*European Journal of Science and Theology*, April 2013, Vol.9, No.2, 19-29

# THE CONTRIBUTION OF BYZANTINE MEN OF THE CHURCH IN SCIENCE COSMAS INDICOPLEUSTES (6TH CENTURY)

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(Received 15 February 2012)

## Abstract

The first Christian centuries in the Byzantine Empire, from the 3rd one to the 6th one, comprise a period in which the Christian religion had to consolidate its place as the dominant religion. Therefore, everything that seemed to contradict the Scriptures had to be adapted to them by any means. For this reason, since Geography did not agree in several instances with the holy texts, and because the Scriptures could not be in error, the Geography of the times had to be harmonized with the holy texts of the new religion. This task was undertaken by the 6th century Nestorian Christian monk Cosmas the 'Indicopleustes'. Cosmas wrote the *Christian Topography*, a work through which he attempted to create a new system of geography or a representation of the World that would fit to the information contained in the Holy Scripture. His work and life are considered here.

*Keywords:* Byzantium, geography, Cosmas Indicopleustes, Christian topography

## 1. Introduction

The study of geography in the Byzantine Empire was considered essential and useful, because this knowledge was necessary for the determination of the location of the Holy Land, as well as for setting the borders between the bishoprics. Therefore, having as starting points the work of the ancient cartographer and geographer Marinus of Tyre (ca. 60/70-130 AD) and the famous opus *The Geography* (also known as *Geographia*, *Cosmographia*, or *Geographike Hyphegesis*) [1] by the great astronomer, mathematician and geographer Claudius Ptolemy (2nd century AD), Byzantine scholars composed their own geographical treatises.

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To be exact, geographical studies and the study of the works of the ancient geographers were taking place mainly, almost exclusively, in the monasteries. The beliefs of the early Byzantine geographers about the Earth, especially those of Cosmas Indicopleustes, were rather imaginary, heavily influenced by the Holy Scripture and its ideas on cosmogony, while the main five geographical works of that period are in their majority mere catalogues of names and city guides for use by the school pupils, students and the visitors of the cities.

The fact that the geographical works of the early Byzantine centuries were basically written travelogues and travel-oriented descriptions indicates the clear difference between the Geography of the Greek antiquity and Geography as it was perceived in the early Byzantine period.

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 Saint Catharine of Mount Sinai. His name was Cosmas, the so-called 'Indicopleustes', i.e. the one who had sailed to India.

## 2. The life of Cosmas Indicopleustes

Cosmas was of Greek origin and he became famous from the work he authored in the Monastery of Saint 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) ([2], Book II, 29), the Kingdom of Axum and its vicinity (the region of the modern countries Ethiopia, Eritrea and Somalia) ([2, p. 159], Book II, 30), the Palestine and the Sinai peninsula ([2, p. 197], 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 [3].

Finally, our voyager returned to Alexandria and retreated to the famous Monastery of Saint 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* (*'Christian Topography'*) 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 (*Laurentianus Plutei IX. 28*).

It seems that the writing of the *Topographia Christiana* was completed in the middle of the 6th century. According to Roger Pearce: *"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."* [Cosmas Indicopleustes, *Christian Topography*. Preface to the online edition, 2003, http://www.tertullian.org/fathers/cosmas_12_book12.htm].

It should be noted that Mechir and Mesori are, respectively, the 6th and the 12th month, of the ancient Egyptian solar calendar, which had Thoth as the first month of its year [4].

## 3. Topographia Christiana

In the 12-book version of the *Christian Topography* [5], 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. Elesbaas sent legates to Palestine in *c.* 550 [6].

Cosmas had not received any special education [2, Book II, 1], and so it is natural that his work contains some very naïve cosmographical views, which contradict the worldview of the great astronomer and geographer of the 2nd 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*" [3]. 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*" [3, 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, the 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.*" (*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.*" (*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 disappeared 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'.

## 5. The theological views of Cosmas and the heresies of his period

As far as the theological ideas contained in the *Christian Topography* are concerned, Cosmas Indicopleustes, being a Nestorian heretic, adopts several views from the works by the earlier Christian bishops Diodorus of Tarsus (? – in office from 378, passed away in 392) and Theodorus of Mopsuhestia (350-429), who expressed Nestorian views. Nestorians, named after Nestorius (386-450), who was archbishop of Constantinople for three years (428-431), separated the two natures of Jesus and stressed the specific content of each of these two natures, which were clearly different from each other. They believed that, if the unification of these two natures was ever possible, this could be only 'moral'. According to their beliefs, the Virgin Mary did not give birth to the pre-existing Logos and Son of God, but just to the human Jesus. Mary, being a human herself, could not generate a God, but only a man, with whom the God-Logos was united later on. Nestorius, along with other representatives of Antiochean theology, such as Theodore of Mopsuhestia, Diodorus of Tarsus and others, used to call Mary *Anthropotokos* (man-bearer) and *Christotokos* (Christ-bearer) instead of *Theotokos* (God-bearer). Nestorius and his teachings were condemned as heretical by the Third Ecumenical Council, which was held in Ephesus in 431. The Council's decision was that Christ had two natures, the divine one and the human one, which were truly and absolutely united in His person, therefore the adjective *Theotokos* is valid for Virgin Mary [7].

Cosmas, in the 5th book of his *Christian Topographia*, mentions three other sects, those of Manicheans, Marcionists [2, Book V, 178] and Montanists [2, Book V, 252]. This fact indicates that these heresies were active and they had followers in Alexandria at the time Cosmas was writing *Topographia*.

Manichaeism was named after the Persian Manes (216-277), who emphasized the eternal struggle between Good and Evil, believing that Jesus was created by the spirit of Good and that his Crucifixion was the work of Satan.

Manichaeism was characterized by the intensity of the clash between Good and Evil and the duality Light-Darkness [7, p. 303].

Marcionism was named after Marcion, a Gnostic from Sinope who taught during the 2nd century. His teaching's main points are the existence of a benevolent-supreme God-Father, the Highest God, who is superior to the God-Creator, who is merely just. The Highest God is perfect and benevolent, while the Creator (who created the World) is just but not benevolent: he is the God of the *Old Testament*, while the God of the *New Testament* is the benevolent Highest God [7, p. 303].

Finally, Montanism was named after Martinus Montanus, a former priest of Cybele, who in 172 AD formulated his theory about a Century of the Father (*Old Testament*), a Century of the Son (*New Testament*) and a Century of the Spirit, the one announced by Montanus himself. He assigned a paramount position to the *Gospel of John*: "*But when the Counselor (Paracletos) comes, whom I shall send to you from the Father, even the Spirit of truth, who proceeds from the Father, he will bear witness to Me*" (John 15.26). So, in *John's Gospel*, Montanus detected the promise of the coming of Paracletos [7, p. 306].

All these sects are mentioned in the work by Cosmas, who at the same time rejects the Greek science and keeps a hostile stance against the 'gentile' education.

## 6. Cosmas Indicopleustes as a geographer

A central point in the main work of Cosmas is his attempt to prove that the Greek geographers were wrong in writing that the Earth is spherical, while in his opinion it is flat. However, this particular view of the flat Earth was of small acceptance even in his day; it was not accepted by the Byzantine scholars, nor by the educated Christian priests.

Nevertheless, despite its naïve 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 views and information were discussed and commented upon by several subsequent scholars, while his popular writing style made the *Christian Topography* [5] a favourite reading among the less educated Byzantines, since it agreed with their daily experience.

However, his near-contemporary eminent Christian philosopher John Philoponus (490-570), who had Monophysitic tendencies, was quick to reject *Topographia Christiana*, along with most of the Byzantine scholars, in the name of the Aristotelian-Ptolemaic Universe. For this reason (see *on line Christian Topography*) parts of the 11th and even more the 12th book of the *Topographia* seem rather disconnected from the work's main topic (geography or topography): Instead, in the 12th 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 11th book he describes certain ports 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. Sri Lanka is also mentioned by Palladius of Helenopolis (364-431 or 368-430, see our previous paper [8]), in his famous work *Epistola de Indicis Gentibus et de Bragmanibus* (*On the nations and Brahmans of India*), where he exploits original material from his personal experience but also from descriptions by Egyptian travellers to India [9].

## 7. Existing copies and editions of *Topographia Christiana*

The work of Cosmas, *Topographia Christiana*, is saved in three basic copies. One is in the 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, i.e. the two books that are rather irrelevant to the work's main topic (the 11th and the 12th, see previous paragraph) are omitted.

The other two existing copies of the *Topography* contain all 12 books. They were both dated in the 11th century. The first one is an illustrated manuscript kept in the Monastery of Saint 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 Mount Athos.

It should be noted that a fourth complete copy of *Topographia Christiana*, which is an exact transcription of the one kept in Florence, dated from 1682, was in England (*Phillips 2581*) but it has been lost and it is not known whether it was destructed or it is kept in some unknown library or in the archive of some secretive collector.

However, there are many more (at least 20) manuscripts that contain minor parts of the *Topographia*. These partial manuscripts contain mainly illustrations: 1) Paris Suppl. Gr. 844, 18th century. Contains only copies of some of the pictures in L. 2) Paris Gr. 2426 (P). 16th century. On ff. 112 ff, contains a copy of most of book 11, copied by Nicholas de la Torre, possibly from the archetype of Z, although it contains more of this book than Z did. The text is handled freely, and seems to relate to the Smyrna manuscript: 3) Smyrna B-8 (Z), ca. 1100 AD, described by Papadopoulos Kerameus in an 1877 catalogue. Selections appear on pp.156-192, under the name of Maximus (written over a shorter name that has been erased). Just a collection of pictures with short bits of text attached to it. 4) Vienna Theol. 9 (W). Selections. Bought in Constantinople by A. Busbeck. Copied from S, or more likely an Ms. similar to S. 5) Vat. Gr. 363 (R2), 10th century. 6) Oxford, Bodleian Library: Ms. Cromwell 15, 11th century. Bought on Mount Athos in 1727. 7) Bodleian Arch. Selden 29. AD 1338, fol. 116 has a catena on Luke, ascribed to *Cosmas Indicopleustes*. 8) Vat. Gr. 342. 12th century, fol. 7v. 9) Vat. Gr. 525. 12th century. fol. 1. 10) Venice, Marcianus Gr. 498. 14th century. fol. 270. 11) Bodleian, Baroc. 15, 12th

century. fol. 22. 12) Turin B. I. 10. 13) Milan, Ambrosian. B. 106. 10th century. 14) Moscow 358, 11th century. 15) Vat. Gr. 1747. 16) Paris Gr. 2743. Once Colbertinus 1476, 16th century, copied by J. Diassorinos. This is mentioned by Montfaucon, and also by Omont, both of whom lead the reader to suppose Cosmas was the author of a commentary on the *Psalms* preserved herein. In fact it contains only the usual chunk of book 5, followed by material from other authors. 17) Paris Gr. 169 (Mazarin-Reg. 3450), 14th century. A similar Ms., with the paragraph expanded by adding a following section from other authors. 18) Vallicellianus C. 4. 16th century. ff. 434-5. Also with the expanded paragraph from book 5. 19) Paris Gr. 3179, 16th century. Copied by Bigot. Also with the expanded paragraph from book 5. 20) Vat. Gr. 711. fol. 196. (More details in the complete list exist in the Preface of the online edition by Roger Pearce, 2003).

As far as printed editions of the work are concerned, *Topographia Christiana* was published for the first time in the West in 1707 by the French scholar and critic Bernard de Montfaucon (1645-1741) in *Collectio nova patrum et scriptorum graecorum* [10]. In 1806 it was included in the 88th volume of *Patrologia Graeca* by J.-P. Migne [5], while as a separate book it was published in London, translated by J. Mac Crindle under the title *The Christian Topography of Cosmas, an Egyptian Monk* (Hakluyt Society Publications, no. 98, London 1897, pages 365) [11] and in Cambridge, England, by E.O. Winsted, as *The Christian Topography of Cosmas Indicopleustes* [12].

The views of Cosmas Indicopleustes as expressed in his *Topographia Christiana* were studied by Wanda Wolska-Conus, who published a pertinent treatise entitled *La Topographie chrétienne de Cosmas Indikopleustês - Théologie et Science du VI siècle* (Paris 1962) [13]. A voluminous work on him was published by Redin [14] as well. In Serbian, *Christian Topography* was translated in 1649, by monk Gavrilo Troičanin, in the Monastery of Holy Trinity, and illustrated by Andrija Raičević [15]. On the influence it had on the formation of erroneous comprehensions, witness the manuscript where Cosmas is named the Saint [16], as well as some icons and frescoes in Serbian monasteries where the Earth is represented as a flat tablet with a conus like mountain according to Cosmas [15, p. 37].

Nowadays the text of *Topographia Christiana* is available on line in the Internet, both the prototype (in Greek) [http://www.hs-augsburg.de/~harsch/graeca/Chronologia/S_post06/Cosmas/cos_ipro.html], and translated in English.

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* [17] (contained in Thevenot's *Relation des divers Voyages curieux*). This work was compiled from first-hand information and it was published in Paris by Melchisédec Thévenot (1663).

## 8. Conclusions

In the middle of the 6th century AD the Hellenistic antiquity reaches its end. In this age of the early Byzantine period the Near and the Middle East become Christian at a fast pace. However, the struggle between the two worlds, the old 'gentile' one and the emerging Christian one, is intense and it appears both indirectly, through ancient philosophical elements in the dogmas of Christian sects, and directly, in the form of the confrontation between the last scholars of the ancient world and the bishops and priests of the Church.

In this contest comes to participate a dynamic Nestorian monk, 'Cosmas the Indicopleustes', an uneducated but much travelled man. Armed with the practical knowledge he amassed from his distant voyages, he writes the *Christian Topography*, a work that essentially stands against the correct theories of the Greek astronomers and geographers of antiquity, who wrote and taught about the sphericity of the Earth.

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 naïve interpretation of the *Pentateuch*'s contents and he looks down on Cosmas, writing about him rather scornfully.

In reality, Cosmas does not represent the Christian Church, since he is just a Nestorian (heretic) monk and his views were not accepted by the educated priests or the leaders of the Church. Neither does he represent some scientific or cultural or spiritual or ideological current inside the Church. However, he considerably influenced the simple, uneducated members of the lower priesthood, as well as the naïve, 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.

On the other side, it can be said that *Topographia Christiana* was one of the earlier Byzantine works that indicate the results of the abandonment of the ancient secular education, which had started from the previous centuries. Apart from natural sciences such as astronomy, cosmology and geography, the classic medicine as the legacy of the great doctors of Greek and Hellenistic antiquity gradually retreats during the same period, without losing its representatives: the populace begins to assign metaphysical causes of the diseases and to consider them as merely a form of divine punishment, a belief that can be find even nowadays, especially in the Third World countries. In this way, in the Byzantine Empire after the $7^{th}$ century the medical doctor was gradually replaced by the monk or the equivalent of the Russian *starets*, who was called in order to drive away the disease, or rather the demons that caused it, by reading prayers, giving their blessing and burning incense [18].

Only centuries later, in the period of the Palaiologean Dynasty (1261-1453) a relative Renaissance of the sciences and culture happened in the Byzantine Empire, however it was too late for a true revival of sciences as the Empire was then in permanent political and territorial decline and the fall of the capital Constantinople to the Ottoman Turks was near (1453).

This paper is the continuation of our previous work on the connections between spirituality and science [19, 20], on the contribution of the Church in Byzantium to the Natural sciences [21-23], the anti-astrology stance of the Church Fathers [24] and on the contribution of the Church in Byzantium to Geography [8].

## Acknowledgements

This study formed part of the research at the National and Kapodistrian University of Athens, Department of Astrophysics, Astronomy and Mechanics, and we are grateful to the University of Athens for financial support through the Special Account for Research Grants. It is also supported by the Ministry of Education and Science of the Republic of Serbia, through the project III44002.

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