

Matematické listy Gerberta z Remeše

Summary

In: Marek Otisk (author); Richard Psík (author); Gerbert of Reims (other): Matematické listy Gerberta z Remeše. (English). Praha: Centrum Vivarium FF OU, 2014. pp. 145–146.

Persistent URL: <http://dml.cz/dmlcz/402415>

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SUMMARY

Pope Silvester II. (pont. 999–1003) born Gerbert of Reims or Aurillac, Bobbio or of Ravenna, belongs among the most famous personalities of the Latin speaking Christian world around the period of the first millennium. The life of this important diplomat is closely bound to Ottonian house as well as to a fight for the French crown between Carolingian and Capet dynasties. Gerbert became during his life an (non-legitimate) archbishop of Reims, abbot of the St. Columbanus monastery in Bobbio, archbishop of Ravenna and finally the pope. According to medieval so-called *Gerbert's legend*, Gerbert achieved all these positions with help of devil and thanks to the devil's intervention he also became one of the most noted scholars and teachers of his time. His influential pupils (above all kings and emperors) then did not hesitate to appoint him with various church offices.

Gerbert of Reims holds a firm position in history of philosophy and scientific thinking. Measured by today's categories he can be noted as an important astronomer, logician, rhetorician, philosopher or mathematician who was also active in music theory and praxis, geometry as well as in area of practical and theoretical arithmetic. The last mentioned activity is subject of this book bringing the Latin original and Czech translation of seven Gerbert's letters dedicated to mathematics.

First five of them were addressed to Gerbert's friend, co-operator and perhaps pupil Constantine of Fleury. All letters to Constantine were written by the end of the 70-ties or at the beginning of the 80-ties of the 10th century, therefore during the time when Gerbert worked as teacher in Reims. *Letter 1* is reaction to the period debate on conversion of three-membered numerical sequences arranged according to a certain ratio in the three same sums. Gerbert, following Boethius's *Introduction to arithmetic*, deals with a conversion of superparticular numbers arranged in ratio 5 : 4 to a parity, i.e. ratio 1 : 1 and vigorously delimits the non-systematic method that was probably commonly used, however without respecting the nature of numbers, metaphysical hierarchy of relationships between the numerical ratios and ignoring the Boethius's rules of conversions. Numerous and clear rejection of alternative approach of the ratios conversion is not even reduced by mathematical final correctness of the unrecognized method.

Letters 2 and *3* represent Gerbert's commentaries on various text passages of Boethius's *Introduction to music*. Boethius's work is always quoted at first then Gerbert explains the arithmetic base of the quoted postulate. In *Letter 2* Gerbert targets multiplication of ratios and classification of resulting products according to relative nature of numbers. *Letter 3* describes and by using

specific example clarifies a process of subtraction of smaller superparticular ratio from immediately subsequently bigger superparticular ratio. The resulting difference was found smaller than half of the subtracted ratio (subtrahend) as the double quantity of the result is a semitone smaller than subtracted ratio.

While the first three Gerbert's letters are dedicated to theoretical arithmetic, *Letters* 4 and 5 represent an accompanying text of an abacist tract. Their subject is introduction to practical arithmetic, i.e. computing. Both abacist letters have very similar structures: Gerbert praises Constantine for his interest in study; and more he calls him consolation of his struggle and reason for writing the abacist treatises. Then Gerbert delimits himself towards other period scholars who only mention the abacus computations, however Gerbert criticises them for their disinterest in scientific texts of older authorities as well as for inability to understand neither the basic principles of abacist numeration nor methods of arithmetic computations.

Another two Gerbert's mathematic letters were written in later period of Gerbert's life (*Letter* 6 in year 988, *Letter* 7 probably in year 999). Both are part of a correspondence between Gerbert and Remigius of Trier (*Letter* 6) and Adelbold of Utrecht (*Letter* 7). First of the two letters deals in its mathematic part with divisible numbers, i.e. with way of measuring one number by another one. This topic is also linked to abacus numeration as well as to disintegration of numbers according to superparticular ratios. *Letter* 7 in general manner as well as with help of the specific examples explains different method of expressing the surface area of equilateral triangle using geometric and mathematic skill.

Individual letters are accompanied by commentaries closely introducing mainly the historical context of the individual problem and mathematic method presented in Gerbert's letters.

The book opens an introductory study in order to ease orientation in the topics targeted by Gerbert's mathematic letters as well as to closely present Boethius's *Introduction to arithmetic*, the theoretical base of arithmetic knowledge initial for Gerbert's texts (especially a character of number as such, character of numbers in relation to other numbers, i.e. above all number measuring or numeral sequences and ratios, further long also figural numbers and their discovering and depicting). Early medieval abacus computing tradition is also briefly presented including the design and structure of this unique mathematic device.

The introduction to theoretical and practical arithmetic is preceded by condensed description of Gerbert's personality. The author of the letters is mainly presented as an important scholar of his period who was also very active in field of diplomacy. The book doesn't miss out so called *Gerbert's legend* reflecting already during the medieval period the personality of the great intellectual and mathematician.