Cosa, Frankfurt and der Oder, 1601). But this particular style was conserved in Riga until well into the 18th century – from 1769 onward, the authors eliminate algebra as irrelevant for the (mercantile) arithmetic they teach.
Deschauer does not analyse this use of schemes in his commentary but replaces them with calculations in post-Cartesian style. However, all problems are rendered in facsimile, and the reader who is interested will therefore have all the necessary material at hand.
Quite often, Deschauer protests that the use of the rule of three within the algebraic calculations is superfluous (in particular when one of the numbers involved is 1). This may be turned into an observation concerning the thinking of the Riga masters: that the rule of three was so fundamental an ingredient in their "toolbox" that it came more naturally to them than a simple multiplication or division.
The second part of the book is not systematically accompanied by facsimiles; it therefore mostly does not allow the reader to approach the texts independently of Deschauer. Due to the character of these problems, however, there may be less need for that.
Already the algebraic part, but in particular the genuinely commercial part (where it is more needed) is well provided with explanations of historical events, of metrology and of commercial techniques (some of which are quite complicated). The book as a whole is provided with a well-structured system of indexes: of names, of professions, of goods, of commercial concepts, etc. On only one point (p. 139) did the reviewer observe a mistake: In a book from 1703, Wolck solves correctly a partnership problem, where one partner invests his capital for three months, the other for four months. Deschauer claims that Wolck's result is wrong, presupposing in his own solution that not only the profit but also the total capital has to be divided proportionally to the products of investment and time.

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