

Gregory of Nyssa's Fourth Century Water Organ (a Reconstruction) and the Elements of Creation in His Texts: Water, Air, Fire and Earth

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Abstract:

Gregory of Nyssa (c. 335 - c. 395), as the Platonists and most of the ancient thinkers, consider water, air, fire, and earth to be the fundamentals of the created world. He qualifies the human person to be a microcosm, a small world that reproduces the universe.

*When, in his dialogue **On the Soul and the Resurrection**, [1] Nyssen describes two of the constituents of creation (air and water) and exemplifies how people use them, he does so by presenting a mechanism powered by those.*

This article presents a twenty first century reconstruction of that 'installation' described by Gregory in the fourth century AD.

Keywords: *Gregory of Nyssa, Macrina, Moses, earth, water, air, and fire*

Gregory of Nyssa (c. 335 - c. 395) held that a person is a microcosm, a small world that reproduces the greater one; he affirms this through the mouth of his sister Macrina: "It has been said by the **wise that a human being is a microcosm** and as such it contains in itself the same components the entire universe does;" PG 46: 28B. [2] These are both material and non-material in nature, and are mixed together. Concerning the physical elements, they consists in water, air, earth, and fire, as the science and the philosophy up to and of Nyssen's time assumed – Empedocles [3] and Plato [4] famously elaborated on these fundamentals of the cosmos. They are as important in people's lives as are within the larger creation, and sometimes people's actions clearly reflect that, as we shall see here. My article focuses on the importance attributed by Gregory and Macrina to water and air; it concentrates especially on a particular instance in which these are shown by the Cappadocian nun to work together. It does so by introducing the description offered by Macrina to a physical mechanism (**μηχανήματι**) –

actually ‘a krater’, i.e. ‘a cavity’ – in which the two elements interact. I have reconstructed it and we shall see it further within my text.

With respect to the human soul – the spiritual aspect of people – Gregory considered that its role within a body is similar with that which God plays in the macrocosm: to give life and co-ordinate movements and activities. According to this thinker the material world is God’s place of dwelling, which he transcends just as the body is the home of the soul which she also transcends (because it is non-material); God is the supreme transcendent and non-physical entity and the souls are his ‘image’. Macrina repeatedly emphasizes that elements of different nature like the human soul and body can ‘wave’ together with good results; she mentions similar examples where the material and non-material as well as visible and invisible mix: solidity and warm, moisture and softness (for instance, PG 46: 25C-27A), etc. [5]

These fourth century theologians believed that at death the body decomposes in its material elements and that at the Resurrection these recombine themselves; [6] (PG 46. 24B–C). From Nyssen’s dialogue *On the Soul and the Resurrection* we understand that the soul stays with the particles of the decomposed body until it is resurrected; she repeatedly underlines that for immaterial realities as her (the soul) – as also for the intellect – distance and space are irrelevant; (for example, in PG 46. 29 A-B). [7] For both Gregory in the above-mentioned work, and his intellectual predecessor Plato within his own dialogues [8] (which the bishop certainly read [9]), the soul is immortal because she is a simple indissoluble entity which has its origin in the Divine.

In the conversation captured by the text of the *On the Soul and the Resurrection*, Gregory’s interlocutor emphasizes that since a human individual is an animated, conscious being he/she cannot be composed only of air, water, earth, and fire because in itself these elements are not animated; nonetheless, Nyssen’s sister is in complete recognition of their importance. She not only knows how philosophy treated those but, as stated above, also how the physical elements practically combine for specific uses, as in the ‘installation’ that I have just mentioned. This is activated by water and air on human initiative. Macrina describes it and the thinking that triggered its construction as follows:

First [the person] saw, by dint of thinking, that to produce any sound there is need of some wind; and then, with a view to produce wind in the mechanism, he previously ascertained by a course of reasoning and close observation of the nature of elements, that there is no vacuum at all in the world, but that the latter is to be considered a vacuum only by comparison with the heavier [...]; **thus the water is checked by the strong current of air, and gurgles and bubbles against it. Men observed this, and devised in accordance with this property of the two elements a way of introducing air to work their mechanism.** They made a kind of cavity of some hard stuff, and prevented the air in it from escaping in any direction; and then introduced water into this cavity through its mouth, apportioning the quantity of water according to requirement; next they allowed an exit in the opposite direction to the air, so that it passed into a pipe placed ready to hand, and in so doing, being violently constrained by the water, becomes a blast; and this, playing on the structure of the pipe, produced a note;" PG 46, 36C-37B. [10]

Figure 1a) represents a photograph of the water 'organ' I have made; such a container is close to those was peculiar to the fourth century Cappadocia (1b).

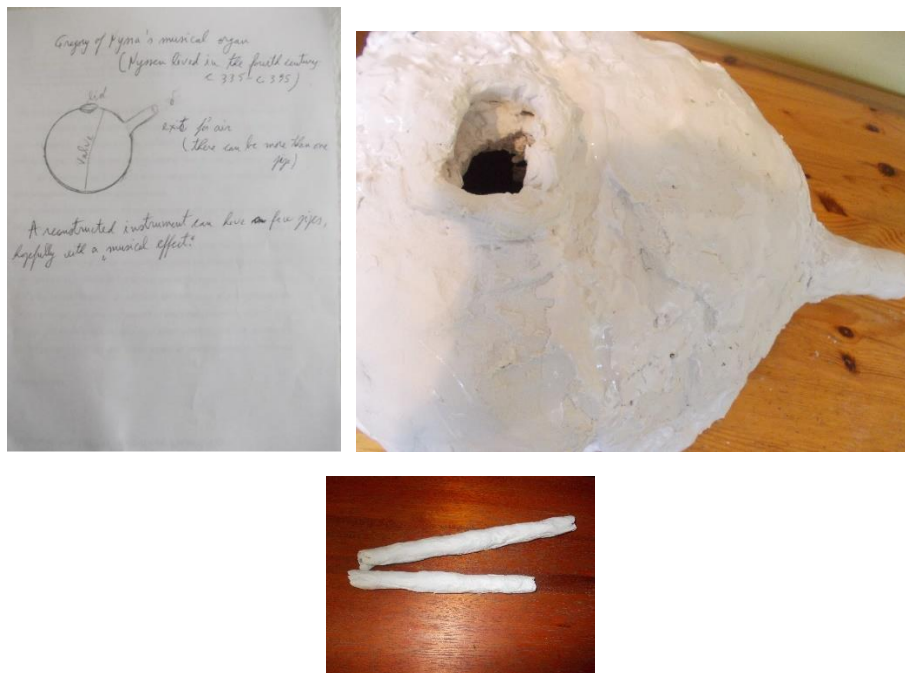


Fig. 1 a. Drawing of Gregory of Nyssa's fourth century 'cavity' or 'musical organ' as described in his dialogue *On the Soul and the Resurrection*; GNO_15_t> Leiden: Brill, c. 2019; transl. in NPNF02-5, pp. 596-597.

I have made a krater in the style of Cappadocian containers peculiar to the fourth century (more 'rustic' than those in the image below); the air can escape through the tube on the right, and more tubes can be added.

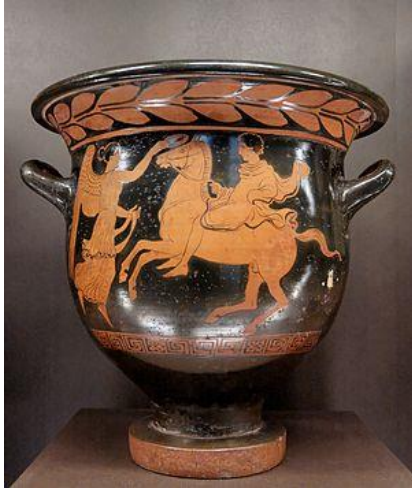


Fig. 1 b. A krater like this began to be made from the Bronze Age (3000 BC-1200 BC) in the Mediterranean area.

(This particular vessel was decorated by the painter Sisyphus from Apulia; he painted especially in red. His works are dated to the last two decades of the fifth century and the very early fourth century BC.

Sisyphus represented here the figure of a young rider crowned by a winged Nike/Victory. It was painted in circa 420 BC; today it is in the Louvre).

After making this object according to Macrina's description, I say that the ideal specifications for a strong sound to come out from this krater are thus:

High 38 cm
 Diameter in the center of the krater 24 cm
 Tube 12 cm

High 38 cm/ c. 15 inches (14. 9606)
 Diameter in the center of the krater 24 cm/c. 9. 5 inches (9. 44882 in)
 Tube 12 cm/c. 5 inches (4. 72441)

If we add more tubes in order to transform this simple krater ('atmospheric' vessel) in a 'musical installation' we need to increase the pressure with which we pour water in it; this way the noise coming out from the vessel will be more audible. (I am aware that Ctesibius of Alexandria (285 - 222 BC) [11] constructed a 'water-clock'/*hydraulis*. From the reconstruction of that 'clock' I have seen, it differs from our 'device'; his is a cuboid).

In *The Life of Moses*, a text that, according to the latest dating, was written in 381AD [12] Nyssen has another chance to elaborate on the elements that make the world. He uses *the story of Moses's escape from the Egyptian slavery to flag out how the constituents of creation are together instrumental in the carrying out of such an extraordinary deed:*

When Moses saw that all the subjects agreed with their leader in his evil, he laid a blow upon the whole Egyptian nation, sparing no one from the calamities. Like an army under orders, **the very elements of the universe – earth, water, air, and fire which are seen to be in everything** – cooperated with him in this attack on the Egyptians, and changed their natural operations to serve human purposes. For by the same power and at the same time and place the disorderly were punished and those free of wrong did not suffer; [13] GNO 25, I. 25.

About the importance of each individual natural element in people's lives as a reflexion of how it is in the Creation or rather about how the two levels intersect from this perspective, the same story of the escape of Jewish people from Egypt provides examples. One of them follows:

After that, Moses pushed on, but when he had travelled three days without water he was at a loss how to relieve the thirst of the army. They pitched camp near a pool of salty water, more bitter than the sea itself. While they were resting close to the water and were parched with thirst, Moses, acting on the counsel of God, found a piece of wood near that place and threw it into the water. Immediately it became drinkable, for the wood by its own power changed the nature of the water from bitter to sweet; [14] (GNO 25. I. 33).

And the most spectacular instance, one that illustrates the movement of the water within the Red Sea at Moses's command, is here:

He [Moses] approached the bank and struck the sea with his rod. The sea split at the blow, just as a crack in glass runs straight across to the edge when a break occurs at any point. The whole sea was split like that from the top by the rod, and the break in the waters reached to the opposite bank. At the place where the sea parted, Moses went down into the deep with all the people and they were in the deep without getting wet and their bodies were still in the sunlight. As they crossed the depths by foot on dry bottom, they were not alarmed at the water piled up so close to them on both sides, for the sea had been fixed like a wall on each side of them; [15] (GNO 25. I. 31).

In describing the role of the four main elements in people's lives as a reflexion of that within the universe, as mentioned above, Gregory kept close to the Platonic tradition that is preoccupied with how the world is created and goes on. Plato, in his dialogues *Philebus* and *Timaeus*,

especially in the latter, explains the coming into being of the universe. In *Timaeus*, he avers:

Hence the god set water and air between fire and earth, and made them as proportionate to one another as possible, so that what fire is to air, air is to water, and what air is to water, water is to earth. He then bound them together and thus he constructed the visible and tangible universe. This is the reason why these four particular constituents were used to beget the body of the world, making it a symphony of proportion; (Timaeus 32b-c). [16]

I will elaborate another time on the role of fire and earth in Creation. For now I only insert an example in which the former is important. I do so because in the *Life of Moses* fire is mentioned 15 times. Among its meanings (*and loyal to the Bible*) the following are to be remarked on: the **fire** as the passion of faith; the **fire** in people's heart (an almost synonym of the previous expression), and the voice of the Apostle "as material for the fire" mentioned earlier. [17] This component of creation also represents the fire that led the Israelites in the desert during night. The words 'fire' and 'light' are sometimes employed to represent the Father, respectively the Son (if we remember also John of Damascus compares Father and Son with fire and light in his text *Fountain of Knowledge*).

Iconographers of Byzantine tradition have represented fire in various forms. The most connected rendering to what the book *Life of Moses* represents is that known as the 'burning bush' on Sinai Peninsula. Today people can see a plant next to the church of the Monastery of St. Catherine, which they are told to be what Moses saw in flames that did not destroy it.



Fig. 2. Icon of Moses receiving the Ten Commandments. The bush is depicted at his feet, lower left (Saint Catherine's Monastery, c. 1050).



Fig. 3. The bush at Saint Catherine's Monastery in the Sinai Peninsula, which monastic tradition identifies as being the burning bush.

An extensive discussion on the role of fire in Creation as understood by Gregory of Nyssa will be provided in another article. Then I will also discuss the role and the potentialities of earth in the same context.

Notes:

- [1] Gregory of Nyssa, "De Anima et Resurrectione", in *Gregorii Nysseni Opera Online*, Werner Jaeger. Consulted online on 21 August 2019 <http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t> Leiden: Brill, c. 2019; Gregory of Nyssa, "De anima et Resurrectione inscribitur Macrinia dialogus", in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique vol. 46, 1863, cols. 11-161; translated as *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers, Second Series*, vol. 5, pp. 596-597 (p. 436 in the first series??).

Nyssen has another text about Resurrection (of Christ): “In Christi Resurrectionem Oratio Quinque”, J-P. Migne, *Patrologia Graeca* 44, Paris: Imprimerie Catholique, 1863, cols. 599-690.

- [2] “Ἡ δὲ λέγεται (44), φησὶ, παρὰ τῶν σοφῶν μικρὸς τις εἶναι κόσμος ὁ ἄνθρωπος, ταῦτα περιέχων ἐν ἑαυτῷ τὰ στοιχεῖα, οἷς τὸ πᾶν συμπληρῶται”, in Gregory of Nyssa, “De Anima et Resurrectione”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019, p. 13; Gregory of Nyssa, “De anima et Resurrectione inscribitur Macrinia dialogus” 28B, in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique, vol. 46, 1863 [cols. 11A-160C]; the translation here is mine. (There are a few translations of this dialogue and of this fragment thus: *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers*, vol. 5, second series, Edinburgh: T&T Clark, and Grand Rapids, Michigan: WM. B. Eerdmans Publishing Company, 1892; the 14 volumes uploaded on line between 1990 and 1999, p. 432: “It has been said by wise men that man is a little world in himself and contains all the elements which go to complete the universe”; and *On the Soul and the Resurrection*, trans. and Introduction Catherine P. Roth, Crestwood, N.Y.: St. Vladimir’s Seminary, 2002, first edition 1992, p. 34: “It is said by the wise that the human being is a kind of small cosmos, containing in itself the same elements with which the whole is built up”).

Nyssen has another text about Resurrection (of Christ): “In Christi Resurrectionem Oratio Quinque”, J-P. Migne, *Patrologia Graeca* 46, Paris: Imprimerie Catholique, 1863, cols. 600C-690A.

- [3] Empedocles of Akragas (c. 492-432) is considered the first thinker to speak about the water, air, earth, and fire as the basic constituents of the cosmos. Empedocles, *On Nature*, in M. R. Wright (ed.), *Empedocles the Extant Fragments*, with Greek text, English translation, introduction and commentary, New Haven, London: Yale University Press, c198; London: Bristol Classical Press; Indianapolis; Cambridge: Hackett Pub. Co., 1995 (concordance and new bibliography); Brad Inwood, *The Poem of Empedocles: a text and translation with an introduction* Toronto, Buffalo: University of Toronto P.ress 1992; revised edition 2001, with Greek text, facing English translation and introduction; Alain Martin and Oliver Primavesi, *L’Empédocle de Strasbourg: (P. Strasb. gr. Inv. 1665-1666)*; Strasbourg: Bibliothèque nationale et universitaire de Strasbourg and Berlin: Walter de Gruyter, 1998; Simon Trépanier, “Empedocles on the ultimate symmetry of the world”, in David N. Sedley (ed.), *Oxford Studies in Ancient Philosophy*, volume XXIV, Summer 2003, Studies in ancient philosophy, Oxford: Oxford University Press, 2003, pp. 1-57; S. Trépanier, *Empedocles: An Interpretation*, New York, London: Routledge, 2004. See also Diogenes Laertius, “Empedocles”, 8.51-75, in *Lives of the Eminent Philosophers*, edited by Jim Miller, translated by Pamela Mensch, New York: Oxford University Press, 2018.

- [4] Plato, *Timaeus*, 32 b-c; p. 1237; the content of this fragment is included in the body of the article below. Plato, *Complete Works*, edited by John M. Cooper and D. S. Hutchinson, Indianapolis, Cambridge: Hackett Publishing Company, 1997, p. 1237; the dialogue *Timaeus* is translated by Donald J. Zeyl.
- [5] Gregory of Nyssa, “De Anima et Resurrectione”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019, for instance pp. 12-14. Gregory of Nyssa, “De anima et Resurrectione inscribitur Macrinia dialogus”, in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique, vol. 46, for instance 25C-27A, 1863, cols. 11-161; translated as *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers, Second Series*, vol. 5, p. 592 (432).
- [6] Gregory of Nyssa, “De Anima et Resurrectione”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019; for instance p. 10. Gregory of Nyssa, “De anima et Resurrectione inscribitur Macrinia dialogus”, in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique, vol. 46, for instance 24B-C, 1863, cols. 11-161; translated as *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers, Second Series*, vol. 5, p. 592 (432).
- [7] Gregory of Nyssa, “De Anima et Resurrectione”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019, for instance pp. 15-16. Gregory of Nyssa, “De anima et Resurrectione inscribitur Macrinia dialogus”, in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique, vol. 46, 1863, for instance 29 A-B [cols. 11-161]; translated as *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers, Second Series*, vol. 5, p. 432.
- [8] See, for instance, Plato, *Phaedo* 78C, “Is not anything that is composite and a compound by nature liable to be split up into its component parts, and only that which is noncomposite, if anything, is not likely to be split up? I think that is the case, said Cebes.” And 80b “Consider, then, Cebes, whether it is follows from all that has been said that the soul is more like the divine, deadless, intelligible, uniform, indissoluble, always the same as itself...” Also *Republic* 611a-612a: “[The soul] is immortal [...] then you realize that there would always be some souls, for they couldn’t be made fewer if none is destroyed, and they couldn’t be made more numerous either [...] But we’ve already given a decent account, I think, of what its condition is and what parts it has when it is immersed in human life.” Plato, *Complete Works*, edited by John M. Cooper and D. S. Hutchinson, Indianapolis, Cambridge: Hackett Publishing

Company, 1997; the dialogue *Phedo* [pp. 49-101] has been translated by G. M. A. Grube, and *Republic* [pp. 971-1223] by G. M. A. Grube and C. D. C. Reeve; pages 68-69; 70; respectively 1214-1215. See also Plato, *The Collected Dialogues of Plato*, edited by Edith Hamilton and Huntington Cairnes, trans. Paul Shorey, Bollingen Series 71, Princeton, NJ: University Press, 1985; and Plato, *The Works of Plato*, edited, trans. and Introduction Benjamin Jowett, New York: Random House, 1928 (c. 1875). Commentary on the simplicity and the indivisibility of the soul in Rachana Kamtekar “Speaking with the same voice as reason”, in Rachel Barney, Tad Brennan, and Charles Brittain (eds.), *Plato and the Divided Self*, Cambridge: Cambridge University Press, 2012, pp. 77- 101.

[9] See my chapter on Gregory of Nyssa in *Visions of God and Ideas on Deification in Patristic Thought* (co-edited with Mark Edwards), London: Routledge/ Taylor & Francis, 2016/2017, pp. 55-74.

[10] “Ἡ δέ, Συμμαχεῖ, φησί, τῷ λόγῳ καὶ τὸ ὑπόδειγμα καὶ ἡ κατασκευὴ πᾶσα τῆς ἀνθυπενεχθείσης ἡμῖν ἀντιρρήσεως οὐ μικρὰ συντελέσει πρὸς τὴν τῶν νοηθέντων ἡμῖν βεβαιότητα. Πῶς τοῦτο λέγεις; Ὅτι τοι, φησί, τὸ οὕτως εἰδέναι μεταχειρίζεσθαι τε καὶ διατιθέναι τὴν ἄψυχον ὕλην, ὡς τὴν ἐναποτεθεῖσαν τοῖς μηχανήμασι τέχνην μικροῦ δεῖν ἀντὶ τῆς ψυχῆς τῇ ὕλῃ γίνεσθαι, δι’ ὧν κίνησιν τε καὶ ἤχον καὶ σχήματα καὶ τὰ τοιαῦτα καθυποκρίνεται, ἀπόδειξις ἂν εἴη τοῦ εἶναι τι τοιοῦτον ἐν τῷ ἀνθρώπῳ, ὃ ταῦτα πέφυκε διὰ τῆς θεωρητικῆς καὶ ἐφευρετικῆς δυνάμεως κατανοεῖν τε ἐν ἑαυτῷ καὶ προκατασκευάζειν τῇ διανοίᾳ τὰ μηχανήματα, εἴθ’ οὕτως εἰς ἐνέργειαν διὰ τῆς τέχνης ἄγειν καὶ διὰ τῆς ὕλης δεικνύειν τὸ νόημα· πρῶτον γὰρ ὅτι πνεύματός ἐστι χρεῖα πρὸς τὴν ἐκφώνησιν κατενόησεν, εἴθ’ ὅπως ἂν ἐπινοηθῆι πνεῦμα τῷ μηχανήματι τῷ λογισμῷ προεξήτασε τὴν τῶν στοιχείων φύσιν ἐπισκεψάμενος, ὅτι οὐδὲν κενὸν ἐν τοῖς οὐσίῳ ἐστίν, ἀλλὰ τῇ πρὸς τὸ βαρύτερον παραθέσει κενὸν τὸ κοῦφον νομίζεται, ἐπεὶ καὶ αὐτὸς ἐφ’ ἑαυτοῦ κατ’ ἰδίαν ὑπόστασιν ὁ ἀῆρ ναστός τε καὶ πλήρης ἐστίν· διάκενον γὰρ τὸ ἀγγεῖον ἐκ καταχρήσεως λέγεται, ὅταν τοῦ ὕγρου κενὸν ᾖ, οὐδὲν δὲ ἦττον μεστὸν ἀέρος ὁ πεπαιδευμένος καὶ τοῦτο λέγει· σημεῖον δὲ τὸ ἐπαχθέντα τῇ λίμνῃ τὸν ἀμφορέα μὴ εὐθὺς πληροῦσθαι τοῦ ὕδατος, ἀλλ’ ἐπιπολάζειν τὰ πρῶτα τοῦ ἐναπειλημμένου ἀέρος |ἐπὶ τὸ ἄνω τὸ κοῖλον ἀνέχοντος, ἕως ἂν πιεσθεῖς ὁ ἀμφορεὺς τῇ χειρὶ τοῦ ἀρυομένου ἐν τῷ βάθει γένηται καὶ τότε δέξηται τῷ στομίῳ τὸ ὕδωρ· οὗ γινομένου δείκνυται τὸ μὴ κενὸν αὐτὸν εἶναι καὶ πρὸ τοῦ ὕδατος· μάχη γάρ τις περὶ τὸ στόμιον τῶν δύο στοιχείων ὁρᾶται τοῦ μὲν ὕδατος ὑπὸ βάρους ἐπὶ τὸ κοῖλον βιαζομένου τε καὶ εἰσρέοντος, τοῦ δὲ ἀέρος τοῦ ἐναπειλημμένου τῷ κοίλῳ διὰ τοῦ αὐτοῦ στομίου ἐπὶ τὸ ἔμπαλιν συνθλιβομένου περὶ τὸ ὕδωρ καὶ ἀναρρέοντος, ὡς ἀνακόπτεσθαι διὰ τούτου καὶ ἀνακογχυλιάζειν τὸ ὕδωρ περιαφρίζον τῇ βίᾳ τοῦ πνεύματος. ταῦτά τε οὖν κατενόησε, καὶ ὅπως ἂν ἐντεθεῖη πνεῦμα τῷ **μηχανήματι** (mechanism) διὰ τῆς τῶν στοιχείων φύσεως ἐπενόησε· κοῖλον γάρ τι ἐκ στεγανῆς ὕλης κατασκευάσας, καὶ πανταχόθεν τὸν ἐν αὐτῷ ἀέρα περισχῶν ἀδιάπνευστον ἐπάγει τὸ ὕδωρ διὰ στομίου τῷ κοίλῳ κατὰ τὸ μέτρον τῆς χρεῖας τὸ ποσὸν συμμετρήσας τοῦ ὕδατος, εἴθ’ οὕτως ἐπὶ τὸν παρακείμενον αὐλὸν δίδωσι κατὰ τὸ ἀντικείμενον τῷ ἀέρι τὴν δίοδον, ἐκθλιβόμενος δὲ τῷ ὕδατι βιαιότερον ὁ ἀῆρ πνεῦμα γίνεται, ὅπερ ἐμπύπτον τῇ κατασκευῇ τοῦ αὐλοῦ τὸν ἤχον ποιεῖ.” Gregory of Nyssa, “De Anima et

- Resurrectione”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019, works 15, pp. 20-22. See also Gregory of Nyssa, “De anima et Resurrectione inscribitur Macrinia dialogus”, in J.-P. Migne, *Patrologiae cursus completus (series Graeca)*, Paris: Imprimerie Catholique vol. 46, 36C-37B; 1863 [cols. 11A-160C]. The translation of this text is within *On the Soul and the Resurrection* by William Moore and Henry Austin Wilson, in Philip Schaff and Henry Wace (eds.), *Nicene and Post-Nicene Fathers, Second Series*, vol. 5, p. 597 (435).
- [11] Ctesibius of Alexandria (285 - 222 BC), the teacher of Hero of Alexandria, and probably the first hear of the Museum in Alexandria, was a mathematician and inventor. His works (*On pneumatics, Memorabilia*) have not survived, but the *Memorabilia*, a compilation of his research, was cited by Athenaeus (in activity about the end of the second and beginning of the third century AD). Ctesibius's work is mentioned by Vitruvius, Athenaeus, Pliny the Elder, and Philo of Byzantium, Proclus, Hero of Alexandria (cf. *Encyclopaedia Britannica*-<https://www.britannica.com/biography/Ctesibius-of-Alexandria>).
- [12] Lucas Francisco Mateo-Seco and Giulio Maspero (eds.), *The Brill Dictionary of Gregory of Nyssa*, *Vigiliae Christianae Supplements* 99, Leiden: Brill, 2010, p. 93 (and p. 788). (I myself proposed a different dating in 2017, but in more than two years research has advanced and changed the possible date when this text was cenceived).
- [13] Gregorii Nysseni, “De Vita Moysis pentecosten”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, vol. 25; general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_25_t, pp. 11-12. See also GNO. 7. 1, Leiden: Brill, first printed in 1964, reprinted 1991. “ἰδὼν ὁ Μωϋσῆς τῷ καθηγουμένῳ τῆς κακίας ἅπαν τὸ ὑπο-ἅπας | εἶδω | καθηγέομαι | κακία | ὅλος | ὑποχείριος χεῖριον κοινήν ἐπάγει παντὶ τῷ ἔθνει τῶν Αἰγυπτίων πληγὴν ἔθνος | ἐπάγω | κοινός | πᾶς | πληγὴ οὐδένα τῆς τῶν κακῶν πείρας ὑπεξελόμενος. συνεκινεῖτο δὲ κακός | πεῖρα | συγκινέω | ὑπεξαιρέω αὐτῷ πρὸς τὴν τοιαύτην κατὰ τῶν Αἰγυπτίων πληγὴν οἷόν ὁρμή τις στρατὸς ὑποχείριος, αὐτὰ τὰ στοιχεῖα τῶν ὄντων τὰ ἐν τῷ στοιχείῳ | στρατός | ὑποχείριος παντὶ θεωρούμενα, γῆ τε καὶ πῦρ καὶ ἀήρ καὶ ὕδωρ, ταῖς προ-18 ἀήρ | γῆ | θεωρέω | πᾶς | προαίρεσις | πῦρ | ὕδωρ αἰρέσεσι τῶν ἀνθρώπων τὰς ἐνεργείας συνεξαλλάσσοντα. ἄνθρωπος | ἄνθρωπος | συνεξαλλάσσω ἄνθρωπος | ἄνθρωπος | συνεξαλλάσσω Τῇ γὰρ αὐτῇ δυνάμει κατὰ τὸν αὐτὸν χρόνον καὶ τόπον δύναμις | τόπος | τόπος | χρόνος | χρόνος τό τε ἀτακτοῦν ἐκολάζετο καὶ ἀπαθὲς διέμενε τὸ κακίας ἀπαθῆς | ἀπαθῆς | ἀτακτέω | διαμένω | κακία | κολάζω (GNO 25, pp. 11-12). The English rendering of this dialogue is in Gregory of Nyssa, *The Life of Moses*, trans. Abraham J. Malhherbe and Everett Ferguson, Mahwah, NJ: Paulist Press, 1978, p. 36; reprint Harper Collins Publishers in 2006. Also Gregory of Nyssa/Grégoire de Nysse, *La vie de Moïse*, edited by Jean Daniélou, Sources Chrétiennes 1, Paris: Éditions du Cerf, 1968, the third edition (revised and corrected),

- pp. 44-326. See also Ann Conway-Jones, *Gregory of Nyssa's Tabernacle Imagery in its Jewish and Christian Contexts*, Oxford: Oxford University Press, 2014.
- [14] Gregory of Nyssa/Gregorii Nysseni, “De Vita Moysis pentecosten”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, vol. 25; general editor for the hardback version Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_25_t, p. 39. See also GNO. 7. 1, Leiden: Brill, first printed in 1964, reprinted 1991; translated as Gregory of Nyssa, *The Life of Moses*, trans. Abraham J. Malhherbe and Everett Ferguson, Mahwah, NJ: Paulist Press, 1978, p. 39; reprint Harper Collins Publishers in 2006. Also Gregory of Nyssa/Grégoire de Nysse, *La vie de Moïse*, edited by Jean Daniélou, *Sources Chrétiennes* 1, Paris: Éditions du Cerf, 1968, the third edition (revised and corrected), pp. 44-326. See also Ann Conway-Jones, *Gregory of Nyssa's Tabernacle Imagery in its Jewish and Christian Contexts*, Oxford: Oxford University Press, 2014.
- [15] Gregory of Nyssa/ Gregorii Nysseni, “De Vita Moysis pentecosten”, in Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, vol. 25; general editor for the hardback version Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_25_t, p. 15. See also GNO. 7. 1, Leiden: Brill, first printed in 1964, reprinted 1991; translated as Gregory of Nyssa, *The Life of Moses*, trans. Abraham J. Malhherbe and Everett Ferguson, Mahwah, NJ: Paulist Press, 1978, p. 38; reprint Harper Collins Publishers in 2006.
- [16] Timaeus 32b-c: “ὁ θεὸς ἐν μέσῳ θείας, καὶ πρὸς ἄλληλα καθ’ ὅσον ἦν δυνατὸν ἀνὰ τὸν αὐτὸν λόγον ἀπεργασάμενος, ὅτιπερ πῦρ πρὸς ἀέρα, τοῦτο ἀέρα πρὸς ὕδωρ, καὶ ὅτι ἀἴρ πρὸς ὕδωρ, ὕδωρ πρὸς γῆν, συνέδησεν καὶ συνεστήσατο οὐρανὸν ὀρατὸν καὶ ἀπτόν. [32c] καὶ διὰ ταῦτα ἐκ τε δὴ τούτων τοιοῦτων καὶ τὸν ἀριθμὸν τετάρων τὸ τοῦ κόσμου σῶμα ἐγεννήθη δι’ ἀναλογίας ὁμολογήσαν...”; Plato, *Timaeus*, 32 b-c; in Plato, *Complete Works*, edited by John M. Cooper and D. S. Hutchinson, Indianapolis, Cambridge: Hackett Publishing Company, 1997, p. 1237; the dialogue “Timaeus” is translated by Donald J. Zeyl. See also Plato, *The Collected Dialogues of Plato*, edited by Edith Hamilton and Huntington Cairnes, trans. Paul Shorey, Bollingen Series 71, Princeton, NJ: University Press, 1985; and Plato, *The Works of Plato*, edited, trans. and Introduction Benjamin Jowett, New York: Random House, 1928 (c. 1875). The translation by Benjamin Jowett is as follows: “God placed water and air in the mean // between fire and earth, and made them to have the same proportion so far as was possible (as fire is to air so is air to water, and as air is to water so is water to earth), and thus he bound and put together a visible and tangible heaven. And for these reasons, and out of such elements which are in number four, the body of the world was created, and it was harmonised by proportion.”
- [17] Gregory of Nyssa: *The Life of Moses*, trans. Abraham J. Malhherbe and Everett Ferguson, Mahwah, NJ: Paulist Press, 1978, reprint Harper Collins Publishers in 2006, Book II. 62, p. 68.

References:**a) Primary sources:**

- Diogenes, Laertius. 2018 “Empedocles”, 8.51-75. In: *Lives of the Eminent Philosophers*. Edited by Jim Miller. Translated by Pamela Mensch. New York: Oxford University Press.
- Empedocles of Akragas. 1992. *The Poem of Empedocles: a text and translation with an introduction* by Brad Inwood, Toronto, Buffalo: University of Toronto Press. Revised edition 2001, with Greek text, facing English translation and introduction.
- Empedocles of Akragas. 1998. “On Nature”. In: M.R. Wright (ed.), *Empedocles the Extant Fragments*, with Greek text, English translation, introduction and commentary, New Haven, London: Yale University Press, c 198; London: Bristol Classical Press; Indianapolis; Cambridge: Hackett Pub. Co., (concordance and new bibliography).
- Gregory of Nyssa. 1863. “De anima et Resurrectione inscribitur Macrinia dialogus”. In: J.-P. Migne, *Patrologiae cursus completus (series Graeca)*. Paris: Imprimerie Catholique.
- Gregory of Nyssa. 1978. *The Life of Moses*. Trans. Abraham J. Malherbe and Everett Ferguson, Mahwah, NJ: Paulist Press. Reprint Harper Collins Publishers in 2006.
- Gregory of Nyssa. 2002. *On the Soul and the Resurrection*. Trans. and Introduction Catherine P. Roth, Crestwood, N.Y.: St. Vladimir’s Seminary.
- Gregory of Nyssa/Grégoire de Nysse. 1968. “La vie de Moïse”. Edited by Jean Daniélou, *Sources Chrétiennes*, 1. Paris: Éditions du Cerf. The third edition (revised and corrected).
- Gregory of Nyssa/Gregorii Nysseni. 2019. “De Anima et Resurrectione”. In: Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, general editor Werner Jaeger, consulted online on 22 June 2020 http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_15_t, Leiden: Brill, c. 2019
- Gregory of Nyssa/Gregorii Nysseni. 2020. “De Vita Moysis pentecosten”. In: Ekkehard Mülenberg and Giulio Maspero (eds.), *Gregorii Nysseni Opera Online*, vol. 25; general editor for the hardback version Werner Jaeger, consulted online on 22 June 2020. http://dx.doi.org/10.1163/2214-8728_gnoo_aGNO_25_t.
- Plato. 1985. *The Collected Dialogues of Plato*. Edited by Edith Hamilton and Huntington Cairnes. Trans. Paul Shorey, Bollingen Series 71. Princeton, NJ: University Press.
- Plato. 1997. “Timaeus”. In: *Complete Works*. Edited by John M. Cooper and D.S. Hutchinson. Indianapolis, Cambridge: Hackett Publishing Company.

b) Secondary literature:

- Akerman, S. 1999. "Stiernhielm Pythagorizans and the Unveiling of Isis". In: Richard Henry Popkin, *Everything connects: in conference with Richard H. Popkin; essays in his honor*. Edited by James E. Force and David S. Katz, Brill's studies in intellectual history v. 91, Leiden: Brill.
- Conway-Jones, A. 2014. *Gregory of Nyssa's Tabernacle Imagery in its Jewish and Christian Contexts*. Oxford: Oxford University Press.
- Ene D-Vasilescu, E., 2019. *The epektasis [ἐπέχτασις] and the exploits of the soul in Gregory of Nyssa's De anima et resurrection*. Paper presented at the eighteenth International Conference on Patristics Studies, Oxford, 22 August 2019.
- Ludlow, M. 2003. *Universal salvation: eschatology in the thought of Gregory of Nyssa and Karl Rahner*. Oxford: Oxford University Press.
- Ludlow, M. 2009. "Science and Theology in Gregory of Nyssa's *De anima et Resurrectione*: Astronomy and Automata". In: *The Journal of Theological Studies*, volume 60, Issue 2, 1 October 2009. <https://doi.org/10.1093/jts/flp067>
- Martin, A. and Oliver Primavesi. 1998. *L'Empédocle de Strasbourg: (P. Strasb. gr. Inv. 1665-1666)*. Strasbourg: Bibliothèque nationale et universitaire de Strasbourg and Berlin: Walter de Gruyter.
- Mateo-Seco, L.F. and G. Maspero (eds.). 2010. *The Brill Dictionary of Gregory of Nyssa*. Vigiliae Christianae Supplements 99. Leiden: Brill.
- McGlothlin, T.D. 2018. *Resurrection as Salvation: Development and Conflict in Pre-Nicene Paulinism*. Cambridge: Cambridge University Press.
- Popkin, R.H. 1999. *Everything connects: in conference with Richard H. Popkin; essays in his honor*. Edited by James E. Force and David S. Katz, Brill's studies in intellectual history v. 91. Leiden: Brill.
- Swinburne, R. 2003. *The Resurrection of God Incarnate*. Oxford: Oxford University Press.
- Trépanier, S. 2003. "Empedocles on the ultimate symmetry of the world". In: David N. Sedley (ed.), *Oxford Studies in Ancient Philosophy*, volume XXIV, *Summer 2003, Studies in ancient philosophy*. Oxford: Oxford University Press.
- Trépanier, S. 2004. *Empedocles: An Interpretation*. New York, London: Routledge.
- Wessel, S. 2010. "Memory and Individuality in Gregory of Nyssa's *Dialogus de anima et resurrectione*". In: *Journal of Early Christian Studies*, vol. 18, number 3.