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Curiosity in the Early Christian Era - Philoponus's Defence of Ancient Astronomy against Christian Critics[1]

Curiosity is seen today as something good, desirable even. However, it was not always so. From the time that Hellenistic culture started to show signs of decline shortly before the birth of Christ, the attention of ancient scholars focused on the past, looking back to a golden era of sages. For Christianity, the primary interest was not the investigation of the natural world, and yet its world-view challenged some common assumptions that were of importance for the 'natural philosophy' conceptions of pagan late antiquity such as the eternity of the world, the divinity of the heavens, the astrological determinism, and so forth.

Although these debates were not about the 'technical' portion of ancient learning – sphericity of the earth and heavens, epicycle models of planetary movements, theory of eclipses, and so on – voices were raised demanding a 'Christian cosmology'. Their stronghold was at the theological school of Antioch that clashed with their traditional rivals of Alexandria, the city that was also the cradle of pagan natural philosophy. By the sixth century, the main exponent of the Antiochene flat earth cosmology, Cosmas Indicopleustes, was confronted by the Alexandrian Christian scholar John Philoponus, who defended the freedom of investigating nature and the freedom of scientific curiosity, within a Christian world-view.

Keywords: curiosity, Cosmas Indicopleustes, John Philoponus, flat earth, sphericity, concordism, Christoph Rothmann, accommodation principle

> *For someone honouring what is true, wherever it may be found, honours Christ, the Truth.* John Philoponus[2]

It was in the early 1990s when I first came across the name 'Philoponus' in my first years of interest in the history of science and its relations with Christianity. I knew of him as the distant precedent for a medieval explanation of movement, the impetus theory. It was only in the late 1990s,

1 This is an expanded version of the lecture I delivered at the *Christians in Science* Southern Conference 2017 (21 October) at Oxford.

2 Philoponus, J. *De opificio mundi* (*On the Creation of the World*, thereafter *CW*) 3.13. Quoted from an unpublished draft English translation by the late Leslie S.B. MacCoull (1995) who kindly shared it with me in 2008. This and all quotations from *CW* have also been compared with the published French translation, and in some cases slightly modified accordingly: Philopon, J. *La Création du monde*, Rosset, M-C. & Congourdeau, M-H. (trans.), Paris: Migne (2004).

when my interest in the historical origins of the interactions between science and Christianity led me to ancient sixth century Alexandria and the work of flat-earther Cosmas Indicopleustes, that I rediscovered Philoponus.

John Philoponus appeared as the main supporter of the opposite view, that of Christians who accepted the sphericity of the earth. Although the sphericity of the earth was already known before Alexandria was founded in the fourth century BC, it was in this new Egyptian city that the director of its famous library, Eratosthenes, published his measure of the diameter of the spherical earth. Later, Hipparchus became known as one of the most brilliant Hellenistic astronomers.

The illustrious tradition of Alexandrian astronomy and mathematics continued in the Roman period with the work of Ptolemy and was still taught in Byzantine Christian Alexandria up to the time of Philoponus in the sixth century. This was probably the hardest place in the ancient world to defend the outdated idea of a flat earth, a view associated with the theological school of the Syrian city of Antioch, traditional rival of the Alexandrians' theology.

It seems an odd debate for theologians, even in ancient times when sometimes bizarre arguments erupted giving rise to incredibly vigorous debates. There is no mention of the shape of the earth in the Gospels or the New Testament: it was not really a point of interest for the disciples of Jesus. If we think about the golden rule, the two greatest commandments and the Sermon on the Mount… astronomy, geography or natural philosophy were very far from the concerns of Jesus.[3]

Science and faith in early Christianity

Technical topics regarding natural philosophy, what we could consider today more properly as 'science', such as the sphericity of the earth and heavens, the epicycle models for planetary movement, the theory to explain eclipses, the measurement of the size and distance of the heavenly bodies, and many other subtle details of ancient astronomy were not in question, and were unaffected by Christianity. In fact, few Christians were trained to understand and work on those topics, and hardly mentioned them in their books that were predominantly theological. How, then, did Christians end up debating the shape of the earth? And how was it that doubts emerged about something that had been considered already settled for a millennium?

The division between religion and science (which at that time belonged

3 Early criticisms in the Pauline letters, e.g. Col. 2:8 and 1 Cor. 3:18-19, of 'philosophies' or 'wisdom' refer to religious dissentions, not to academic debates on natural philosophy.

in the realm of philosophy and natural philosophy) seems clear today. However, in antiquity, a debate such as that concerning the divinity of the heavens could have an impact on more practical natural philosophy. If planets are divine, how could natural phenomena discovered on earth apply to them? Why should we try to reduce all the complexity of planetary movements to circles without considering alternatives?

As Christianity grew and extended throughout the Roman Empire, Christians soon discovered that their way of thinking about God and the world, their world-view, was in conflict with long held assumptions in this sophisticated culture. We could mention at least three key topics: (1) the eternity of the world as opposed to the creation out of nothing, (2) the divinity of the heavens as opposed to the idea of the whole universe being part of the created realm, and (3) astrological determinism as opposed to human freedom. It is clear that although there are scientific aspects to these debates, they also – especially in those times – concern philosophy and theology.

Confronted with such complexity, how was a Christian who was not a professional scholar to decide what to keep and what to reject from ancient Greco-Roman culture? How to disentangle astronomy and astrology when, for example, the *Almagestus* and *Tetrabiblos*, the two mayor ancient compilations for astronomy and astrology, were authored by the same person, Ptolemy? Was there not a temptation to just reject the whole pack?

The problem with curiosity in early Christianity

Now we can see how it was not improbable that, out of a religious concern, inquiry on scientific topics could be under threat in a culture where science and religion were so intimately intertwined. As we see in the book that is the focus of our present discussion, *The Penultimate Curiosity*,[4] this close relationship could be mutually enriching, but it could also backfire. This explains some famous quotations from early Christian authors, as, for example this one from the treatise *On the prescription of heretics* by Tertullian in the late second century:

> What, indeed, has Athens [meant to represent pagan scholarship] to do with Jerusalem [representing Christian religion]? What concord is there between [Plato's] Academy and the Church? What between heretics and Christians? ... Away with all attempts to produce a mottled Christianity of Stoic, Platonic, and dialectical composition! We have no need for *curiosity* beyond Christ Jesus, no investigation beyond the Gospel. When we believe [the Gospel], we need give credence to nothing else![5]

4 Briggs, A. & Wagner, R. *The Penultimate Curiosity*, Oxford: Oxford University Press (2016).

5 Quoted in Lindberg, D.C. 'The fate of science in patristic and medieval Christendom', in

A fellow North African Roman Christian and man of letters, Augustine of Hippo, wrote in his *Confessions*, in the late fourth century:

> … because of this disease of *curiosity* … men proceed to investigate the phenomena of nature, though this knowledge is of no value to them: for they wish to know simply for the sake of knowing.[6]

Here we have well illustrated two key reasons for the mistrust of inquiry led by curiosity. In the first case there was the danger of heresy due to the syncretism between Christian ideas and pagan philosophy. If we read the lines that precede the famous Athens versus Jerusalem quotation, we find Tertullian complaining that all heresies have their roots in philosophy. In fact, the book itself is devoted to attacking heresies: it is a debate about religion, not philosophy or natural philosophy. The second quotation refers to another reason to discredit curiosity, its lack of utility. However, we should also ask here, lack of utility… for what? And the answer in authors who follow this line of thinking is always the same: lack of utility for a Christian life.

In this regard, we should say that the disdain for curiosity about obscure and sophisticated areas of inquiry – on the grounds that they were of no obvious utility for life – was a very common feeling in late antiquity among Christians and pagans alike. In fact, abstract and creative speculation into areas of natural philosophy had almost died out by the time the Hellenistic kingdoms fell under the Roman influence in the second to first centuries BC. Late antiquity is generally considered the era of the commentators, and even Philoponus was one of them, although a very critical and creative one, able to advance ideas beyond the text he was discussing.[7]

Harrison, P. (ed.) *The Cambridge Companion to Science and Religion*, Cambridge: Cambridge University Press (2010), p. 22; italics mine.

6 *ibid.*, p. 24.

7 The freedom of Philoponus' approach to the literary sources has been recently noted:

> The greatest challenge for a student of this period of the history of philosophy is to understand how a phenomenon such as Philoponus could have happened. To be sure, elusive individual qualities of his mind and personality must have played an essential rôle, but it is equally true that philosophical, social, and religious parameters are likely to have supplied conditions which allowed him to carry forward his unprecedented and unparalleled act of emancipation from a widely accepted intellectual tradition. … However this is eventually going to be explained, it seems certain that what essentially enabled Philoponus to operate both as a critic of Aristotelianism and as a constructive thinker in his own right was somehow tied up with new understanding of what one ought to do when one is reading and interpreting the philosophical texts of Plato or Aristotle. Whereas Neoplatonists, especially since Proclus (412-485), tended to approach these ancient texts as a fabric of venerable signs pointing *per se* and in an infallible way to a higher reality and to the truth, Philoponus read them (as we do today) as indicators of the thoughts and intentions of fallible authors. This more measured hermeneutic approach allowed Philoponus to point out problematic tensions and apparent contradictions in the Aristotelian corpus, or to highlight significant instances of disagreement between Plato and Aristotle; in contrast, the program of the Neoplatonic tradition he grew up in was to ignore the problems, or explain them away. (Wildberg,

We should further comment here that these criticisms were not devised to attack 'scientific' curiosity as we understand it now. What concerned these authors was not the technical knowledge of mathematicians, medics, astronomers and the like. As soon as we go deeper into what they really criticise we find other things, such as the philosophical-religious ideas mentioned above. In fact, a few years later after *Confessions*, in the early fifth century, Augustine himself displayed an impressive knowledge of philosophy and natural philosophy in his *Literal Commentary on Genesis* in order to understand the word and the work of God. This was a positive attitude to secular knowledge, quite different from the quotation above.[8]

Certainly, what gave shape to the Christian attitude to philosophy and natural philosophy was not extreme rejection as is sometimes portrayed through the selective use of isolated quotations such as those above, but 'Augustine's handmaiden formula' as indicated by historian David C. Lindberg, who explained that 'For all his worry about overvaluing the sciences of the classical tradition, Augustine applied them to biblical interpretation with a vengeance. … Indeed, as the handmaiden proved her reliability over the centuries, supervision by the church steadily declined to the point where she was granted a high degree of autonomy.'[9]

The challenge of a Christian flat earth cosmology

After setting that context, we can understand better a much more potentially damaging threat that arose in Eastern Christianity. If lack of interest in 'curiosity' could discourage inquiry into nature, that could be rekindled by the handmaiden formula. However, what really was a stumbling block is found in the work of a lay Christian, traditionally known as Cosmas Indicopleustes, who launched an attack on the most fundamental tenets of ancient astronomy and geography such as the sphericity of the earth.

Cosmas was merely repeating and expanding the ideas of more sophisticated Antiochian theologians from the fourth century onwards, such as Diodorus of Tarsus and Theodore of Mopsuestia. And with that attack, came the cry for a fully-fledged 'Christian cosmology' to replace the pagan ideas. Furthermore, Cosmas required Christians to choose between the 'Christian theories' and the 'error of the pagan theories' 'opposed to divine scripture', in the words of Cosmas.[10]

C. 'John Philoponus', *The Stanford Encyclopedia of Philosophy* (Spring 2016 Edn.), Zalta, E.N. (ed.), https://plato.stanford.edu/archives/spr2016/entries/philoponus/ last accessed 26/09/2017).

8 In addition, see his positive appreciation of that secular knowledge in the quotation copied in footnote 23.

9 Lindberg *op. cit.*, (5), p. 25.

10 Indicopleustes, C. *Christian Topography* (thereafter *CT*) prologue.2,4,5 (pp. 3-4). The

However, Cosmas did not stop there. He knew that there were many Christians who accepted the sphericity of the earth, so he could not make a division between pagan sphericists and Christian flat-earthers. Therefore, he attacked with even more hatred those Christians sphericists as false Christians, renegades that followed pagan theories. In the prologue of his work *Christian Topography*, of about 550, he attacks:

> … some supposed to be Christians, holding divine scripture of no account but despising and looking down upon it, assume like the Pagan philosophers, that the form of the heavens is spherical, being led into this error by the solar and lunar eclipses. … one who wishes to profess Christianity cannot be led away by the plausible errors of those outside the Church—errors which are opposed to divine scripture.[11]

At the beginning of this treatise, Cosmas renews these criticisms:

> But those on the other hand who prank themselves out in the wisdom of this world, and are self-confident that by scholastic reasonings they can comprehend its figure and position, scoff at all divine scripture as a mass of fables, stigmatising Moses and the prophets, the Lord Christ and the Apostles as idle babblers, and given over to vain delusions; while with supercilious airs, as if they far surpassed in wisdom the rest of mankind, they attribute to the heavens a spherical figure and a circular motion….[12]

A little later he focused even more in his attacks on Christians who accept the science of the time:

> But those who wish to profess Christianity, while wishing at the same time to bedeck themselves with the principles, the wisdom, and the diversity of the errors of this world, and contend that one thing and another should be accepted, seem to differ nothing from a shadow…
>
> It is against such men my words are directed, for divine scripture denounces them, as of old it denounced the strangers sojourning in Samaria, because they feared God and burned incense and offered worship on the high places. Were one to call such men double-faced he would not be wrong, for, look you, they wish both to be with us and with those that are against us, thus making void their renunciation of Satan whom they renounced in baptism, and again running back to him. Now,

translation and page numbers are from the English translation: McCrindle, J. W. (trans.) *The Christian Topography of Cosmas, an Egyptian Monk*, London: The Hakluyt Society (1897), and the numbering of the sections is according to the French translation: Indicopleustes, C. *Topographie chrétienne*, Wolska-Conus, W. (ed.), Paris: Les éditions du Cerf, vol. I, books 1- 4 (1968), vol. II, book 5 (1970) and vol. III, books 6-12 (1973).

11 *CT* prologue.4 (p. 4).

12 *CT* 1.2 (p. 9).

such men cannot be with us at all; but they occupy a middle position,[13]

From time to time in his text, he throws additional angry remarks at:

> … those miserable men [who] admit the spherical form of the heaven to be true, disbelieving, yea, rather execrating, the whole of divine scripture …[14]

And at the end of his treatise, he continues this fierce line:

> … they regard themselves as Christians, nevertheless think as do the Pagans who assert that the heaven is spherical. For their views differ not at all from those which the Pagans proclaim…[15]

A bit later Cosmas makes an interesting alignment, associating the acceptance of the sphericity of the earth with all what he hated. In this way, the acceptance of a pure 'scientific fact' was equated with a denial of Christian faith:

> Who will not pay regard to … all the saints and of the Lord Christ and his Apostles—to the harmony of the Old and the New Testament? Which of these dissented from the others, and maintained that the heaven was spherical, or proclaimed the pre-existence of this world, or represented that the world was eternal, or denied the resurrection of the body, or the dispensation of Christ, under which righteous men go up to heaven?[16]

It is not surprising that with quotations such as these, that were known in Western Europe upon the recovery of Cosmas's text and its publication in France in 1706, many have represented ancient Christians as enemies of science. However, it is ridiculous to present such quotations without any study of the context. The quotations themselves show that Cosmas's views were not the only ones that existed in the church, and his irritation was more directly at Christians who accepted the sphericity of the earth than at pagans, at a time when paganism was quickly disappearing in the Roman empire.

These texts show that not all Christians were flat-earthers like Cosmas, but did Cosmas really succeed in eradicating the idea of the sphericity of the earth in ancient Christianity? The truth is that he failed completely. Christians in the late antiquity, both in the East and West, ignored his cosmology. In the West it was never translated into Latin,[17] and in the

13 *CT* 1.3-4 (pp. 9, 10). The reference to Samaritans derives from 2 Kings 17:33.

14 *CT* 3. 87 (p. 128).

15 *CT* 5.178 (p. 212).

16 *CT* 5.182-183 (p. 214).

17 Although this is what it is usually stated, there are two very small fragments of the *Christian Topography* in Latin, and a similar cosmology to that of Cosmas is seen in the strange *Cosmography* attributed to a mysterious Aethicus Ister, that seems to have been composed

East, we find criticism of its content by the Armenian scholar Shirakatsi in the seventh century, an indirect disciple of Philoponus, and a ninth century review of the Cosmas's treatise by Photius, Patriarch of Constantinople and senior cleric of the Byzantine Empire, who mocked the ideas of Cosmas.[18]

Philoponus's defence of the sphericity of the world

However, the most important reaction came from the same city where Cosmas lived, Alexandria, and by a contemporary Christian, none other than the key intellectual John Philoponus, philosopher, natural philosopher and theologian. Trained in Alexandria in the philosophical pagan school, Philoponus became known as a Christian scholar who was very critical of Aristotle. In particular, his criticism of Aristotelian physics of movement and other points of natural philosophy became well-known in medieval Muslim culture and was much discussed in the West during the late Middle Ages and Renaissance, reaching even the famous Galileo.[19] Besides that, Philoponus defended a Christian world-view against the philosophy and theology of Aristotle and Neo-Platonists on certain key issues: he rejected the eternity of the world and the divinity of the heavens, as well as astrology.

At about the same time that Comas published his text, Philoponus went as far as composing a whole commentary on Genesis 1, *On the Creation of the World*, in which he accepted the sphericity of the world and, without naming him, rejected Cosmas's pseudoscience and pseudotheology. Although most of Philoponus's texts have been lost, this one survived and was translated into Latin and printed at the time of the Renaissance. It has recently been published in German and French.

What was the nature of the defence of the sphericity of the earth that Philoponus devised? Apart from long technical explanations defending the sphericity of the earth and theological debates with the Antiochenes, Philoponus engaged in the topic of science and faith relations.

He first rejected the idea that Moses (and he insisted on mentioning this very biblical character who Cosmas took pride in defending) intended to write on astronomy:

in Western Europe during the early eighth century. In any case, its impact on European culture seems to have been minimal. See the recent translation and study by Herren, M.W. *The Cosmography of Aethicus Ister*, Turnhout: Brepols (2011).

18 Photius, *Bibliotheca* 36. For a criticism of the 'flat error', the idea that educated medieval Christians were predominantly flat-earthers, see my recent short review of the topic: de Felipe, P. 'The modern myth of the medieval flat earth', *Dialog Theologie & Naturwissenschaften* (January 2017), available online at: http://www.theologie-naturwissenschaften.de/startseite/leitartikelarchiv/flat-earth-myth.html (last accessed 26/09/2017).

19 For the history of that millennial debate, see Sorabji, R. (ed.) *Philoponus and the Rejection of Aristotelian Science*, London: Institute of Classical Studies (2010, 2nd edn.).

> No one considering the systematic treatment of nature by later writers is going to ask Moses' scripture … what has been thoroughly researched on these subjects by specialists. … That was not the excellent Moses' intent; he was rather the first chosen by God to lead people to knowledge of God and to teach a way of life befitting that.[20]
>
> … do not let anyone ask if Moses is writing a work of astronomy or a technical treatise on natural causes. This is not the scope of theologians, nor the teaching for leading people to knowledge of God, but rather a job for specialized workers: for every field intends a useful purpose for human life.[21]

Secondly, Philoponus differentiated between astronomy and astrology, indicating clearly what to keep and what to reject from the ancient teachings about the heavenly bodies. In that he was following the famous fourth century commentary on Genesis by Basil of Caesarea:

> He [Basil] said that their observations were accurate; not the astrological or horoscopes –no way! They are false and lead to the impiety (of holding that) good or evil things happen to us not by choice, but out of necessity on account of the stars' motions and their relations to one another … What Basil the Great called accurate were not astrological observations but astronomical ones, which accurately explain the stars' motions, their forward and retrograde motions, stations and conjunctions, full moons, solar and lunar eclipses, and in how much time each of the planets completes its orbit, and whatever things pertain to this method.[22]

Finally, Philoponus harshly criticised those who used the Bible to attack astronomy, without naming Cosmas, but rather Theodore of Mopsuestia, the leader of the Antiochean School condemned in 553 at the Council of Constantinople. Mirroring some remarks by Augustine of Hippo in the Latin West more than a century before,[23] Philoponus also worried about

20 Philoponus *op. cit.*, (2), *CW* 1.1.

21 *CW* 1.2.

22 *CW* 3.6.

23 Compare Augustine's famous denunciation in *De Genesi ad Litteram* 1.19.39 (which was quoted by Galileo Galilei in his 1615 *Letter to the Grand Duchess Christina of Tuscany*):

> There is knowledge to be had, after all, about the earth, about the sky, about the other elements of this world, about the movements and revolutions or even the magnitude and distances of the constellations, about the predictable eclipses of moon and sun, about the cycles of years and seasons, about the nature of animals, fruits, stones and everything else of this kind. And if frequently happens that even non-Christians will have knowledge of this sort in a way that they can substantiate with scientific arguments or experiments. Now it is quite disgraceful and disastrous, something to be on one's guard against at all costs, that they should ever hear Christians spouting what they claim our Christian literature has to say on these topics, and talking such nonsense that they can scarcely contain their laughter when they see them to be *toto caelo*, as the saying goes, wide of the mark. And what is so vexing is not that misguided

the discouraging effect on Christian apologetics of those ignorant remarks by unlearned Christians:

> If certain people, owing to the uneducated state of their soul, cannot attain to what has been said and are troubled about the way the facts are put together, silence will help them to cover up their own ignorance. And let them not tell lies about God's creation out of their own lack of experience and the slowness of their mind, fearing the retributions for a lie. … What punishment do they deserve who lie about such works of God? Let them hear it from him: 'My name is blasphemed by you everywhere among the nations.'[24]
>
> For those who grasp investigations of matters of the heavens with accuracy and witness in their words that they possess perception both about the other things I have already said and about eclipses of the sun and moon, …
>
> … since the cause of each of these things is accepted by people willing to learn, so they know these and similar matters through scientific knowledge [probably a less anachronistic term could be 'systematic knowledge'], and know the phenomena by their own observations. When they encounter those of good old Theodore or one of his followers and observe the great stupidity of what they say, how can they not jump on our reverent teaching like flies on wounds in bodies, and how would they not blaspheme against us, or I should say against God, and flap their jaws attributing the absurdity of their words to the whole

people should be laughed at, as that our authors should be assumed by outsiders to have held such views and, to the great detriment of those about whose salvation we are so concerned, should be written off and consigned to the waste paper basket as so many ignoramuses.

Whenever, you see, they catch out some members of the Christian community making mistakes on a subject which they know inside out, and defending their hollow opinions on the authority of our books, on what grounds are they going to trust those books on the resurrection of the dead and the hope of eternal life and the kingdom of heaven, when they suppose they include any number of mistakes and fallacies on matters which they themselves have been able to master either by experiment or by the surest of calculations? It is impossible to say what trouble and grief such rash, self- assured know-alls cause the more cautious and experienced brothers and sisters. Whenever they find themselves challenged and taken to task for some shaky and false theory of theirs by people who do not recognize the authority of our books, they try to defend what they have aired with the most frivolous temerity and patent falsehood by bringing forward these same sacred book to justify it. Or when even quote from memory many things said in them which they imagine will provide them with valid evidence, *not understanding either what they are saying, or the matters on which they are asserting themselves* (1 Tm 1:7). (Augustine *On Genesis*, Hill, E. (trans.), New York: New City Press (2002), pp. 186, 187).

In this translation, the word 'experiments' corresponds to 'experientia', meaning in fact observations rather what we could understand today as experiments.

24 This is a reference to *Romans* 2:24.

dogma? But enough talk about the affairs of these people.[25]

Now we can also make sense of some words – in another text that Cosmas composed after the *Christian Topography* – that seem very personal:

> … one of those who glory in being Christians, when wishing to speak against the Pagans, unconsciously agreed with them in their opinion, that heaven is a sphere which is always revolving … and I could not but wonder that the wisdom of a man of so great learning should be blinded by his craving for distinction. For if, as a Christian, he had in view to refute the view of the Pagans, he ought first to have overthrown from the foundation their principles relating to the sphere and its revolution, just as we ourselves, by the will of God, have done in the other work, which as requested we composed.[26]

We can understand the frustration of Cosmas, as Philoponus was the living evidence that his desire to lump Christian sphericists together with those who held a pagan world-view that included such topics as the acceptance of the pre-existence and eternity of the world, had failed. Philoponus was a Christian scholar able to accept the sphericity of the world and at the same time reject its eternity. And that was something that Cosmas hated as he wanted to associate both issues together in a single ideological pack that he could reject as a whole. And that was not nonsense. For Antiochene theologians, and indeed for pagan philosophers, the spherical shape of the world was a guarantee of a perfect, continuous and eternal movement. Accepting the sphericity did not imply accepting the eternity of the world, but it was much easier in the view of these theologians to take a shortcut and shoot down sphericity, which was seen as the root of all problems (as can be seen in the above quotation by Cosmas, particularly in the last sentence).

Does not all this sound familiar, reminiscent of the situation for Christians in the sciences today? As the late Professor Donald Mackay put it, writing on evolution:

> Hardly was it [Darwin's *The Origin of Species*] published, however, before this purely scientific idea was seized upon in the interests of atheism and turned into something quite different. … 'Evolution' began to be invoked in biology apparently as a substitute for God. And if in biology, why not elsewhere? From standing for a technical hypothesis … the term was rapidly twisted to mean an atheistic metaphysical principle … 'Evolutionism' became a name for a whole anti-religious philosophy, in which 'Evolution' played the role of a more or less personal deity, as the 'real force in the universe'.

25 Philoponus *op. cit.*, (2), *CW* 3.8. The insert in brackets is mine.

26 Indicopleustes *op. cit.*, (10) *CT* 7.1 (p. 263). This later text is preserved as an added chapter (book 7) to the surviving text of the *Christian Topography*.

> Faced with such a confusion of issues, it is hardly surprising that some Christians of the last [nineteenth] century were induced to direct their fire in the wrong quarter, and to attack the technical theory instead of its philosophical parasite.[27]

Philoponus on science and faith

What I have written above shows clearly how Christianity, far from destroying ancient astronomy, actually preserved it, in spite of internal forces pulling in the opposite direction. And if you read about Philoponus, you can also find how his research even exposed the limitations of ancient natural philosophy, pointing to deficiencies that a millennium later became key in developing modern science. This is a story not often discussed in popular books, but which you can read about in *The Penultimate Curiosity*.

However, in Philoponus we find something more than a defence of the sphericity of the earth. We also find a particular way of addressing the relationship between science and faith; and here it will probably be better to talk about the future as well as the past, to reflect on how he solved the difficulties in relating science and faith, the challenge posed by Cosmas.

First, we have to say that Philoponus had a very good intuition of what Genesis is about. He pointed to the idea that these writings were intended as religious polemic, not scientific study, to attack the deification of nature. Interestingly, this is similar to how, in the twentieth century, the Genesis 1 account has come to be interpreted by biblical scholars:

> I have often said that he [Moses] wrote this book to lead people to knowledge of God for those subject to him, those who for a long time had also been brought up with the Egyptians and infected with their impious forms of worship. Almost all the barbarians up to now, as they had not yet received the mystery of Christ, believe that the sun and moon and the other stars are gods.[28]

Sadly, he did not follow this line of thought to the end. In the very next paragraph after the rejection quoted above that 'Moses is writing a work of astronomy', Philoponus introduced this new caveat:

> The aim of the present work is to show, as far as possible, that nothing in the prophet's cosmogony disagrees with the arrangement of the universe, but rather the opposite, that much of what was written about causes by later natural philosophers took its beginning from Moses' scripture.[29]

27 MacKay, D.M. *Clockwork image. A Christian perspective on science*, London: Inter-Varsity Press (1974), p. 52.

28 Philoponus *op. cit.*, (2), *CW* 4.1.

29 *CW* 1.2.

Although Moses was not specifically writing about astronomy, all that he said about that topic had to be correct, and Philoponus wasted many pages trying to find the sphericity of the earth in the Bible, at all cost. Furthermore, he followed the wrong but common idea among early Christians and Hellenised Jews, that ancient Greek philosophers and natural philosophers took their ideas (and that one in particular) from the Bible.[30]

> As I have shown that Moses' cosmogony agrees with extant reality, I have also taken those more highly reputed in astronomy than all their predecessors, Hipparchus and Ptolemy, as witnesses … and I think they took their points of departure from Moses' writings…[31]

So the argument has come full circle: what is in the Bible agrees with what the ancient scholars said, and that in turn was considered as derived from the Bible itself, and all that should be in agreement with what is in nature, not suspecting that this science-Bible consensus was a forced one that could be challenged by a closer inspection of nature.

The danger of concordism

So we can now begin to see the problem. It is called 'concordism' and is an artificial attempt to fit together the Bible and science (in this case the ancient natural philosophy of Plato and Aristotle and the astronomy of Hipparchus and Ptolemy).

This kind of solution has been attempted time after time in Christian history… and has always failed. The Bible is set up to be in agreement with some piece of current science that eventually will be overruled and a new concordism will be required. This is a real problem for Christianity, that has been called 'ratcheting concordism'.[32] And this is not the worst, although science and faith conflicts have often been exaggerated,[33] at times an initial concordism has only been dismantled after a conflict; sadly, in some cases, only to be replaced by a new concordism in a mindless ratcheting race.

30 Philoponus insists particularly on the imitation by Plato of Moses' ideas, as Moses is earlier than Plato. In particular, Philoponus focuses on the *Timaeus*, which interpretation was disputed by Philoponus in a previous book, *On the Eternity of the World Against Proclus*. Plato's *Timaeus* was a philosophical treatment of the creation of the world, but one that was particularly amenable to use by Christians in concordance with their ideas of creation. While Proclus attempted to use it to defend the eternity of the World, Philoponus read it as a creationist text. See Judson, L. 'God or nature? Philoponus on generability and perishability', in: Sorabji *op. cit.*, (19), pp. 221-237.

31 Philoponus *op. cit.*, (2), *CW* 3.3.

32 Venema, D.R. 'Genesis and the genome: genomics evidence for human-ape common ancestry and ancestral hominid population sizes', *Perspectives on Science and Christian Faith* (2010) 62(3), 166-178.

33 de Felipe, P. & Jeeves, M.A. 'Science and Christianity conflicts: real and contrived', *Perspectives on Science and Christian Faith* (2017) 69(3), 131-147.

Even an enthusiastic student of the legacy of Philoponus such as Stanley L. Jaki has recognised the historical shortcomings of Philoponus's approach (the same could also be applied to Augustine):

> Zealous faith could easily mislead, as shown for instance by Philoponus's repeated insistence that the Mosaic cosmogony was in full accord with the scientific (Aristotelian) world picture. … Philoponus spared no effort to prove that for Moses the earth was not flat but spherical.
>
> Clearly, the time was still far away when theologians were ready to do justice to the principle that Genesis was written for spiritual and not for scientific instruction. The first to state this programmatically was Philoponus himself, but he was also the first to ignore this wise principle.[34]

Concordism was not invented by Philoponus or Basil. It was a constant in early church history, and in some ways it was a positive move towards science. Far from trying to destroy science, the attitude of most early Christian leaders was to find integration, as we saw in the Lindberg reference to the medieval 'Augustine's handmaiden formula'. The way to achieving this was concordism: if the God of the Bible is the Creator of the cosmos, the information conveyed by his Word revealed in the Bible has to agree with his Creation activity as found in the cosmos. However, this great principle needs some help when specific problems arise. What happens when the two sources of information do not match?

The accommodation principle

Early Christians devised a solution that found masterly expression in Augustine,[35] the *accommodation principle*: if biblical texts were written in a particular place and time, understanding the nature in those texts should be expected to be in accordance with knowledge at that place and time, as divine revelation should not be expected to be concerned with science (for Augustine, see references in footnote 44). We glimpse that in Philoponus's defence of Moses as writing a book not to teach astronomy, but to lead his people to God rather than to a knowledge of nature (see above quotations corresponding with footnotes 20, 21 and 28).

This principle was transmitted to European medieval theology and to the Protestant reformers. We can see an example of this in Calvin's commentary on Genesis 1:

34 Jaki, S.L. *Science and Creation*, Lanham, MD: University Press of America (1990), p. 187.

35 For example in discussing Genesis 2:6: 'Or is scripture here again talking, as its habit is, in a weak and simple style to the weak and simple, and yet all the same suggesting something more profound for those to grasp who have the capacity?' (*De Genesi ad Litteram* 5.6.19. Augustine *op. cit.*, (23), p. 285). See other example in *De Genesi ad Litteram* 2.16,33,34.

> For, to my mind, this is a certain principle, that nothing is here treated of but the visible form of the world. He who would learn astronomy, and other recondite arts, let him go elsewhere.[36]

> Moses wrote in a popular style things which, without instruction, all ordinary persons, endued with common sense, are able to understand; but astronomers investigate with great labour whatever the sagacity of the human mind can comprehend.[37]

However, with the collapse of Aristotelian and Ptolemaic geocentric cosmology in the late sixteenth century, the limitations of the traditional practice of balancing concordism and accommodation became clear. If concordism was no longer tenable, it seemed that a drastic accommodation had taken place in the Bible. Astronomers such as Tycho Brahe illustrate the desperate attempt to retain some concordism. He accepted the accommodation with these words in an undated letter from 1590 to another geocentric astronomer, Peucer:

> Moses composed the account of creation for common and simple people who were not acquainted with mathematics and physics and he undertook to explain things which appear to men's eyes, not invisible and obscure things.[38]

Nevertheless, Brahe also strove to achieve concordism, forcing the Bible or the science into his own astronomical models. His then was a moderate accommodation, compatible with concordism, as can be seen in a letter to the Copernican astronomer Christoph Rothmann on 21 February 1589:

> The reverence and authority due to the sacred writings is and ought to be greater than that of dragging them into common discussion. For although they adjusted themselves to the common method of understanding in physics and some other matters, yet let it be far from us to think of them as speaking in *such* a common manner that we do not believe them to be speaking truth. Thus Moses, even if he does not refer to the deep things of astronomy when treating the creation of the world in the first chapter of Genesis, because he is writing for the common people, nevertheless he does introduce that which our astronomers can concede. … [You] detract too much from the prophets by saying that they did not understand more about the nature of things than other vulgar men. Although they did not treat of physics by profession, indeed this was not the nature of their gift, nonetheless they mixed many

36 Calvin, J. *Commentaries on the first book of Moses called Genesis*, King, J. (trans.), Edinburgh: Calvin Translation Society (1847), vol. 1, 1.6, p. 79.

37 *ibid.*, 1.16, p 86.

38 Dreyer, J. et al. (eds.) *Tychonis Brahe Dani Opera Omnia*, Copenhagen: Nielsen and Lyciche (1913-1929), vol. VII, p. 231. Quoted in Howell, K.J. *God's Two Books*, Notre Dame, In: University of Notre Dame Press (2002), p. 106.

physical propositions in with their prophecies, which no one, however deeply imbued in natural philosophy, could deny.[39]

Radical accommodation

Interestingly, we find a more radical form of accommodation in Rothmann. He showed what has been the solution for many Christians in the sciences since the sixteenth century who have found themselves uneasy with concordism and moderate accommodation. In an earlier letter to Brahe, dated 19 September 1588, Rothmann contributed to the debate as to whether celestial matter was solid or liquid:

> Unless this question is decided by us [astronomers/mathematicians], it will not be decided by anyone, whether theologian or physicist [philosopher]. For God has not revealed anything whatever about this in his Word, because it has nothing to do with our salvation. The Scriptures, which are written for the unlearned and learned alike, the common and ingenious, do not contain such disputations which are not even understood by very many learned. . . . Also, how can the physicists know anything with certainty? For we know and understand about the heights and the matters discussed by us only as much as we discover mathematical demonstrations through trigonometry.[40]

> Authority of Sacred Scripture is no obstacle. It is not written solely for me and for you, but for all men; and it speaks after their capacity of understanding, as all Theologians declare in the exposition of the first chapter of Genesis. ... Hebrews were of the opinion that clouds in the heights could not hang [there] unless there existed some hard and impenetrable matter which supported water. God speaks accommodating Himself to the capacity of the Hebrews...[41]

> … the Holy Spirit did not want to reveal them [the prophets] the wisdom that God set in nature, except for the wisdom of that wonderful and supernatural of the Redemption of the human race…. Therefore, the authority of Sacred Scripture, even though adduced in a plausible

39 Dreyer *op. cit.*, (38), vol. VI, pp. 177, 178. Quoted Granada, M.Al. 'Il problema astronomico cosmologico e le Sacre Scritture dopo Copernico: Christoph Rothmann e la "teoria dell'accomodazione"', *Rivista di storia della filosofia* (1996) 51(4), 789-828, (quotation p. 811). The English translation of the first part is from Howell *op. cit.*, (37), pp.100, 101, and the final part from Blair, A. 'Tycho Brahe's critique of Copernicus and the Copernican system', *Journal of the History of Ideas* (1990) 51(3), 355-377 (363).

40 Dreyer *op. cit.*, (38), vol. VI, p. 149. Quoted in Howell *op. cit.*, (38), pp. 93, 94.

41 Dreyer *op. cit.*, (38), vol. VI, p. 159. Quoted in Granada, M.A. 'Tycho Brahe, Caspar Peucer, and Christoph Rothmann on Cosmology and the Bible', in: van der Meer, J.M. & Mandelbrote, S. (eds.) *Nature and Scripture in the Abrahamic Religions*, vol. 2, Leiden: Brill (2008), pp. 563–583 (quotation composed from two translated fragments in p. 571 and 572; for a longer context see Granada, *op. cit.*, (39), pp. 809, 810).

> manner, it could not be an objection in this question, since we will know only as much as we achieve to discover through mathematical demonstrations.[42]

Sadly, as we saw above, these ideas were rejected by Brahe. Even Galileo, who in 1615 quoted in detail Augustine and those famous words of Cardinal Baronius ('That the intention of the Holy Ghost is to teach us how one goes to heaven, not how heaven goes'),[43] and who defended the accommodation principle, still expected some kind of concordism by way of a very peculiar, even bizarre, re-reading of the biblical text. In so doing Galileo was probably truly following Augustine's own expectations, as he can also be considered an advocate of moderate accommodation.[44] Galileo suggested that reference to the motion of the sun could be found in the miracle recorded in Joshua, suggesting that the movement the text could be speaking about was not around the earth but the sun's revolution around its own axis that could be held responsible for the movement of the whole solar system. Such a fallacious last resource was clearly unable to solve the problem.

Conclusion

For centuries, and still today, there have been Christians who seek to reconcile science and the Bible through concordism. Centuries of failures show how short-sighted are those efforts. Looking for the Big Bang or geo-

42 Dreyer *op. cit.*, (38), vol. VI, p. 160. Quoted in Granada *op. cit.*, (39), p. 810, (English translation mine).

43 Galilei, G. 'Letter to the Grand Duchess Christina of Tuscany'. English version from Stillman, D. (trans.). *Discoveries and Opinions of Galileo*, New York: Anchor-Doubleday (1957), p. 186.

44 See quotation above in footnote 23 from *De Genesi ad Litteram* 1.19.39, as well as 1.18.37, 1.19.38, 1.20.40, 1.21.41, 2.1.4, 2.5.9, 2.9.20-22, 2.18.38 and 5.8.23. All taken together show how Augustine expected some concordism or, if that was not possible, an allegorical interpretation to solve science and faith conflicts, not conceiving the possibility of ancient (and wrong) 'science' in the Bible. In particular, we should consider this statement: 'It must be stated very briefly that our authors knew about the shape of the sky whatever may be the truth of the matter. But the Spirit of God who was speaking through them did not wish to teach people about such things which would contribute nothing to their salvation.' (*De Genesi ad Litteram* 2.9.20. Augustine *op. cit.*, (23), pp. 201, 202). Although Rothmann stated that he was following the accommodation principle of Augustine, he went further than the bishop of Hippo in saying that: 'The Holy Spirit did not want to reveal to them [the prophets] the wisdom that God set in nature' (see above ref in footnote 42). In spite of the Holy Spirit's accommodation, for Augustine, Philoponus and Brahe the Bible writers knew the 'truth' and that led them to expect that no contradiction with nature could be found in the Bible. However, for Rothmann, they did not know 'the wisdom that God set in nature', so *there was no hope of finding scientific clues in the Bible*. This seems to be similar to the 'Principle of Scriptural Limitation' identified by Ernan McMullin in Augustine's *De Genesi ad Litteram*. However, Augustine himself failed to remain always faithful to it. McMullin, E. 'Galileo's theological venture', in McMullin, E. (ed.) *The Church and Galileo*, Notre Dame, In: University of Notre Dame Press (2005), pp. 88-116 (esp., p. 95).

logical eras in Genesis 1 is, sadly, as misleading as the attempts to read about the sphericity of the earth or the structure of the solar system in the Bible. Philoponus did not have the vantage point we have after so many centuries of history of science and faith interactions. Therefore, we should do better.

A more radical approach, such as the old radical accommodation of Rothmann could be more productive and liberate us from those unnecessary anxieties. A radical approach that recognises that in many instances the 'science' found in the Bible is an ancient one, as Rothman said, 'God speaks accommodating Himself to the capacity of the Hebrews'. This 'science' is by our standards mistaken, but recognising this fact does not affect our Christian faith.

In this context I should like to end with the words of one of the founding fathers of the Big Bang theory, the cosmologist and Catholic priest Georges Lemaître, who sounds not so different from Rothmann:

> As a matter of fact neither St Paul nor Moses had the slightest idea of relativity. The writers of the Bible were illuminated more or less – some more than others – on the question of salvation. On other questions they were as wise or as ignorant as their generation. Hence it is utterly unimportant that errors of historic and scientific fact should be found in the Bible, especially if errors relate to events that were not directly observed by those who wrote about them.[45]
>
> Divine revelation never taught us what we could have found out by ourselves, at least when these natural truths are not necessary to understand the supernatural truth.[46]

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45 Lemaître's answer in an interview by Aikman, D. 'Lemaitre follows two paths to truth', *The New York Times*, 19 February 1933, 3-18, (p. 3).

46 Lemaître, G. 'La culture catholique et les sciences positives'. This lecture was delivered on 10 September 1936, at the 6th Catholique Congress, Malines, and was published in: *Actes du VIe congrès catholique de Malines*, vol. 5, *Culture intellectuelle et sens chrétien*, Bruxelles: A.S.B.L., pp. 65-70 (p. 69). The full text of this lecture and long excerpts from the interview mentioned in the above footnote can be found in de Felipe, P., Bourdon, P. & Riaza, E. 'Georges Lemaître's 1936 Lecture on Science and Faith', *Science and Christian Belief* (2015) 27(2), 154-179.

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