Editorial

This third issue of SCIAMVS includes five articles by scholars of six nationalities, and concerning five different languages. Once again the importance of a close reading of primary texts is emphasised. Four of the articles include new editions of previously unknown or imperfectly known documents, with English translations and commentaries; the fifth (Hayashi's), a close comparison between two versions of a text. The documents may be written on clay (as in the first article), or may be tables rather than written texts (as in the third). An accurate knowledge of the primary materials is a prerequisite for any statements on the history of mathematics, and, in the case of tables and diagrams, the layout of the text is also important. Through its large format SCIAMVS can accommodate large-scale reproductions of the primary documents, and all the requisite scripts can be printed elegantly. The presentation of original texts provides the primary documentation that any scholar can refer to, if he or she has any doubts about a particular interpretation. The texts themselves are usually accompanied by literal translations, which preserve the rhetorical, syntactical and notational styles of the original texts. In mathematics, unlike other subjects, two levels of 'translation' are required: the literal translation, and the 'translation' into modern notation. A typical example is that of algebra, in which a literal translation of an Arabic or Latin text may read 'the side of the square in excess is the side of the unknown square in the first and second trinomial equations', but this may be 'translated' into: $x^2 + q = px, x^2 + q$. If the first level is omitted, there is a real danger of misrepresenting the original author, or at least losing many of the nuances of his mathematical culture. The provision of these two levels is also important to ensure that the history of pre-modern mathematics does not remain the prerogative of mathematicians, but can also be appreciated by students of the relevant cultures, and integrated into a larger picture of the society in which the texts were written.

Following previous editorials I would like to continue to place the research presented in these volumes of SCIAMVS into a scholarly tradition, but one stretching back beyond Otto Neugebauer and Kiyosi Yabuuti, to the turn of the nineteenth to twentieth centuries. Two articles in this volume (the second and the fifth) depend on editions of Greek mathematical works made by Johan Ludvig Heiberg; a third (my own), on those of Latin mathematical texts made by Nikolai Bubnov. For over a hundred years the editions of these towering scholars have served as the basic texts for the history of ancient and medieval Western mathematics. Heiberg (1854-1928) was professor of classical philology at Copenhagen University from 1896 until 1924.

He specialised in editing texts on Greek mathematics, but also dealt with philosophy and medicine. He edited the works of Archimedes (twice), Euclid (together with H. Menge), Apollonius of Perga, Hero of Alexander, Serenus Antinoensis, Ptolemy (the *Almagest* and minor astronomical works), and Theodosius (Sphaerica), as well as Simplicius' commentary on Aristotle's *De caelo*, Paulus Aegineta's medical encyclopedia, and several texts by the father of Greek medicine, Hippocrates. He supplied all his editions of works of mathematics and astronomy with Latin translations, and his texts of Euclid and Apollonius were in turn provided Thomas Heath with the material for making his well-known English translations of the two authors. Heiberg's bibliography consists of over 200 items, and most of his editions remain the texts still in use today. Nikolai Bubnov, on the other hand, a Professor in Kiev, is known for only one work: *Gerberti postea Silvestri II papae Opera Mathematica* (972-1003), published in Berlin in 1899 (another text, *Arithmetische Selbstandigkeit der europaiaschen Kultur. Ein Beitrag zur Kulturgeschichte*, 1914, is not so readily available). In this work, however, he did much more than edit the mathematical works more or less securely attributed to Gerbert d'Aurillac (who was Pope Silvester II from 999-1003). He surveyed a large number of manuscripts of mathematical texts written in this period and immediately afterwards, and established the mutual relationships both between these texts and between the manuscripts that contained them. Thus he identified the Latin writings on the astrolabe that were translated directly from Arabic, and showed the order of dependence of later texts by means of a system of symbols that scholars still use. He did a similar thing with early texts on the abacus and the early medieval texts on land- surveying and geometry. Altogether over fifty texts are included in his book, and any scholar working on Latin texts on the abacus, the astrolabe or geometry before ca. 1100 must begin with the editions made by Bubnov.

In spite of the greater facilities for travel, for reproducing material, and for communicating information available to us, and our advanced computer technology, it is difficult to match the achievement of these two scholars. But our aims are the same: to produce texts that are faithful to the evidence provided by the manuscripts (or clay-tablets), but that are also informed by mathematical competence. Both Heiberg and Bubnov presumed that their readers were competent in Latin (if not also in Greek). Alas, this is no longer the case, and English translations of texts have to be provided rather than Latin ones. But by providing English translations, and the second level of 'translation' into modern mathematical terms, we are going further than our nineteenth- and early twentieth-century predecessors. We are trying to make mathematics of early periods and cultures understandable to as wide an audience as possible.

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