

## COSMAS INDICOPLEUSTES AND HIS MODEL OF THE UNIVERSUM

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**Abstract.** The Nestorian Christian monk Cosmas the "Indicopleustes", wrote in 6th century the *Christian Topography*, a work through which he attempted to create a new system of geography and the representation of the World that would fit to the information contained in the Holy Scripture. His work and life, and his model of the Universum, are considered here.

### 1. INTRODUCTION

The first Christian centuries in the Empire, from the 3rd one to the 6th one, were those in which the new Christian religion had to consolidate its place as the dominant religion. Therefore, everything that seemed to contradict the Scriptures had to either disappear and be forgotten, or to be adapted to them. Therefore, since geography of the Greek and Hellenistic periods did not agree in several instances with the holy texts, and because the Scriptures could not be in error, geography as it was perceived at the time had to be harmonized with the holy texts of the new religion. This task was undertaken by a 6th-century Nestorian (heretic) Christian merchant, traveller and later monk in the Monastery of St. Catharine of Mt. Sinai. His name was Cosmas, the so-called "Indicopleustes" i.e. the one who had sailed to India.

Our full article on Cosmas Indicopleustes is published in Manimamamis et al. (2013). Since this publication is not known in astronomical community, and work of Cosmas is of interest for the history of astronomy, we present here parts of our consideration, essential from the astronomical point of view. The more complete information is presented in Manimamamis et al. (2013).

## 2. THE LIFE OF COSMAS INDICOPLEUSTES

Cosmas was of Greek origin and he became famous from the work he authored in the Monastery of St. Catharine around 547 AD. When he was still young, circa 520, he travelled as a merchant to the region around Egypt, i.e. the Red Sea (and to the east up to the Persian Gulf) (Cosmas, 1968, Book II, 29), the Kingdom of Axum and its vicinity (the region of the modern countries Ethiopia, Eritrea and Somalia) (Cosmas, 1968[2], Book II, 30), the Palestine and the Sinai peninsula (Cosmas, 1968, Book V, 8, 14, 51, 52).

After these first voyages and for about 15 years during the reign of Justinian I (527-565), Cosmas travelled in the Black Sea, east Africa and he sailed along the shore of the Indian Ocean, reaching India and Sri Lanka. For this reason he was later called Indicopleustes, not in the manuscripts about his work but around the 11th century (see e.g. Theodossiou and Danezis, 2010, p. 211).

Finally, our voyager returned to Alexandria and retreated to the famous Monastery of St. Catharine on Mount Sinai, where he became a monk in 535 and started to write down impressions and descriptions from his voyages around a large part of the then known world: He authored a geographical work entitled *Topographia Christiana* or simply *Cosmographia*, which consisted initially of five books, later of six and finally of twelve. With his *Christian Topography* Cosmas attempted to create a new system of geography, or just a representation of the World, in such a way that it would be in harmony with the teachings of the Holy Scripture. It is not absolutely certain that the name "Cosmas" was his real one; it is generally used because it is written in just one of the copies of *Topographia Christiana*, the one kept in Florence.

It seems that the writing of the *Topographia Christiana* was completed in the middle of the 6th century. According to Roger Pearce (2003): *The date of the work is fairly certain. In book 2, Cosmas tells us that it is 25 years since he was in Axum, and he was there when Elesbaas was preparing his expedition against the Homerites. That expedition probably took place in 525 AD, or possibly 522 AD. At the beginning of book 6, he refers to two eclipses, giving the dates as Mechir 12 and Mesori 24: these would seem to be the eclipses of 6 Feb. 547 and 17 Aug. 547. The logical inference is that the work was written around 550 AD.*

## 3. THE TOPOGRAPHIA CHRISTIANA

In the 12-book version of the *Christian Topography*, many useful pieces of geographical information are contained, which were correctly recorded by Cosmas as an in situ collector of information. He describes the places he visited himself, but also all what he heard about them by both the sailors and the inhabitants of these places. In addition, he drew many maps of these places and sketches of the peculiar animals he saw there. In parallel, he records valuable historical information of his age, since it is certain that he happened to *be there*, when historical events were taking place, such as the military preparations of the king of the Axumites, Elesba(a)s (or Kaleb or Chaleb) against the Jewish people of Yemen (the Homerites). Elesba(a)s, or Elesboas or Kaleb is honoured by the Ethiopian Church as a blessed person: his feast is on May 15. As a king of Axum (Aksum) in Ethiopia, he fought in 525 against the Jewish ruler Dhu-Nawas, who persecuted the Christians in Nedjran, a town in South-Arabia. Also, Emperor Justinian asked Elesbaas for his help against the Persians. Elesbaas

lost a battle against an opponent, and retired to a cell near Axum. He died about 555. (Mertens, Article about: St. Elesba(a)s).

Cosmas had not received any special education (Cosmas, 1968, Book II, 1), and so it is natural that his work contains some very naive cosmographical views, which contradict the worldview of the great astronomer and geographer of the 2<sup>nd</sup> century Claudius Ptolemaeus (Ptolemy). Cosmas outright condemns these views as "false".

The content of *Topographia Christiana*, being a compilation of various topics, does not really correspond to its title, but as a whole it does have an underlying aim: to set the foundations for a novel system of natural geography that would be totally based on the *Bible*. To this end, the polymath scholar and patriarch Photius I (820-893) of Constantinople calls *Topographia Christiana* a simplistic transfer of the descriptions of the *Pentateuch* and he characterizes Cosmas with some scorn as *closer to myth rather than to truth* (Theodossiou and Danezis, 2010, p. 211). Because his language is simple, Photius accuses him of "ignoring the Greek language" and concludes his mention to this work and its author by asserting that "[Cosmas] also writes some other, bizarre things" (Theodossiou and Danezis, 2010, p. 212).

#### 4. THE COSMOLOGICAL VIEWS OF COSMAS INDICOPLEUSTES

Essentially, Cosmas is a zealot heretical (Nestorian) Christian, who has a tremendous zeal to defend the simple cosmology of the Jewish tradition. By combining his empirical geographical observations with certain Biblical references he accepts that, contrary to the then accepted Ptolemaic system that shape of the Earth is not spherical, but flat, long and narrow, like the tabernacle, the house of worship described to Moses by God during the Jewish Exodus from Egypt. In other words, according to Cosmas the Earth is a flat rectangular region - rectangular parallelogram. Similarly, the Universe is a two-floor rectangular parallelepiped box of vast volume, similar to the Arc of the Covenant, having the Earth as its base and the "first heaven" (the highest one) as its cover. This heaven is the one identified as the Heavenly Kingdom and it rests upon the firmament. The firmament in turn forms the "second heaven" which is the heaven of the mortals, in other words the kingdom of the Earth. In essence, this is a belief rooted in the ancient Egyptian cosmogony. The whole system is supported on its four edges, which, in the form of columns, rest upon the four "corners of the Earth" which, as we mentioned already, is believed by Cosmas to be a flat parallelogram area covered by the celestial dome, the firmament and surrounded by the ocean of the waters, beyond which the paradise is located. Cosmas believes that the flat Earth sits upon the bottom of the motionless Universe, which is also non-spherical: it is presented as a huge cubical chamber with a curved (concave) ceiling. Around a bell-shaped mountain towards the North, revolve the Sun, the Moon and the stars, tracing circular orbits, always in accordance with God's orders, who at any given moment can stop and redefine their course, as in the book of Isaiah, where the Sun moved backwards by 10 degrees:

*I will make the shadow cast by the sun go back the ten steps it has gone down on the stairway of Ahaz. So the sunlight went back the ten steps it had gone down.* (The Holy Bible, 1984, Isaiah 38:8)

...and as happened in Gibeon, when Joshua, holding his hands outstretched during the battle of the Israelites with the Amorites, stopped the course of the Sun:

*On the day the Lord gave the Amorites over to Israel, Joshua said to the Lord in the presence of Israel: "O sun, stand still over Gibeon; O moon, over the valley of Aijalon." So the sun stood still, and the moon stopped, till the nation avenged itself on its enemies, as it is written in the book of Jashar? The sun stopped in the middle of the sky and delayed going down about a full day. (The Holy Bible, 1984, Joshua 10:12-13)*

The Sun approaches alternatively the peak and the base of the bell-shaped mountain. This way Cosmas explains the succession of day and night. When the Sun shines and illuminates our part of the Earth, we have day, yet the tall bell-shaped mountain in the north prevents the rays of sunlight to shine on the regions of the Earth that are beyond the other side of the mountain, so darkness prevails upon these lands.

In summer, according to Cosmas, the Sun revolves around the narrow peak of the mountain, and therefore disappears from our view only for a short time span, since this part of the revolution was short; but in winter the Sun revolves around the wide base of the mountain and so the winter nights are longer than the days, since the revolution of the Sun around the huge base of the mountain lasts for a much longer time span.

In addition, Cosmas writes that the stars and the planets do not move by themselves, but they are moved by the "planetary angels", a belief that reached even the 17th century, the age of Johannes Kepler, the "law giver of the skies".

Despite its naive character and its extravagant statements, the *Topographia* was, and still is, important, not for his beliefs about the nature of the world, but for the valuable geographical, cultural and historical information it contains, which is based on his own experiences as an eye witness of the countries he travelled. His popular writing style made the Christian Topography a favorite reading among the less educated Byzantines, since it agreed with their daily experience.

However, most of the Byzantine scholars, rejected his views in the name of the Aristotelian-Ptolemaic Universe. For this reason, in the 12<sup>th</sup> book, Cosmas tries to counter the criticism of other scholarly monks and the Christian Byzantine savants, who did not agree with his views. In the 11<sup>th</sup> book he describes certain parts of India's west coast, where ships were loading pepper, and he also offers significant information about Sri Lanka, which he calls Taprobane: He explains its significance for commerce and he notes that on this island there existed a community of Nestorian Christians.

## 5. EXISTING COPIES OF *TOPOGRAPHIA CHRISTIANA*

The work of Cosmas, *Topographia Christiana*, is saved in three basic copies. One is in Vatican, it is the code Vaticanus Graecus 699, and it was written in the 9th century in Constantinople; it contains only the first ten books. The other two existing copies of the Topography contain all 12 books. They were both dated to the 11th century. The first one is an illustrated manuscript kept in the Monastery of St. Catharine on Mount Sinai (No. 1186), yet it is considered to be a copy written in Cappadocia. The second one, the code *Laurentianus Plutei IX. 28*, is kept in Florence, but it was

written in the Iviron Monastery of Mt Athos. However, there are many more (at least 20) manuscripts that contain minor parts of the *Topographia*.

In Serbian, *Christian Topography* was translated in 1649, by monk Gavriilo Troičanin, in the Monastery of Holy Trinity, and illustrated by Andrija Raičević (Janković, 1989, p. 34). On the influence it had on the formation of erroneous comprehensions, witnesses the manuscript where Cosmas is named the Saint (Stojanović, 1903) as well as some icons and frescoes in Serbian monasteries where the Earth is represented as a flat tablet with a cone like mountain according to Cosmas (Janković, 1989, p. 37).

Cosmas also wrote other works, such as *Geographia* (Cosmographia) and *Astronomia* (astronomical tables), but these were lost; however, besides *Topographia Christiana*, there is one more work by Cosmas that was saved: this is the *Description of the Plants and Animals of India*.

## 6. CONCLUSIONS

For Cosmas the secular wisdom is of no value whatsoever; he elaborates on another logic, in which everything is explained with the use of the sacred texts and especially with the *Old Testament*. His views about the world are based on the theory of the flat Earth, which, in general, is supported by a literal interpretation of the holy texts of all three major monotheistic religions (Judaism, Christianity and Islam). Thus, a considerable part of the work written by Cosmas has as its deeper purpose to lay the foundations of a system of natural geography based on the *Bible*. For this reason, the scholarly patriarch Photius (810-891) labels *Topographia Christiana* as a naive interpretation of *Pentateuch's* contents and he looks down on Cosmas, writing about him rather scornfully.

Cosmas considerably influenced the simple, uneducated members of the lower priesthood, as well as the naive, uneducated laypersons in the Byzantine Empire, because his *Christian Topography* was an original and interesting work that contained a wealth of information of travel-oriented geographical and commercial interest given in a simple language, a fact that made it an easy-to-read and interesting work. While in its age it captivated its readers with its descriptions of exotic places and animals, which always fascinate the wider populace, it is still of interest to modern research scholars and scientists, since the *Christian Topography* continues to be a valuable source for the history of science, commerce and the sea routes of that remote period.

It should not be overlooked that the voyage of an average person to the kingdoms of east Africa, the Red Sea, the Palestine, to Mount Sinai, to the Arabian kingdoms, the Persian Gulf, and especially to India and Sri Lanka was an almost impossible feat.

The *Topography* of Cosmas, apart from its simplistic cosmology, is a significant opus, since it allows the modern reader to take a look upon the world of the sixth century, or at least upon a large part of it, through the pen of an *eye witness* who lived 15 centuries ago, complete with maps, sketches and drawings that decorate and strengthen the text.

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## References

- Cosmas Indicopleustês: 1968, *Topographie Chrétienne*, transl. by Wanda Wolska-Conus, Sources Chrétiennes, volumes I & 2. Les Editions du Cerf, Paris, vol. I, pp. 141, 159, 197.
- Janković, N. Dj.: 1989, *Astronomija u starim srpskim rukopisima*, Serbian Academy of Sciences and Arts, Particular editions, Vol. DXC, Department of natural-mathematical sciences, book 64, in Serbian, Belgrade.
- Manimanis, V., Theodossiou, E., Dimitrijević, M. S.: 2013, European Journal for Science and Theology **9 (2)**, 19.
- Mertens, A. (Franciscan Father), Encyclopedia: Who was a Christian in the holy land? Studium Biblicum Franciscanum (SBF), Jerusalem. Site Hosted by Christusrex.org [Article about: St. Elesba(a)s]. On line:  
<http://www.christusrex.org/www1/ofm/sbf/escurs/wwc/e.html>
- Pearce, Roger: 2003, *Preface*, On line Christian Topography, in English:  
[http://www.tertullian.org/fathers/cosmas\\_12\\_book12.htm](http://www.tertullian.org/fathers/cosmas_12_book12.htm)
- Stojanović, Lj.: 1903, *Katalog Narodne biblioteke IV*, in Serbian, Royal Serbian State Printing Office, Belgrade (Manuscript No. 497).
- The Holy Bible*: 1984, The New International Version Bible, Zondervan Bible Publishers, Grand Rapids, Michigan.
- Theodossiou, E., Danezis, E.: 2010, *At the Years of Byzantium - Byzantine scientists, physicians, chronologers and astronomers*, in Greek, Diavlos Publ., Athens.