
**THE CONTRIBUTION OF BYZANTINE PRIESTS IN
ASTRONOMY AND COSMOLOGY**

**I. THE CHURCH FATHERS: THE THREE BISHOPS ST.
BASIL THE GREAT, ST. GREGORY OF NAZIANZUS
AND ST. JOHN CHRYSOSTOM**

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Abstract

The life and work of the three Cappadocian bishops: Saint Basil the Great (330-379), Saint Gregory of Nazianzus (329-390) and Saint John Chrysostom (347-407), as well as their contribution to the Natural sciences, especially to Astronomy and Cosmology, have been examined and considered.

Keywords: Byzantium, Natural sciences, Cosmology, History of astronomy, Basil the Great, Gregory of Nazianzus, John Chrysostom

1. Introduction

On the opposite side of Emperor Julian and of the scholars who practiced astrology during the early Byzantine period, a number of Church Fathers ('Doctors of the Church') and bishops flourished and left a legacy in Philosophy and Science without belonging to a school, or representing one.

Some of these Church scholars were educated in the neo-Platonic school of Athens and they essentially formulated the Christian dogma, representing Christianity, since the Christian philosophy of that age was shaped on the basis of neo-Platonic and Aristotelian influences.

The main representatives of this current of thought in the early Byzantine period are above all others the three Church Fathers from Cappadocia: Saint Basil the Great, Saint Gregory of Nazianzus and Saint John Chrysostom.

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These three were followed by the eminent bishops Saint Gregory of Nyssa, Epiphanius of Cyprus, Asterius of Amasseia, Cyril I of Alexandria, Synesius (who can be said to represent the school of Alexandria), Caesarius, Nemesius of Emessa (Syria) and finally the monk Dionysius Exiguus, who compiled *Easter Canons*.

This first paper on the Church Fathers and bishops deals with the Cosmology of the three great Cappadocian Fathers, the ‘Three Prelates’ as they are known in Greece; in a following paper we will examine the work of other eminent bishops and their contribution in the natural sciences.

2. The golden age of Theology and Ecclesiastical rhetorics

During the first century of its life, the Eastern Roman Empire, later called the Byzantine Empire by historians, struggled to discover and then to impose its new, Christian identity. In this context it was very important to construct the Christian dogma and a world view based on the Old Testament; on these two challenges were concentrated the efforts of the Christian scholars. This twin feat was achieved by the great Cappadocian bishops Saint Basil the Great (330-379), Saint Gregory of Nazianzus (329-390) and Saint Gregory of Nyssa, who was brother of Saint Basil. Thanks to them and to Saint John Chrysostom (347-407) the 4th century AD was called the ‘Golden Age’ of Theology and ecclesiastical rhetorics.

Professor Athanassios V. Vertsetis writes in his book *General Didactics* about the evolution of the art of teaching: “*The Fathers of the Church faced the issue of the methodology of teaching within the frame of the needs of Church rhetorics and catechism, and they examined the whole topic only relative to the monologic persuasive preaching. The Byzantine empire, as it is known, contributed nothing to the sciences; the Aristotelian dogmatism that prevailed during the whole Medieval period did not favor creative advances.*” [1]

It is true that initially the position of the official Church, as a representative of a new and novel religion that was expanding to the point of prevalence, was quite negative towards the gentile science, since the latter was a product of the ancient pagan world. However, Astronomy was indispensable, because a calendar should be devised for the determination of the Christian holy days, especially of the date of the Easter. For this reason the wise bishops studied Astronomy and through this knowledge they approached the Cosmology and cosmogony of the *Old Testament*. Actually, in order to reconcile the astronomical views of their age with the cosmogony described in the Book of *Genesis*, they wrote treatises *On the Six-day Creation (Peri Hexahemerou or On Hexameron)* that became staple texts of the spiritual production of the 4th century [2]. As Th. Nikolaidis writes, “*The most important texts were the ‘Homilies to the Six-day Creation’ by Saint Basil the Great and those by his brother, Saint Gregory of Nyssa, treatises that exerted an especially strong influence, not only in the East but also in the West.*” [3].

Most bishops were involved, in addition to their pastoral and theological work, in teaching and Astronomy, the science of time measurement and of the heavens, while they also wrote about Astronomy and cosmogony. Let us examine first the life and work of the three Cappadocian bishops: Saint Basil the Great, Saint Gregory of Nazianzus and Saint John Chrysostom.

3. Saint Basil the Great (330-379)

Basil (Vassilios) was born in Neocaesareia, on the Black Sea shore, in the year Constantinople was founded (330). His family was a pious Christian one; his father was Basil, a teacher of Rhetorics and his mother Emmeleia. His grandmother, Macrina, was a daughter of a martyr and she was taught the primal Christian theology by Gregory the Illuminator (c. 257–c. 331), the patron saint of Armenia.

After he received an elementary education in Neocaesareia, Basil continued his studies in Caesareia of Cappadocia, in Antioch, in Constantinople (under the gentile orator Livianus) and in the famous neo-Platonic school of Athens, where philosophers Imerius and Proaeresius were teaching. In these student years Basil became a friend of Gregory of Nazianzus, while he also met with Julian, the subsequent Emperor Julian the ‘Renegade’ (*Paravates*). When he returned in his homeland, Basil followed a monastic life for quite a while. In Caesareia Basil was ordained a deacon, a priest and later on he became a bishop (370-379). After his death he was elevated to the ranks of the saints of the Church due to his broad work as a philanthropist; his younger brothers Gregory of Nyssa and Peter of Sebasteia, and sister Macrina, were also sanctified.

During the several years of his studies Basil received a wide classical education. He studied Grammar, Rhetorics, Medicine, Philosophy, Geometry, Mathematics and Astronomy. However, as far as the study of Astronomy is concerned, Basil in his *Homilies to the Six-day Creation (The Hexameron, 379 AD)* writes: “*What is the meaning of Geometries and of the methods of Mathematics, of the stereometries and of the much-celebrated Astronomy, of all this multi-sided vanity, if all who ardently keep themselves busy with them made the thought that the world we see has the same origin with the Creator of everything God, thus equating in grandeur the limited and material world with the limitless and invisible nature?*” [4].

Nevertheless, it seems that when Basil the Great calls Astronomy a ‘vanity’ he most probably means what we now know as astrology. This view is supported by the fact that in other texts he considers the observation of the stars necessary, because through it, as he writes, we become acquainted with the divine wisdom and we receive important precept from its knowledge; but up to a certain point: one should not examine the stars beyond what is necessary. Indeed the polymath Father of the Church notes: “*What other does the moon teach us by becoming full and waning once again, except to avoid thinking great about the prosperities of life? I only suffice not to examine the signs that come from the stars beyond what is necessary.*” [4]

Basil's classical culture enabled him to teach properly in his *Treatise towards the young* [5] on the issue of the place of the secular education in the Christian school and, in doing so, to influence the stance of the Church with respect to the classical education both then and during the Renaissance.

According to the late professor of Byzantine studies N. Tomadakis: "While Basil the Great wrote a treatise on how children would benefit from the Greek texts, it should not be assumed that in this work the Church Father was advising the youth to adopt the thought of the classics; on the contrary. In books full of wrong beliefs and myths he was able to find several episodes that possessed a moral value and hence they could be used to form the character of the Christian children, nothing more. Basil and the other great Fathers studied of course excellent Greek in the Greek schools of Athens and of the East, however the influence of the Jewish spirit through the Scriptures was deep upon them... They studied the Greek authors for the favour of Rhetorics. The beautiful, the aesthetically good element, was of no interest to them when it was unrelated to the true and attached to the gentile element. And 'true' was only the revealed religion as a relation to God, while moral was only the teaching of Christianity." [6]

Basil studied Astronomy in Athens and his views on the cosmological visualization of our World are noteworthy, showing his effort to render the Greek and Hellenistic model of the Universe compatible with the Book of *Genesis*. According to G. Katsiampoura [7]: "Basil was opposed with fervour to the view that the world is eternal ('aidius'), without a beginning or an end, an Aristotelian view already well-established in the 4th century. Without formulating a new personal cosmology, Basil adopts the cosmology of the Book of *Genesis* about the creation of the Universe out of nothing by the Christian Creator, as mentioned by V.N. Tatakis [8]. This perception, which will form the official cosmological view in the Medieval times, lies under the fact that Ptolemy's main cosmological work, the 'Hypotheseis Planomenon', does not experience the dissemination of the respective astronomical work of the same author. On the other side, as far as the shape of the Earth and its place at the centre of the Universe are concerned, these are accepted by Basil as they are described by Aristotle and the Ptolemaic system without question. The only new element added by Basil with respect to the Universe is the existence of an additional sphere, that of the celestial waters, beyond the 8th sphere of the fixed stars described by Ptolemy. This ninth sphere separates the world of the material creation from the world of God. Much later, in the Medieval Age, even more spheres would be added. Nevertheless, the cosmological view expressed by Basil and adopted by the Church could coexist with the Ptolemaic system of the world; it is impossible to replace Ptolemy's astronomical system, because it is incomplete, interested more in the first cause of the Creation, cosmogony, than in the astronomical calculations of the Alexandrine savant and of his succeeding astronomers, as Th. Nikolaidis mentions [3]."

4. The schools of Antioch and Alexandria

As a conclusion it can be said that Christian cosmology's foundation was laid by the work of Basil the Great, who, having studied in the gentile schools, was well acquainted with the principles of the Greek cosmology: The Earth was spherical, surrounded by a spherical sky and other spheres, the uppermost one being the vast 8th sphere of the fixed stars.

As a Christian priest, however, he also knew well the Jewish cosmology of the Book of *Genesis*. This cosmology is purely theological in its content, describing the Universe indirectly, through its creation by the omnipotent God within six days. According to this view of the world the Earth is supported by waters under it, the Sun is on the firmament along with the other (the fixed) stars and everything is surrounded by the universal waters, in accordance with the Babylonian model of the Universe [9].

We should not be impressed by this general view of the wise men of that era. Even today, during the Orthodox service of the Good Thursday it is chanted: "... *the One who suspended the Earth among the waters.*"

In addition, according to the Judeo-Christian model of the Universe, this has one beginning: the moment of its creation by the creator God. It also has an end: during the Second Coming. All these should be coupled with the Greek/Hellenistic cosmology and some views should be eliminated — for example the fact that in the Greek cosmology of Aristotle and Ptolemy (2nd century AD) there was the sub-lunar destructible space and the space above the Moon, which was eternal and indestructible; this was an unacceptable view for a Christian thinker, since only God can be eternal and indestructible: if the space above the Moon had these properties, then the creation itself would be equally important with the creator God!

Following the description of the world's creation within six days, the Christian scholars, including Saint Basil the Great, entitled their works *On the Six-day Creation (Peri Hexahemerou or On Hexameron)*. Essentially, despite the fact that Basil was educated in the Neo-Platonic school of Athens, his philosophy and ideology approaches more the views of Clement of Alexandria (c.150-211/216), Origen (185-251) and especially the theology of the Jewish scholar Philo of Alexandria (25 BC-40 AD). Through all these thinkers and subsequently by Augustine of Hippo (354-430), who was influenced a lot by the texts of both Saint Basil the Great and Saint Gregory of Nyssa, Platonic philosophy was introduced in the deeper theological core of the Christian Church [10].

Philo of Alexandria was the most important representative of the Alexandrine Jewish theology; he attempted to combine and reconcile Greek philosophy, especially the 'most holy Plato', with the wisdom of the Scripture (our *Old Testament*). His ideas stem from the notion of God as a clear, absolute, super-perfect and blissful entity, of whom we know only the existence, but not the essence.

The term *hexahemeros* ('six-day') occurs first in the writings of this Platonic philosopher and through Theophilus, the sixth bishop of Antioch (since 169) [11], was passed to the subsequent Fathers and was essentially established by Basil the Great with his famous *Nine Homilies to the Six-Day Creation* [12]. It is natural that here the views of two eminent Christian schools of thought slip into and are combined in this work. On the one side the worldview of the Antioch, which more or less interprets the Scriptures literally and expresses the Asian cosmological views (flat Earth and Universe of various shapes). On the other side the worldview of the Alexandria school, which due to its Greek and Hellenistic background interprets *Genesis* in a more metaphorical way in order to adapt it to the more advanced cosmological system of the Alexandrine natural philosophers, with its spherical Earth and a spherical Universe that has the Earth at its centre [13].

5. The heresies torment the Church

From the middle of the 4th century up to the 8th century various heresies and schisms trouble the Christian Church and more generally the Christian empire. The Church reacts through the Ecumenical Councils in its attempt to clarify and establish the Christian Faith. This had the effect that everything was centred through the topic and scope of the unity of the Church, which also reflected the unity of the empire. Therefore, it was very difficult for any scholar to think of and work on something different.

The great theological antitheses arising with these heresies, which were often oppositions between different cosmogony or cosmological views, lasted for about five centuries and they were recorded in the decisions of the Ecumenical Councils and in the texts of the Church Fathers. These differing views were often based upon different philosophical positions; for example the Nestorians, the followers of Nestorius of Constantinople, represented the Aristotelians of the Antioch school and they opposed to the Platonists of the Alexandrine school, led by Cyril I of Alexandria. Several heresies created a world model that was different from that of the Old Testament [14].

6. The works of Saint Basil the Great

Basil ended up as a very prolific author of the Church, a Father who struggled for Orthodoxy and against the heretical views of his period. First of all, he opposes to many views of the ancient Greek philosophy that do not agree with the Christian cosmological model; in addition he strongly opposes to certain Christian heretical views that also express or imply a world model different from that of the *Old Testament*.

For his tireless teaching and writing despite his fragile health, Basil was called by the Church 'Great' ecumenical Teacher. All of his works can be found in the *Patrologia Graeca* [15].

Basil's works can be divided into four broad categories: dogmatic, practical, homilies and epistulae (letters).

6.1. Dogmatic

- *Refutation of the Apology of the Impious Eunomius (Adversus Eunomium);*
- *On the Holy Spirit.*

6.2. Practical

- *Ascetics (Asketika)*, of which the main genuine parts are the *Moralia*, the *Regulae tractatae* (in 55 + 80 chapters) [15, vol. 31, pp. 905-1052 and pp.1052-1306], works that were used as the basis of the monastic life in the East;
- *Address to Young Men on Greek Literature* (alternatively: *Address To Young Men On How They Might Derive Benefit From Greek Literature*), where he expands on his view that the Greek literature has a relative value, which is preparatory for the understanding of the Holy Scriptures, and therefore only those Greek texts that teach us virtue should be read;
- *Two Homilies on Baptism;*
- *A Divine Liturgy*, which is still performed by the Orthodox Church 10 times per year.

6.3. Homilies

- Hermeneutic, such as the *Nine Homilies to the Six-day Creation, On the Psalms, On Passages of the Scripture et a;*
- Moral, such as: *On Fasting, To the Rich, Against Anger, De humilitate;*
- Panygeric (Panygyric), to martyrs;
- Dogmatic: *Quod Deus non est auctor malorum (On that God is not the cause of Evil), De fide (On Faith), Contra Sabellianos et Arium et Anomæos (Against Savellians, Against Arius and the Unlawful), et al.*

6.4. Letters

About 350 letters are attributed to Saint Basil the Great.

Of special interest for those that study Theology, Philosophy and the History and philosophy of the sciences are the *Nine Homilies to the Six-Day Creation* and the letters, which show his broad and deep knowledge in Astronomy but also in Meteorology.

This is mentioned by professor K.D. Georgoulis: "*From a philosophical point of view, of special interest are the 'Nine Homilies to the Six-Day Creation'. In these Basil has incorporated his views in Physics, Cosmology and Anthropology. He exhibits a love towards nature and he appears to be a keen observer of natural phenomena and events... Nature is esteemed as a creation*

that was created by God through His wisdom... Basil the Great in these Homilies lays the foundations for the new stance of Christianity towards the physical reality. This work introduces him not only as a sharp observer but also as a connoisseur of the Aristotelian works on natural history.” [16]

The *Nine Homilies to the Six-Day Creation* is a work rich in astronomical information and in the corresponding philosophical approaches of Cosmology; in the past our research team has made announcements on these thoughts and approaches of Basil the Great in international conferences of History and philosophy of astronomy and Natural sciences [17].

The *Nine Homilies* were translated for the first time in Latin by the Byzantine scholar and philosopher Ioannis Argyropoulos (1410-1490), who earned the seat of Greek studies at the University of Florence in 1456 and stayed there at least up to 1471.

The Emeritus professor of Astrophysics Sotirios N. Svolopoulos comments on Saint Basil's *Nine Homilies*: “*In two of these homilies much of Basil's astronomical knowledge appears. By analyzing the word 'beginning' (archè), he shows from the start an excellent use of dialectics, with the development of the mathematical notion of the point, of the impossibility of its subdivision, of the notion of time and of the beginning of time, coming to the conclusion of the impossibility of the existence of an infinite number of time beginnings. It would not be possible for time to exist before the creation of matter, for the notion of time is interwoven with the notion of change. Therefore, the Creation of the Universe was momentary and timeless (without time). And because the world has a beginning, Basil does not doubt that it will also have an end.*” [18]

Basil the Great, bishop of Caesareia in Cappadocia and a saint of both the Eastern and the Western Christian Church, was explaining in a simple and understandable way in his first *Homily to the Six-Day Creation*, many centuries before the rise of modern science, that time as humans perceive it is not the same as motion, but it measures it through the effects of change and weathering it causes.

He also came through logical processes to the same conclusion modern Cosmology and Physics has arrived at: that time was born together with the Universe, i.e. along with the three-dimensional Euclidean space, giving an excellent philosophical explanation of the notion of the 'beginning' as far as the Creation is concerned.

More specifically, this great father of the Orthodox Church writes: “*The flow of time, which is always in a hurry, it rolls and leaves, never stops; or is not so? The past disappeared, the future has not yet come and the present slips out of our perception before we grasp itTherefore [time] was necessary for the bodies of animals and plants, which out of a necessity are bound to a flow and are joined by the motion that leads to the birth or to the decline, that causes them to be contained in the nature of time, which presents a special character according to the object or body that undergoes the change.*” [4, p. 16]

In another passage of the *Nine Homilies to the Six-Day Creation* Basil mentions: “*Perhaps because the Creation was made in an instance and without the intervention of time, it was said that ‘in the beginning He created’; for the beginning has no parts, nor dimensions. In the same way the beginning of the road is not road by itself and the beginning of the house is not house, the beginning of time is not time, not even the smallest time interval. If someone objects to this and supports the view that the beginning is time, let him know that he will need to divide it in the parts of time, which are beginning, the middle and the end. But to invent a ‘beginning of a beginning’ is absurd, and whoever bisects the beginning will produce two beginnings instead of one, or rather an infinite number of beginnings, for whatever gets divided this way it is divided ad infinitum to other parts.*” [4, p. 18]

As a conclusion of the previous analysis, according to the views of Basil, the Universe was created outside of time. In other words the notion of the three spatial dimensions, of time and of the perceptible Euclidean space is a *result* of the creation of a perceptible Universe, i.e. what exactly is accepted by the modern Cosmology [11, p. 53].

About the *Nine Homilies to the Six-Day Creation* the professor of the School of Theology at the University of Athens father George D. Metallinos writes: “*Basil the Great offers with his ‘Six-Day’ (P.G. 29, 3-208) a classical example of Orthodox use of scientific knowledge. He achieves the connection of biblical and scientific facts through a continuous transcending of Science. He refutes the materialistic theories and the heretical faults by passing into the theological (and not metaphysical) explanation... Basil the Great himself, being affirmative to Science, as an omni scientist, he also accepts its god-centered character.*” [19]

Basil, having studied the Greek pre-Socratic philosophers, Plato and Aristotle, and especially the latter’s *Meteorologics* [20], offers in his works scientific explanations about the formation of the rainbow, of the rain itself, of the lightning, of the thunder and of other natural phenomena [15, vol. 29, p. 292].

As far as the triadic nature of God, Basil the Great accepts that the Father, the Son and the Holy Spirit as a set possess common characteristics: ‘They’ are infinite, impossible to be understood, indescribable and unbuilt (or inbuilt). Moreover, the clarification of the terms ‘essence’ (‘ousia’) and ‘substance’ (‘hypostasis’) by Basil not only formed the dogma of the Holy Trinity in an age when heresies tormented the Church, but also it served as a basis for the correct explanation of the relation between the two natures of the theanthrope Jesus Christ.

The Orthodox Church commemorates Saint Basil the Great, the first of the great ecumenical teachers and Church Fathers, on January 1, but also on January 30 together with Saint Gregory of Nazianzus and Saint John Chrysostom in the festival of the ‘Three High Priests’. The Western Church celebrates his memory on June 14.

6.5. Some conclusions about the Homilies to the Six-Day Creation

Summing up, it can be said that Basil the Great:

1. Opposes the ancient Greek philosophy and certain Christian sects in that he does not accept the eternal and indestructible nature to the world above the Moon, since this world, too, had a beginning and so it will also have an end. According to Basil the eternal and immortal nature belongs only to God.
2. He accepts in general the ideas of the Greek and Alexandrian (Hellenistic) astronomy, i.e. the geocentric Ptolemaic system of the world. The spherical Earth lies at the centre of concentric spheres that reach up to the 8th sphere of the fixed stars. Consequently Basil does not accept the Asian cosmology, nor the ideas of the Antioch School; for this reason and because of his Greek education he reads *Genesis* in an allegorical way as far as the ordering and the motion of the world are concerned.
3. He adds another sphere, that of the celestial waters, beyond the 8th sphere of the fixed stars described by Claudius Ptolemy. This ninth sphere separates the world of the material creation from the world of God. He does so in order to agree with the biblical phrase '*above the seas He laid its foundations*' (meaning the Earth), a phrase he explains by writing that around the Earth there are waters everywhere, because there is the ninth sphere of the celestial waters.
4. Essentially, he attempts to create a compatibility and accordance between the Hellenistic astronomy (especially Ptolemy's *Great Syntaxis*) with the Judeo-Christian cosmology, to the extent of course that this feat is possible. He succeeds in separating the theoretical Hellenistic astronomy from cosmology by formulating a kind of 'personal school of thought' and generating a tradition that was followed by all subsequent Byzantine scholars to the age of Theodoros Metochites (1260/61–1331), who formulates scientific astronomy in the late Byzantine period [21].
5. He also interprets allegorically the verse of the *Psalms* 75: "*I bear up the pillars of it*", which refers to the supporting of the Earth. He explains that these 'columns' are nothing more than the force that holds the Earth at the centre of the world (geocentric system).
6. Finally, to the verse of the *Genesis* that mentions that "*the Earth was formless and empty*", which offered arguments to the heresy of the Gnostics [15] (they interpreted it to mean that Earth pre-existed before the Creation in the form of a formless matter) Basil gave a very simple interpretation: He suggested that the term 'empty' means that the Earth had not 'constructed' yet its natural world, i.e. the plant life, while the term 'formless' means that Earth was invisible because it was covered by the cosmic waters or because of the primordial darkness.

After Saint Basil the Great and his important philosophical and cosmological work, let us examine the other two bishops, who, in spite of their classical education and culture, are short of the cosmological background of Basil the Great.

7. Saint Gregory of Nazianzus (329-390)

Gregory was born in 329 in the small town of Arianzòs, near Nazianzòs of Cappadocia, hence he is called ‘of Nazianzus’ or **Nazianzen** (Greek: ‘Nazianzinòs’) from the wider area of his birth. Because of the power of his theological texts (mainly of the five theological treatises he wrote as bishop of Constantinople against the Arians) he is also called Gregory the Theologian. His father’s name was also Gregory and he lived from 280 to 374; the father was a bishop of Nazianzòs and he is commemorated on January 1, along with Basil the Great’s memory.

Gregory the younger received his basic education in Caesareia, where he was acquainted with Basil and the two adolescents continued their studies in Athens (the neo-Platonic school), where they received their secular education.

Gregory of Nazianzus became at first bishop of Sasima (372) and afterwards bishop of Constantinople (379). He was a profound and eminent orator, Church writer and poet. He is considered the best theologian of the Church after Saint John the Evangelist. In addition to his many theological works, which are the objects of study by other researchers, Gregory as the recipient of a very wide classical education presents in his texts a multitude of astronomical and cosmological topics that are of special interest to us, while at the same time he seeks for the harmonization of Christianity with the world.

Gregory of Nazianzus was the pioneer of an archaic-Christian humanism. In general his philosophy is influenced by Neo-Platonists, while his ascetic ideas were influenced by Stoicism. He is classified as a Neo-Platonic Church writer of the series of the Cappadocian Fathers of the Church, who formed the most important factor for the development of the Christian teaching on a philosophical basis.

Gregory himself wrote more than 245 *Letters* and 45 *Homilies*, where, *inter alia*, he presents the astronomy of his age. Of course, in his words, “*astronomy was considered a dangerous education subject*” [15, vol. 35, p. 761], he most probably means astrology, since in both his *Letters* and *Homilies* he refers to basic astronomical topics: to the stars, the Sun, the solar and lunar eclipses, the Milky Way Galaxy, the zodiac, and also to meteorological matters, such as the lightning and the thunders [15, vol. 36, p. 68]. His whole work can be found in the *Patrologia Graeca* [15, vol. 35-38], while still other works attributed to him by some sources, works generally considered as non-genuine, such as a treatise *Against astrologers*.

The Orthodox Church commemorates Saint Gregory of Nazianzus on January 25, but also on January 30 together with Saint Basil the Great and Saint John Chrysostom in the festival of the ‘Three High Priests’.

8. Saint John Chrysostom (347-407)

John Chrysostom, the great Father of the Church, was born in Antioch of Syria in 347. His father was Secundus, a military officer, and his mother was the pious Anthoussa. He was educated in the schools of his hometown under the supervision of the philosopher Andragathius and the teacher of rhetorics Livianus; this way he was acquainted with the great orators of antiquity and the influence of classical studies is obvious in his whole work, which bears the seal of the ease in expressing himself.

Afterwards, following a prompt by the bishop Meletius of Antioch, John studied in the theological school of Antioch, whose director was Diodorus, the subsequent bishop of Tarsos. John was distinguished especially in the study of literature and in the classical studies, and became one of the greatest Fathers of the Church, an ecumenical teacher and the greatest orator of the Church: '*A Great initiator and leader into the great mysteries of God*'.

John was ordained a deacon in 380 in Antioch by bishop Meletius and a priest in 385 by Flavianus, the successor of Meletius. Finally, on December 15, 397, after the death of archbishop Nectarius, John was ordained bishop of Constantinople, assuming this throne on February 26, 398 AD, as '*the first great in essence ecumenical patriarch, before this title decorated the throne of the Queen of the Cities*'. In his sermons, John strictly criticized the life of eminent persons of the Empire and with his powerful personality he became a central figure of the public and social life of Constantinople. Being a great orator and proponent of Christian morality, he clashed with the highest social class and subsequently, in 402, the so-called '*epi Dryn*' (i.e. 'on the oak tree') Council unfrocked him with a fixed trial. However, the reaction of the people in favour of his worthy Church leader resulted in his call-back from the exile and in his return to the bishop's seat. Yet, in early 403, due to his unrelenting character, he clashed with the empress Eudoxia and the great logothetis Eutropius, a clash that led him to the exile, first in the city of Coucoussos in Armenia and afterwards (because with his correspondence he was still influencing his followers) further away, in the castle of Pityous near Caucasus. On his way to the latter he succumbed to the hardships and died in Comana of Pontos, on September 14, 407. He was buried there, in the church of Saint Basiliscus the martyr, while 31 years later, on January 27, 438 AD, his bones were transferred in Constantinople by his student Proclus, then bishop of the city.

John was an ardent orator and after the 6th century the adjective 'Chrysostom' (Greek *Chrysostomos*, meaning 'gold-mouth', i.e. that the speech was exiting as gold from his mouth) accompanies his name as a reminder of his speeches and sermons, as his rhetorical ability made his texts excellent specimens of Church literature. His work as a writer is enormous in volume and quality (he is the most prolific Father of the Church) and consists of *Treatises*, *Essays*, *Homilies* and *Letters*. In these he urges Christians to send their children to the monks in order to learn to read and write, using the *Scriptures* and the *Psalms* [15, vol. 47, p. 379], and not to the secular teachers, who were also

teaching ancient writers, because the study of the texts of the ancients increases, as he was saying, the thoughtlessness of the children [22].

The Byzantine people, as we know from historians of that age, believed generally in the ‘birthday astrology’ and therefore John Chrysostom warned: “*It is not the task of astronomy to learn from the stars about the people being born*” [15, vol. 57, p. 61, 62]. This is evidence that he tried to strengthen the Christian faith, because he knew the culture of the Greek writers, and he wanted to combat astrology and not Astronomy.

John’s treatise *About the Holy Orders* is considered especially eminent, while from his speeches of special importance are the 21 speeches *To the Statues* (prompted by the destruction of the emperors’ statues by the Antiochians) and the two speeches *To Eutropius*.

Beyond these, the quality of John’s astronomical knowledge is impressive and he has offered a deeply scientific (based on Astronomy) treatment on the issue of the nature of the Star of Bethlehem [11, p. 441, 442]. In it he demonstrates in detail that the Star of Bethlehem could not be, from its description, some strictly defined astronomical phenomenon [15, vol. 57, p. 64, 65]. This means that according to him the existence of the historical Jesus and his divine character cannot be connected in any way with the apparition or the occurrence of some astronomical event in the period of his birth.

However, in spite of these correct astronomical views, it seems that John was supporting a system of the world that approached the views of the Antiochian school, which, as already mentioned, was interpreting *Genesis* word by word, i.e. they believed that the Earth was flat and that the Universe had many forms.

The Orthodox Church commemorates Saint John Chrysostom on November 13, on December 15, on January 27 (the transfer of his bones), but also on January 30 together with Saint Basil the Great and Saint Gregory of Nazianzus in the festival of the ‘Three High Priests’.

9. Conclusions

It is very important to note that the ‘Three High Priests’ had a Greek education, a Greek culture and (therefore) a Greek mentality. Their whole philosophical outlook is expressed (although he often calls the ancient philosophy ‘vain philosophy’) by the famous text of Basil ‘*For the youth, as if they were benefited by Greek literature*’, where he develops the view that the Greek culture and education (poetry, History, rhetorics, Philosophy, music and Astronomy) can be proved very useful after all for a Christian pupil, for it exercises the mind of the pupils to discipline and assists the consolidation of the Christian principles, if of course a proper selection is done of authors and their texts, as Basil says.

Indeed, Christianity through the great Church Fathers assimilated many elements of the Greek civilization, creating the Graeco-Christian civilization with Alexandria, Antioch and Cappadocia as its centres.

This paper is the continuation of our previous work on the connections between spirituality and science [23, 24] and on the contribution of the church in Byzantium to the natural sciences [25]. In our next paper in this series we shall examine the cosmological work and the contribution to the sciences of the following high priests (bishops): Saint Gregory of Nyssa, Epiphanius of Cyprus (315-403), Asterius of Amaseia (4th century), Cyril I of Alexandria (370-444), Synesius of Cyrene (370-414), Caesarius (4th century), Nemesius of Emessa (4th to 5th century) and Dionysius Exiguus (5th to 6th century). We shall especially analyze the work of Saint Gregory of Nyssa, the brother of Basil the Great, who wrote *Apologetic Speech to the Six-Day Creation* [15, vol. 44, p. 61-124] and was elevated to the status of an eminent Christian cosmologist.

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