From the anti-mythology of Israel's prophets to the rise of modern Western science

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ABSTRACT

Since the discovery of the Mesopotamian creation accounts, at the end of the 19th century, many have assumed that the similarities with the Bible accounts mean that biblical authors were just borrowing. However, some 20th century theologians have argued that, behind superficial similarities, lays a sharply different message centred in the separation between Creator and creation, leading to a de-sacralisation of the world. In addition, texts like Genesis 1 and 2 show a high regard for human beings unknown in their cultural context. These ideas have paramount importance for science, allowing and encouraging the human study of a de-divinised nature. Why, then, was a positive effect on the history of science not achieved in the Biblical cultural context?

Some historians of science (Duhem, Jaki, Hooykaas) have pointed out that it was necessary for the intellectual reflection on the Biblical world-view during the Middle Ages and the early Modern era to realise the full implications of these ideas. This process started in the 6th century with the Christian philosopher and scientist Philoponus, who did not hesitate to criticise the divine nature of the heavens in the Greek cosmology, in particular in Aristotle. Criticisms of this sort reappeared among Christians towards the close of the Middle Ages. In the end, the unification of the earthly and celestial physics led to the demise of Aristotelianism, and the rise of modern science. Contrary to popular perception, it is a well-known historical fact that Christians largely led this process. However, in spite of that optimistic reading of science and faith historical relations, it is impossible to deny that conflicts have indeed arisen at some points, why?

I will focus in two different episodes regarding cosmology and separated by one millennium. In the Alexandrian context of the 6th century, Cosmas Indicopleustes (recently identified by Wanda Wolska as Constantine of Antiochia) published the final effort in a long tradition of Antiochian theology. His *Christian Topography* defended a flat earth and a chest-shaped sky together with hatred-filled attacks on Christians that supported the spherical earth. In the 16th century, a new literalistic understanding of the biblical references to nature precipitated some Christians into conflict with those who proposed a moving earth. In spite of the differences of time, place and cultural contexts, I suggest that there are underlying similarities between both conflicts, mainly due to a literalistic interpretation of the biblical references to nature and the desire to find scientific information in the Bible. Is there an alternative to those views?

Interestingly, most of the scientists supporting the heliocentric theory in the 16th and 17th centuries were Christians and many of them devoted time and energy to propose solutions to science and faith problems. Although they were not frequently heard in their own times, their models have had a more favourable reception in recent times with several authors studying them in detail (Hooykaas, Howell). It would be interesting to reflect on the extent to which these "old" solutions can help us today to make sense of both, "old" and "new" conflicts.

Israel's prophets and the anti-mythology of the Creator God

Around a century ago, with the discovery of the Mesopotamian accounts of the creation of the world, the true context of the Old Testament texts was fully revealed.

In those days many assumed that the parallels between the texts from both cultures showed a shared world-view and a dependency of the Bible text from the much older (and widely known in ancient times) Mesopotamian texts.

However, a close examination of both texts shows that **while there are true similarities**: theme (organisation of the world), terminology (similar words as Tiamat and tehom for the original aquatic "chaos"), cosmological ideas (flat-earth, vaulted firmament), etc., **there are also profound differences** when looking to the theology behind them.

Bible texts on creation (Genesis, Psalms, prophets) talk about a key element in all human mythologies (the narrative of the world's origins), using the terminology and cosmological ideas of their times, but to teach a different world-view connected with the monotheistic faith of Israel.

These texts confronted the mythologies of the powerful neighbouring cultures. This was a feat that we can hardly understand in its complete greatness. Who would be so courageous to defy the mighty gods of Egypt and Babylon? The **Bible creation narratives deny the primeval battle between a Creator and the forces of chaos**. The aquatic chaos appears, but it is not really a contender to match the Creator.

All the elements of the universe, that were divinities in the Ancient world, are here stripped of their divinity: the sun and the moon are lamps, the great aquatic monsters are created among the fishes, filling the waters in the 5th day, etc.

Furthermore, the fertility, so precious and costly in sacrifices in the ancient world, is given freely to all living beings, including humans!

In addition, there is no sign in the Bible of the Mesopotamian view of humans as slaves created with the purpose to serve the basic needs of despotic gods. Here, **the sun and the moon are the ones to serve humans**.

Finally, the **stability and goodness of the creation** frees humans from the terror of a cyclical return of the chaos, not completely subdued in the myths. There is no return to the pre-creation situation; the cycles of mythology have been flattened into a linear history with a future entirely in God's hands.

"[...]. Actually, Genesis 1 prepared the way for our age by its own program of demythologizing. By purging the cosmic order of all gods and goddesses, the Genesis creation account 'de-divinized' nature. The universe has no divine regions or beings who need to be feared or placated. Israel's intensely monotheistic faith thoroughly demythologized the natural world, making way for a science that can probe and study every part of the universe without fearing either trespass or retribution." ¹

Once the scene is cleared of all kinds of divine and semi-divine entities that populate the myths, we can move to **some ideas put forward in the Bible.** These can be summarised into three key points: **1 Desacralisation of the world:**

•The world is a material reality in all its parts (heaven and earth).

•The world is not divine and not eternal, so it is contingent.

- 2 Stability of the creation granted by God-given laws to the world:
 •The world is ordered by stable laws, not by the caprices of gods.
 - •The world is "good"; there is nothing evil in the material world itself.

3 Dignity of human beings:

•Humans are the image of the Creator God, able to relate with him.

•Humans are created free and responsible, with the duty to know and care for the creation.

It is not difficult to realise the implications of these ideas for science:

1 A non-divine universe differentiated from the Creator that can be the object of study instead of worship and fear. As the world is declared the "good" creation of God, to study it is to engage in a good and godly activity.

2 An ordered stable world is even more worthy of study, as there is hope that there are laws beneath the apparently chaotic daily events that wait to be discovered. The contingent nature of the creation and its laws means that they are not to be known by an a priori reasoning, but by discovery.

3 Because **humans are images of the Creator and able to know him**, it is also expected that they will understand the way he has ordered the world. Furthermore, the Creator gives an explicit direct invitation to know the creatures and to take care of the creation.

However, although it is possible to trace back these ideas to the creation narratives (and other Bible texts), we should also ask why they did not produce a scientific revolution in the ancient Israel. Why was it necessary to wait more than 2000 years for modern science?

Modern science reaps the benefits of a biblical world-view

The prophets' ideas spread very slowly among their own people in Israel, as the majority preferred to follow the very same mythologies they were combating, in particular the cult of Baal and other Canaanite religions.

It was only after the Babylonian exile that the prophets' views became dominant in Israel. However, Israel was a small and isolated country, and their ideas filtrated very slowly to the surrounding cultures.

All changed with the expansion of Christianity over the Roman Empire. Its growth granted a serious examination of its basic tenets. It was John Philoponus (6th c.) a Christian philosopher/scientist who showed the implication of the Biblical world-view for science.

"The unique position of Philoponus in the history of scientific ideas is given by the fact that through him a confrontation of scientific cosmology and monotheism took place for the first time. The very idea on which all monotheistic religions are based implies of course the belief in the universe as a creation of God, and the subsequent assumption that **there is no essential difference between things in heaven and earth**. [...] neither in classical Hebrew literature nor in the Christian writings preceding Philoponus is any scientific conclusion drawn from these basic tenets of monotheism. The unity of heaven and earth, the sun, moon and the stars being objects created by God just like the grass, the trees, water and the animals - all this was accepted as a fact, it was registered without being interpreted in the frame of a scientific conception or explained in the light of a view of the world differing from former mythological or pagan beliefs."²

According, Philoponus wrote, "There is, generally speaking, nothing in the things in heaven which is not found also in terrestrial bodies."^{2b}

A key point for the desacralisation of heavenly bodies was to be able to explain their movements. According to Aristotle, moving objects needed permanent contact with a motor. For heavenly bodies this was achieved by "intelligences" that were responsible for those movements. Christians such as Theodore of Mopsuestia (4-5th c.) or Cosmas Indicopleustes (6th c.) were more than happy to transform heavenly intelligences into angels, considering this was in line with Biblical truth, in fact resacralising the heavens.

Philoponus alternative was an anti-Aristotelian physics able to unify and desacralise heaven and earth. First, he used the nearly forgotten³ anti-Aristotelian physical theory of impetus (a primitive precedent of the modern kinetic energy) to explain the movement of objects *not* in contact with the source of their motion, as arrows. Then, he extended this idea of impetus to the heavenly bodies in the context of the Biblical creation.

"The supporters of Theodorus' doctrine should tell us where in the Holy Scriptures they have learned that the moon and the sun and each of the planets are moved by angles [...]. As if God who created the moon, the sun and the other stars could not have invested them with a motive force."

Many years before, Basil of Cesarea (4th c.) also attacked the sacralisation of the heavens, and used the image of a cylinder spinning around its own axis after an impulse, to explain the continuous cycles of nature on earth following God's command in Gen. 1:11 *"Let the earth put forth vegetation..."*⁵

Although Philoponus could not stop Aristotle from intellectually taking over medieval Christianity, he was not forgotten. His ideas, and sometimes also his name, were **known to Muslims⁶**, **and later re-emerged among Christians, as Thomas Aquinas (13th c), who also felt the need to desacralise the heavens against Aristotle⁷. In the 14th c, John Buridan revived the impetus in Paris. Aristotelianism still survived a few centuries, while Philoponus' and Buridan's ideas were well known and printed with enthusiasm in the 16th century, slowly making their way to the pioneers of modern science (as Galileo) and influencing the formulation of the law of inertia.⁸**

The desacralisation of the heavens was only completed when **Philoponus' qualitative vision of united laws for heaven and earth was transformed**, by the continuous push of several generations of scientists (from medieval thinkers to the 17th c), into the precise and quantitative Newton's laws.

Historians of science as Duhem, Jaki, Hooykaas, have explained how, in addition to desacralisation, other Christian ideas (many derived form the Biblical creation narratives) were increasingly used from the late Middle Ages to positively influence the birth of modern science. However, this positive history hides some very real conflicts. Why did they happen?

Why science-faith conflicts arise? Flat-earth and immobile earth

Cosmas vs. Philoponus

In the 6th century, Cosmas Indicopleustes (Constantine of Antiochia⁹) defended a **box-like "biblical" cosmology with a flat-earth at the bottom**. This was not an isolated fringe idea, but the culmination of the School of Antiochia's literalistic view on science-faith. **Cosmas attacked Christians that accepted the spherical earth** (including specific attacks to Philoponus):

"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."¹⁰

His cosmology derives from an understanding of the Bible based on:

• "Direct literalism":

"This is the first heaven, shaped like a vaulted chamber, which was created on the first day along with the earth, and of it Isaiah speaks thus: He that hath established the heaven as a vaulted chamber. But the heaven, which is bound to the first at the middle, is that which was created on the second day, to which Isaiah refers when he says: And having stretched it out as a tent to dwell in. David also says concerning it: Stretching out the heaven as a curtain, and indicating it still more clearly he says: Who layeth the beams of his chambers in the waters. Now, when Scripture speaks of the extremities of heaven and earth, this cannot be understood as applicable to a sphere. [...]."11

• "Allegoric literalism": for example, he considered the table of the tabernacle an image of the earth, and then carefully followed its biblical description to find geographic information.¹²

"...those miserable men admit the spherical form of the heaven to be true, **disbelieving**, yea, rather execrating, the whole of divine scripture..."¹³

"...we have exhibited the Christian theories concerning the figure and position of the whole world **from divine scripture**;...⁷¹⁴

Cosmas found support in Eccl. 1:6 for his view that the sun circles a huge mountain in the north, thereby producing the night when it is behind it:

"...according to the **wise Solomon**, [...] The sun ariseth and goeth towards the south and moveth round to the north; the wind whirleth about continually and returneth again according to its circuits."¹⁵





Cosmas' parody of the spherical earth

Cosmas' own chest-shaped earth

Bellarmine vs. Galileo

Ten centuries later, Galileo's support for the **Copernican heliocentric universe** forced the Catholic Church to evaluate science and faith issues. Unfortunately, Cardinal **Bellarmine**, who played a key role in this case, had a view of the **authority of the Bible** that was bound, as the one we saw above, to produce a conflict:

"... to assert that the sun is really located in the center [...] and the earth [...] revolves with great speed around the sun [...] is damaging to the Holy Faith by **making the Holy Scriptures false**."

"Nor can one reply that this is not a matter of faith, because even if it is not a matter of faith because of the subject matter, it is still a matter of faith because of the speaker. Thus anyone who would say that Abraham did not have two sons and Jacob twelve would be just as much of a heretic as someone who would say that Christ was not born of a virgin, for the Holy Spirit has said both of these things through the mouths of the Prophets and the Apostles."

"Let me add that the words, 'The sun rises and sets, and returns to its place...' were written by **Solomon, who not only spoke as inspired by God, but who also was a man more wise and learned than all others** in the human sciences and in the knowledge of created things, and all this wisdom he had from God. Thus it is not likely that he would assert something which was contrary to demonstrated truth or to what could be demonstrated. [...]ⁿ⁶

Literalism, search for scientific data in the Bible, and fear of undermining the authority of the Bible seem common themes. While Cosmas' views did not adversely affect Christianity, the Galileo "affair" produced a lasting damage, still fed with creation/evolution debates, unfortunately repeating mistakes from the past. **Could we "learn from history" and find alternatives to conflicts?**

Can we learn something from science-faith conflicts of the past?

The movement of the earth (much more than the ancient debate on its shape) produced a flood of works on Bible/science relations in the 16th-17th centuries^{17,18}. Now that the debates are settled, what can we learn to help us with today's science/faith issues? Which principles could we appropriate?

1. Two truths cannot be in conflict

As God is the source of everything (the Bible and the universe), therefore, there should be no contradiction among them. **All truth comes from God**.

"True science" and "true theology" should never be in conflict. That means that solutions should be sought for "apparent" conflicts (points 2 & 3).

2. God's two books

A long tradition rooted in the Christian Church Fathers and Jewish theologians views **God as the ultimate source of both, Bible and creation**.

According to that, **science and Bible should both be cultivated**, not confronted, respecting their own methods. In this way, each will give different, but in both cases useful, fruits that we should retain.

• Science: concrete, practical description/explanations (open to discussion and perfection over time) of how nature works. Science should not be used to ground Christian doctrine.

• *Bible*: guidance that conform Christian doctrine on "faith and morals". The Bible should not be used to provide scientific information. However, certain cosmovision/world-view ideas/principles found in the Bible also become part of the doctrine and that can influence science (idea of creation, desacralisation of the universe, etc., as we saw in columns 1 and 2).

3. The accommodation of God's revelation

An equally old idea is that **God has accommodated to humans to reveal himself**. This idea is behind the concept of "revelation" itself and "incarnation"; God speaking to humans in their own language.

Therefore, Jews and Christians have seen many expressions and images in **the Bible as crafted in popular daily language**, and this has been the common interpretation of its anthropomorphic references to God. Jesus himself seems to use the idea of accommodation even further (Mk. 10:5).

Accordingly, when taking about the natural world, the Bible uses expressions accommodated to the culture of the time. Furthermore, as the Bible is intended for everyone (everywhere and at anytime), it has to describe nature in a phenomenological way, without changeable scientific theories.

What to do when a Bible text is found in "contradiction" with science?

1.- The Bible is always authoritative and true, as inspired by God for the comprehension by everyone.

2.- Mentions to science in the Bible are practical devices to speak in ways it could communicate in a meaningful and relevant way to the original readers.

3.- The Bible refers to natural realities using a simple, straightforward phenomenological approach, without theoretical explanations (e.g., in the Bible, the sun does not revolve in circles around a static earth at the centre of the universe, it just rises and sets in the sky, that is what we all see everyday).

4.- The Bible should not be expected to give scientific explanations of nature, as it has not the intention to provide us with science of any kind (e.g., in Gen. 1 sun and moon are both lamps, although the moon just reflects the sun's light; it also mention the stars, but misses the planets!). Therefore, the scientific meaning of the text should not be a barrier for science. Equally important is to resist the temptation of searching, *a posteriori*, for Biblical confirmation of modern science (e.g., some Copernicans used the mention to "firmament" in Gen. 1, to support a moving earth among static stars).

5.- The theological intention of the text is what should be discerned. The solution to conflicts is not the rejection of the text as unauthoritative, or a re-interpretation to fit any scientific theory. Most times it will be found to be giving cosmovision principles and/or using ancient "scientific" ideas to communicate Biblical doctrine about God. That means that the text could be interpreted "literally" from a theologically point of view, not a scientific one (e.g., references to the immobility of the world should be viewed as reassuring us about the stability of creation and of God's good will, not meaning that the earth cannot rotate, shake with earthquakes or even suffer meteorite impacts).

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Poster presented at the Christians in Science/The American Scientific Affiliation congress in Edinburgh (Scotland, UK, 2nd-5th August, 2007). New Frontiers in Science & Faith.