



## Summary :

A scholar, mathematician, architect and engineer. Anthemios was born in Tralles of Lydia in the late 5th century and died in the mid-6th century. His foremost architectural work, the church of Hagia Sophia in Constantinople, made him known as the most important architect of his time and influenced deeply the Byzantine and, generally, the Arab, Slav and European architecture. He wrote commentaries on mathematical works and is the author on an original treatise on concave mirrors.

## Date and Place of Birth

late 5th c. (?) Tralles

## Date and Place of Death

before 558, Constantinople (?)

## Main Role

mathematician, architect

## 1. Biography

Anthemios was born in Tralles of Lydia in the late 5th century. He was born into a family whose contribution in the development of science was significant. His father was [Stephen](#), a prominent doctor in Tralles. He had four younger brothers: the doctors [Alexander](#) and [Dioskoros](#), the grammarian and mathematician [Metrodoros](#) and the legist [Olympios](#). Circa 500, Anthemios attended the classes of the famous teacher of philosophy Ammonius Hermiae in Alexandria, where he met eminent scientists of the time. As a mathematician, he applied himself to the construction of ellipses and parabolas. He contributed greatly to the formulation of the theory of conical sections. He wrote a commentary on the work of Nicomachus of Gerasa, while he studied and developed the theories of Archimedes and Apollonius on ellipses and concave mirrors. Anthemios wrote the mathematical treatise «*De admirabilis machinis*» (On admirable machines). The main object of his studies was the application of geometric laws in engineering. He was known for his original mathematical and geometrical propositions. Anthemios also became very famous as an architect. In 532, Emperor [Justinian I](#) invited Anthemios to undertake, with the help of the engineer [Isidore](#) of Miletus, the reconstruction of the church of Hagia Sophia in Constantinople, which had been ruined during the Nika riots («*Nika*»— a Greek exhortation meaning to "win" or "conquer" — was the cry of the rioters). The church was rebuilt on the plan of a **three-aisled basilica**. The most original element of the church is its immense **dome**. The church, inaugurated on 27 December 537 by Justinian I, impressed enormously the people of the time and became a landmark in the history of architecture. The exact date Anthemios died is not known. He probably died before the strong earthquake of May 7th, 558, when the dome of Hagia Sophia collapsed.<sup>1</sup>

## 2. Work

### 2.1. Writings: About Mathematics

Anthemios made a great contribution to the development of mathematics and the application of mathematical laws in engineering. He became known in his time for the original engineering studies he carried out. It is said that he devised an engine powered by steam with which he caused an artificial earthquake in order to frighten his neighbour, the orator Zeno. The historiographers of the time, Prokopios and [Agathias](#), as well as the poet Paulus Silentiarius admire and praise the knowledge and achievements of Anthemios in mechanics. He must have written treatises on hydraulics as well. His main work, which has survived until today, is the mathematical treatise *De admirabilis machinis* («On admirable machins»). This work is included in the edition of ‘*On burning mirrors*’ by Diocles, which is annotated by Anthemios. In the treatise *De admirabilis machinis*, Anthemios was the first to develop and document the theory of concave mirrors and, in particular, the way the sunbeams may be concentrated by means of a concave mirror at a particular point regardless of season and time. Anthemios is also said to have written another treatise known under the title *Fragmentum mathematicum Bobiense*.<sup>2</sup>



## 2.2. Architecture

The most important architectural work of Anthemios is the construction of the church of Hagia Sophia in Constantinople. This building became the reference point for both the city and the entire Byzantine Empire in the following centuries. The conception of the architectural type of the dome was the result of the thorough research of Anthemios on concave mirrors. The architectural type of the church greatly influenced, directly or indirectly, Byzantine architecture, as well as Orthodox Slav and Ottoman architecture. The historiographer Agathias reports that Anthemios also supervised the construction of numerous other structures within and outside Constantinople. According to *De Aedificiis* of Prokopios, Emperor Justinian I assigned Anthemios and his assistant Isidore with the task of planning and supervising the construction of flood control structures at the Dar'ā stronghold in Mesopotamia.

1. According to earlier views, Anthemios died around 534, before the reconstruction works of Hagia Sophia were completed. But the majority of contemporary scholars do not accept this version [see Soulis, G., *Speculum* 35 (1960), p. 124].
2. Heath T.L., "The fragment of Anthemios on burning mirrors and the 'Fragmentum Mathematicum Bobiense'", *Bibliotheca Mathematica*, III, 7 (1907), pp. 225-233

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**Heath T.L.**, "The fragment of Anthemius on burning mirrors and the 'Fragmentum. Mathematicum Bobiense'", *Bibliotheca Mathematica*, III,7, 1907, 225-233

## Webliography :

Anthemius of Tralles

<http://www-history.mcs.st-andrews.ac.uk/Printonly/Anthemius.html>

## Glossary :

dome

A characteristic element of Byzantine architecture. The dome is a hemispherical vault on a circular wall (drum) usually pierced by windows. The domed church emerges in the Early Byzantine years and its various types gradually prevail, while they are expanded in the Balkans and in Russia.

three-aisled basilica

An oblong type of church internally divided into three aisles: the middle and the two side aisles. The middle aisle is often lighted by an elevated clerestory. In the Early Byzantine years this type of church had huge dimensions.

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