Menso Folkerts, *Essays on Early Medieval Mathematics: The Latin Tradition* (Aldershot: Ashgate, 2003). 382 pp. hc. £59.50. ISBN 0-86078-895-4.

Like other Variorum volumes, this one builds on earlier essays by the author. In contrast to the norm, however, most of Folkerts' were originally published in German, and most of these have been translated into English; this has given

Folkerts the opportunity to update the information given in the original publications on points where he felt the need.

All essays but the first concentrate on the period from the 'Carolingian' to the aftermath of the 'Ottonian Renaissance', ca 750 to 1050—a period that does not impress by the depth of its mathematical insight but where the educated European elite accepted (what little it knew about) mathematics as a legitimate part of good education. With some variation and alongside immense expansion of what mathematics meant, this attitude has persisted ever since. Folkerts' book thus offers insights that are important for understanding both medieval culture and the conditions on which European culture developed afterwards. Several of the papers address a broad scholarly public, and even those containing critical editions made with high technical competence also give explanations that will be accessible to everybody possessing a general familiarity with the epoch or the history of science. Eleven essays are contained in the book, which are as follows.

(I) sets out 'The Importance of the Latin Middle Ages for the Development of Mathematics'. It is the only one to deal with the Middle Ages at large, reaching until the 16th century.

(II) 'Mathematische Probleme im Corpus agrimensorum' is a very convenient survey of all the constituent treatises of this corpus as well as of the mathematics they contain.

(III) is a presentation and a critical edition of '*De arithmeticis propositionibus. A Mathematical Treatise Ascribed to the Venerable Bede*'. The original core of this short treatise consists of three 'guess-a-number' procedures; a proposition 4 added in some manuscripts deals with the arithmetic of negative numbers (true negative numbers, not merely subtractive elements since even an outcome may be negative). Beda is not the likely author, but the treatise can be no younger than the computus encyclopediae from 809 and 818, with which it often goes together (since the arithmetic of negatives seems to be an independent innovation, the mathematical developmental work behind these encyclopediae may be the context where the discovery was made).

(IV) 'The *Propositiones ad acuendos iuvenes* ascribed to Alcuin' and (V) 'Die älteste mathematische Aufgabensammlung in lateinischer Sprache [...]' contain discussion and a critical edition of this fairly well-known Carolingian collection of mostly recreational problems. Folkerts tends to find the ascription to Alcuin likely without claiming that the evidence is in any way compelling.

(VI) 'The Names and Forms of the Numerals on the Abacus in the Gerbert Tradition' assumes that these Arabic dust-form numerals were imported by Gerbert in his youth. Folkerts' discussion leaves no doubt that the origin was West Arabic; but since the computational use of the dust abacus was known to Remigius d'Auxerre already around 900, other channels for the import seem plausible to the reviewer.

(VII) 'The Importance of the Pseudo-Boethian *Geometria* During the Middle Ages', (VIII) 'Die Altercatio in der Geometrie I des Pseudo-Boethius [...]', and (IX) 'The *Geometry II* Ascribed to Boethius' deal with the two geometric compilations put together in the 8th and the earlier 11th century, respectively, their curve of popularity (measured by the number of extant manuscripts) and their influence.

(X) 'A Treatise on the Squaring of the Circle by Franco of Liège, of about 1050' contains a critical edition and an extensive analysis of this culmination of 11th-century 'experimental' geometric thought.

(XI) '"Rithmomachia", a Mathematical Game from the Middle Ages' describes the rules of this board game based on Boethian arithmetic, created as a didactical tool and surviving until the Renaissance. It also lists and describes all known manuscripts and printed presentations. Folkerts follows Borst in ascribing the original design to one Asilo of Würzburg; since the argument used by Bubnov and Borst to dismiss Walter von Speyer's reference to a similar game (ca 970) is patently false (Walter speaks of a game played on the abacus board, and no medieval author linked the game with the abacus, they claim—but Gundisalvo does refer to the 'abacus or *rithmomachia* board'), the reviewer would suggest that we ascribe to Asilo only the creation of what became the archetype but not the first invention.

Jens Høyrup