Authoring : *Katsiampoura Yanna*
Translation : *Νάκας Ιωάννης*
For citation : *Katsiampoura Yanna , "George Pachymeres, Quadrivium", Encyclopaedia of the Hellenic World, Asia Minor*
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Summary :

An educational manual for the higher education entitled *Quadrivium, arithmetic, music, geometry and astronomy*. It was written by George Pachymeres around 1310 and was widely diffused in Byzantium as well as in West.

Date

c. 1310

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1. The textual tradition of the work

The *Quadrivium* (*Σύνταγμα των τεσσάρων μαθημάτων, αριθμητικής, μουσικής, γεωμετρίας και αστρονομίας*) was written by George Pachymeres *c*. 1310. It consists of four units, dedicated, as mentioned in the title, to arithmetic, music, geometry and astronomy, and was to be used for educational purposes as a manual of the secular education. As such it was used not only by the Byzantines but also by the Italian humanists and was widely diffused in the West until the Renaissance. It is preserved in many codices, the most important of which are: cod. Paris. Gr. 2438, copied by John Sanctamauras in 1594 for Lailius Rouinius; cod. Paris. Gr. 2339 copied in 1540 by Angelus Vergetius and Constantine Palaiokappa, and cod. Rossianus XI, 130, copied in 1575 by John Raseos. The great number of copies verifies the wide use of the work.

Pachymeres' *Quadrivium* is the best preserved manual of the era. This work comprises mostly of non-original material, based on the authors of Antiquity. It could be considered a summary of the most important achievements of the ancient science, where, however, intrudes the look and the originality of Pachymeres. The author does not simply copy, but chooses and explains meanings which he considers to be difficult for his contemporaries, so that the work corresponds to his educational purposes. Pachymeres considers the subjects to be of great importance when he states: "lessons are a perfection of the soul", and describes them as "familiar to the human mind" and inherent to it. He thus gains great pleasure from the learning procedure: "the theory of these subjects is a familiar and pleasant occupation" he writes.[1]

Nevertheless, the obscurity and the language affectation, which characterize Pachymeres in general, sometimes impede the understanding of the text.

2. Content

In the unit concerning arithmetic Pachymeres uses Diophantos[2] but also Nikomachos of Gerasa as his sources. He also continues the elaboration of Diophantos further, successfully solving the problem of the second-degree equation. Pachymeres seems to have also known the use of the Arabic numbers (Hindu).[3]

In the unit about geometry, his basic reference is the elaborations of Euclid, whereas in the unit about astronomy he refers to a long series of ancient astronomers, like Aratos, Archimedes, Aristotle, Kleomedes, Euclid, Claude Ptolemy and Theon.

In the unit about music, Pachymeres follows the view of Claude Ptolemy and sees music not as a servant of poetry, but as something directly connected to mathematics. He borrows his basic conceptions from the school of the Pythagoreans, while he mentions the names of Ptolemy, Aristoxenus, Aristotle, Philolaus the Pythagorean and Archytas. The part concerning music has greatly influenced Manuel Vryennios, who quotes many passages in his work *Harmonica*.[4]

3. Evaluation

The level of the *Quadrivium* in general is considered to be rather high. It is priceless for the study of sciences in Byzantium, since it

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presents with clarity which works and authors of antiquity Byzantine scholars would come in direct contact with. Furthermore, it was a starting point for the study of this period and for its characterization as the Palaiologan Renaissance.

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1. Tannery, P., *Quadrivium de Georges Pachymère* (Città del Vaticano 1940), pp. 5, 6.

2. The author had thoroughly studied Diofantos, and he also paraphrased the first book of his *Arithmetike*. See Tannery, P., *Diophanti Alexandrini Opera Omnia* I (Leipzig 1893-5), pp. 78-122. The paraphrase was also reprinted in Tannery, P., *Quadrivium de Georges Pachymère* (Città del Vaticano 1940), ch. 25-44.

3. See Tannery, P., "Les chiffres arabes dans le manuscrits grecs", *Mémoires* 4 (1920), pp. 199-205.

4. See Jonker, G. H., *Μανουήλ Βρυεννίου Αρμονικά* (Groningen 1970).

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Glossary :

liberal arts
Secular or classical education, as opposed to ecclesiastical education.

Pythagoraeans
A group of followers of Pythagoras who were active in Reggio, S. Italy. They were particularly interested in the philosophy of numbers and musical harmony.

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