Jesus, Plato, Math and Theology:
What is Truth?

Why is mathematics true? Is it? The issue of mathematical realism is relevant to Christianity for a variety of reasons. Firstly, as Christians we often claim that Christianity has relevance to all aspects of life. If as Christians we find that our Christianity has no significance to our mathematics, I suggest that we should change either our Christianity or our mathematics. There is no such field as theology, but for the Christians all intellectual efforts are theological because they must always be attempts at understanding God. So Christianity is relevant to our opinion of mathematical ontology because it is relevant to everything. Conversely, mathematical ontology is relevant to Christianity because there are Christians who are mathematicians.

A second reason for a Christian concern with mathematical ontology is that mathematics has often functioned in society as a kind of barometer of truth. Both the modernist and the postmodernist appeal to mathematics as the highest arbitrator of truth. For the modernist the truths of mathematics are fixed and absolute, the great example of indisputable objective truth. For the postmodernist, the understanding that even mathematics is not absolute is seen as the final nail in the coffin of modernist absolutism. If even mathematics is not absolute, nothing is. Both think of mathematics as the shining example of truth, and what truth is.

Finally, mathematical ontology is relevant to Christians because so much of Christian theology has been historically shaped by Platonic mathematics, and the ontology that goes with it. The various contributors to *Mathematics in a Postmodern Age*, edited by Howell and Bradley, seem to assume that Christians are necessarily realists in ontology,[1] and they are not alone. But what is the cause of this Christian connection with mathematical realism in ontology? How much has our idea of God been shaped by Plato and his mathematics?

Plato, more than any other single figure, has influenced mathematics in the Western World. Alfred North Whitehead is credited with saying "All of philosophy is but a footnote to Plato." The same could be said of mathematics. Before what Stewart Shapiro calls (and I agree with him) "...the excessive pigeonholing of academic institutions,"[2] most philosophers were also mathematicians, and of these philosopher/mathematicians Plato is the first and greatest. Although Aristotle's systematic approach to philosophy may make him seem more mathematical to the untrained, it is Plato who strides like a colossus across the history of mathematics. Plato's dialogue *Meno* includes the earliest direct example of Greek mathematics. While Pythagoras was earlier than Plato, "to find more than very short and isolated references to the mathematics of the Pythagoreans, ... we have to go forward to the notoriously biased and uncritical hagiographical writings of Iambichus in the third century AD [more than five hundred years after Plato's *Meno* was written]."[3]

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[1] See especially "God and Mathematical Objects" in *Mathematics in a Postmodern Age*
[2] Shapiro, *Thinking about Mathematics*, p. 3
[3] Fowler, *The Mathematics of Plato's Acadamy*, p. 7-8

There was an epigraph inscribed above the door to Plato's Academy reading "Let no one ignorant of geometry enter here". Plato clearly regarded geometry—which to the Greeks was the essence of mathematics—as fundamental to knowledge. More accurately, Plato regarded mathematics as "the proper training for understanding the Universe as it is, as opposed to how it appears."[4] In his *Republic*, Plato writes of mathematical hypotheses as "...springboards for assault, from which [thinkers] may push their way up to the region free from assumptions and reach the beginning of all."[5] The philosophical idea Plato is most well known for—the idea usually being referred to when we say "platonism" today—is the importance and nature of ideals. This concept is mathematical in its origin.

Plato's philosophy of mathematics was that numbers, theorems, proofs, and mathematical objects in general are real. They exist. Plato thought of numbers as existing in an abstract, idea realm. For Plato however, as expressed famously in his myth of the cave, this idea realm is reality, and the world we experience every day is a shadow realm. Plato argued that the world we experience every day; the world in which we squint in the sun and wrap ourselves in thick coats, and stub our toes; is not the most important world. He drew an analogy from shadows and reflections. In our world of sight, the sun gives us light. We see it, but more importantly—by it we see everything else. Our world of sight is divided into two unequal parts. The greater part is the category of objects. Trees, people, grocery stores, books. These objects that we see are also mirrored and shadowed. This second category of reflection and shadow, together with the first category of objects, make up our world of sight.

Plato argued that our world of sight is itself a reflection or a shadow, and that just as the category of shadows and reflections exist because the sun acts upon real objects, so our world exists as a shadow because something (he called it "the Good") acts upon some category or realm which is more solid, and more real than our world of sight. This realm, of which our world is a reflection, Plato called the "Realm of Ideas". The realm of ideas is similarly divided into shadow and solid. Plato thought of this highest, most solid category as Ideas, such as justice, virtue, beauty, and goodness. The shadow of these is mathematics.

For Plato, mathematics is the way we approach the Good. Just as we might understand the world by studying shadows and reflections if that was all that was available to us, we can understand the idea realm by studying mathematics. The prominence of math in Plato's thought cannot be overstated. Although his explicit mathematical writings are few, they are important to the development of math in the western world, and they are (as noted earlier) the earliest Greek mathematical writing in existence. What is most crucial here is that Plato's mathematics are not separate from his thoughts on other subjects, but rather are implicit in all of his philosophy. Shapiro notes that "there are accounts of a public lecture on the Good, where, to the disappointment of some of his audience, Plato spoke almost exclusively of mathematical matters."[6] For Plato, mathematics was the beginning of any understanding of the Good.[7]

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[4] *Ibid*
[5] Plato, *Great Dialogues of Plato*, "The Republic", p. 311
[6] Shapiro, *Thinking...*, p. 54-55
[7] Fowler, *The Mathematics...*, p. 106-107

From all of this we can understand that Plato was what Shapiro refers to as a "realist in ontology", and what most other philosophers of mathematics refer to as a "platonist". In the *Republic*, Plato criticizes geometricians for speaking in what he thinks is "a very laughable and forced style, for they speak as if they were really doing and achieving something, as if their words had some action in view, talking loudly about squaring and applying and adding and all the rest of it; but the fact is, of course, that the whole study has only knowledge in view."[8] He goes on to say "...the knowledge they seek is not knowledge of something which comes into being for a moment and then perishes, but knowledge of what always is."[9] This, in essence, is mathematical Platonism, which Christians tend to adhere to.

Thomas Aquinas said that Augustine followed Plato as far as the Christian faith allowed.[10] Augustine himself was not a mathematician, and "in general [his] treatment of number adds nothing of substance to the treatment already accorded it in the Pythagorean-Platonic tradition."[11] However, as a philosopher and a theologian his presence looms large over the middle ages, and indeed over Christianity to this day; and it is primarily Platonic, and largely influenced by Plato's mathematics. Augustine credited Platonism as "free[ing] him from the shackles of materialism."[12] As Calvin Jongsma puts it in *Mathematics in a Postmodern Age*:

> "Augustine followed the Neoplatonists in ascribing the highest place to mathematics for giving order to the creation. Mathematical truths are necessary, unchangeable, and universal. God in his wisdom made use of mathematical ideas in structuring the world at the beginning of time."[13]

Augustinian and Thomastic philosophies dominated Europe for centuries, until the Copernican Revolution of the sixteenth century. We often consider the impact Copernicus, Kepler, and Galileo have had on science, but we rarely give adequate attention to the impact they have had, through mathematics, on theology. Copernicus, who was a priest and a mathematician, developed his heliocentric system primarily because of its mathematical elegance. Jongsma puts it this way:

> Copernicus took his approach largely for reasons of mathematical simplicity, systematic coherence, and philosophical perspective. He developed an alternative astronomy because he found the greater geometric simplicity and harmonious arrangement of the resulting planetary and stellar motion philosophically attractive.[14]

Galileo and Kepler both worked to defend the Copernican system, "claiming in essence that mathematics was sufficient for treating [astronomy and physics]."[15]

Kepler, an early seventeenth century astronomer and contemporary of Galileo's, saw the book of nature as a key to understanding God. In the wake of the renewed mathematization of Europe, and with it a new interest in Plato, Kepler studied the heavens to learn about its Creator. Rejecting Ptolemy and Aristotle, Kepler supported Copernicus' model of the universe, and defended it against accusations of disagreeing with Holy Scripture.

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[8] Plato *The Dialogues*, "The Republic", p. 326
[9] *Ibid*
[10] Some cynics have suggested that he followed it even further
[11] Copelston, *A History of Philosophy: Vol 2, Mediaeval Philosophy Part 1*, p. 93
[12] Copelston, *A History of Philosophy: Vol 2, Mediaeval Philosophy Part 1*, p. 58
[13] *Mathematics in a Postmodern Age*, Howell and Bradley ed. p. 144
[14] *Ibid.* 154
[15] *Ibid* 155

> To teach mankind about nature is not the purpose of Holy Scripture, which speaks to people about these matters in a human way in order to be understood by them and uses popular concepts. ... Why is it surprising then, that Scripture also talks the language of human senses in situations where the reality of things differs from the perception?[16]

Kepler agreed with Augustine and Plato, and considered mathematics to be the foundation of the Universe. God, the supreme mathematician, designed the universe according to geometric principles. For Kepler, as for Augustine, the Platonic Ideas were literally that—ideas existing in the mind of God. Kepler writes "Geometry, being part of the divine mind from time immemorial, from before the origin of things, being God Himself (for what is in God that is not God Himself?), has supplied God with the models for the creation of the world."[17] If it is accepted, this idea, with its root in Plato, carried on by Augustine and expressed here by Kepler, explains the feeling of epiphany which accompanies mathematical insight. A major problem with Platonism has always been that if mathematical objects exist in some abstract realm of ideas, then how do we as humans ever gain access to them? If Kepler (along with Copernicus and Augustine) is correct, and mathematical objects exist in the mind of God, or as part of God, then we, being creatures made in the image of God gain access to mathematical objects in the same way that we gain access to God. *Mathematics in a Postmodern Age* claims that "it seems implausible in the extreme that, say, in first learning of the number 2, a child is accessing the contents of the divine mind."[18] I disagree wholeheartedly. I suggest that this is exactly what happens when a child learns of the number 2. I further propose that mathematics is a form of divine revelation. It is fundamental to Christianity that God is accessible, even to a child learning the number 2. Regardless, it is clear that Christian theology in general has been deeply impacted by the Platonism of Kepler.

No less important to Christian theology and to mathematics is Galileo Galilei. Galileo argued that Copernicus' model was not simply mathematically convenient, but was an accurate representation of the physical world. At the heart of this conviction was simply a philosophical belief that accurate mathematical models always tend to correspond to physical realities. Following Augustine, Galileo acknowledged God as the source of natural inspiration. God is the author of the book of nature, and as such the truths of mathematics are divine truths, which lead us to a greater understanding of God. Galileo's Platonism is manifested in that he proposed that the mathematical revelations of the book of nature are less likely to be misinterpreted by humans than the revelations of Holy Scripture. He claimed that where our interpretations of scripture disagree with our mathematical interpretations of the book of nature, it is our scriptural interpretations which should be adjusted. Like Plato, then, Galileo regarded mathematics as the beginning of an understanding of the Good—that is of God, who like Plato's "Good" is the source of all goodness, and the spiritual light by which all goodness is seen.

The theological and philosophical ramifications of the Copernican revolution led directly to modern philosophy, to Cartesian Foundationalism and scepticism and to both its supporters and detractors, and to Newton's mechanical model of the universe.

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[16] Kepler, *Astronomia nova,* quoted at http://www-groups.dcs.st-and.ac.uk/~history/HistTopics/Heliocentric.html#s5

[17] Kepler, quoted in *Mathematics in a Postmodern Age*, Howell and Bradley ed. p. 164

[18] *Mathematics in a Postmodern Age*, Howell and Bradley ed, p. 92

Leibniz criticized Newton's mechanized world for being insufficiently dependant on God. Newton's world could get along just as well without God as with him. In a letter to the Princess of Wales, Leibniz comments:

> Sir Isaac Newton, and his Followers, have ... a very odd Opinion concerning the Work of God. According to their Doctrine, God Almighty wants to *wind up* his Watch from time to Time: Otherwise it would cease to move. He had not, it seems, sufficient Foresight to make it a perpetual Motion. ....[19]

Leibniz held that God was not just the Creator, but also the sustainer of the universe. Notwithstanding his disagreement with Newton on this matter, Leibniz, like Newton, Descartes and Plato, held mathematics to be vital to knowledge, and considered it a "necessary truth"[20]. Leibniz argues that the laws of mathematics are first principles, created by God before all things. Although it is important for Leibniz that "God could have created a world governed by *other* primary laws,"[21] it is equally important that "God had *reasons* for decreeing these laws rather than other possible laws."[22] Leibniz thus argues that the laws of mathematics and logic—the primary laws of our world which exist by logical necessity—are at their root morally, not logically necessary, since God chose them for moral reasons. Another way of putting this is that God created, and is not subject to, logical rules. Therefore nothing God has done could be a logical necessity in an absolute way. But a moral necessity, for Leibniz, is action in accordance to the moral laws which are defined by God's character. God's action is morally necessary by definition, because our definition of moral is based on God's character. Since, then, the logical primary laws were chosen by God for moral reasons, it follows that they are at the core morally necessary.

This incomplete historical survey has hinted at the legacy of Platonism in mathematics, and in Christian theology. All of these mathematicians were realists in ontology, convinced, with Plato, that mathematical objects exist, and their theology was shaped by their opinion of the nature and role of these mathematical objects. Yet perhaps these mathematicians—and indeed the bulk of Christian history—have been insufficiently critical of the pagan source of this mathematical philosophy. Augustine achieved a synthesis of Christianity and Platonism, but was that synthesis in fact a syncretism? Has Christianity been diluted by Greek philosophy to the degree that we no longer recognize the difference? Can a Christian be a Platonist? On the other hand, fictionalism has been accused of dissolving certainties. Recall that mathematics is a social barometer of truth. Should acceptance of fictionalism be seen as a step toward the rejection of all truth? Can Christianity exist without a conviction of objective moral and theological truth? How can Christians, who believe that Jesus Christ is the Truth, accept that there is no truth? Can a Christian reject Platonism? Finally, if neither Platonism nor fictionalism is acceptable to Christianity, can Christians do math at all? If mathematics has its origin in a pagan religious society, and cannot be reconciled with Christianity, should Christians reject mathematics entirely?

A common justification of mathematics by Christians is that God is perfectly rational, and as such mathematical. Our mathematics is useful for understanding God because our mathematics is the height of our rationalism. But the God of the Bible is a

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[19] Koyre, "Leibniz and Newton" in *Leibniz* ed. Harry G. Frankfurt, p. 240
[20] Wilson, "On Leibniz's explanation of 'Necessary Truth'", in *Leibniz*, ed. Harry G. Frankfurt, p. 401
[21] *Ibid* p. 413, my italics
[22] *Ibid* p. 413, her italics

God for whom a day is like a thousand years and a thousand years are like a day.[23] This is a God for whom an hour's work is given the same value as a day's work.[24] This is a God for whom a fraction of a penny is more than great wealth.[25] The arithmetic—the mathematics of God is not like our mathematics. The mistake is the extension of the word "perfect". We say that God is perfect, so it follows that he is perfectly rational. By this argument, we might as well say that God is perfectly round, perfectly weak, perfectly evil. God is not perfectly rational unless rationalism is good in itself, which is an assumption I refuse to grant. Aristotle argued that the *telos*, or perfect end of humanity is reason,[26] and Christians have extended this backward, by the doctrine that we are made in the image of God, to conclude that God is perfectly rational. But Aristotle was wrong, and the Christian extension is flawed. The *telos* of humanity—the humanness of humanity—is seen when a person is being the most personal. Language carries with it generations' worth of wisdom and insight, and it is to language that we can turn to refute Aristotle. Think of the word "humane". We are at our most human, not when we are at our most rational, but when we are at our most loving—and the Bible (which never teaches us that God is reason) teaches us that God is Love.[27] The "God is rational" defence of mathematics simply does not hold water. What, then, is a Christian mathematician to do?

As Christians, we need never be afraid of questioning God, nor of examining all positions and opinions. From Joshua to Paul, God's servants have supported a certain scepticism. Rationalism should not be idolized, but it need not be rejected altogether. Likewise, although Christians should be eternally vigilant and remember the source of wisdom, it is not necessary to reject outright all beliefs which arise from outside the Christian context.

Within Christianity, there is room for disagreement, and there is no one Christian philosophy of math. A Mormon friend of mine has criticized mainstream Christianity by saying that within Christianity there is too much disagreement, and we do not have uniform ideas. If Christianity were truly God-breathed, he argues, it should be consistent. G.K. Chesterton, master of paradox, claimed that far from a weakness, this is exactly the strength of Christianity.

> All sane men can see that sanity is some kind of equilibrium; that one may be mad and eat to much, or mad and eat to little... but the real interest comes in with the question of how that balance can be kept. ...Paganism declared that virtue was in a balance; Christianity declared it was in a conflict: the collision of two passions apparently opposite. ... Take, for instance, the matter of modesty... [Christianity] separated the two ideas [of pride and prostration] and exaggerated them both. In one way [Humanity] was to be haughtier than [they] had ever been before; in another way [they were] to be humbler than [they] had ever been before. In so far as I am [human] I am chief of creatures. In so far as I am *a* [human] I am the chief of sinners... Christianity was positive on both counts. One can hardly think too little of one's self. One can hardly think too much of one's soul...[28]

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[23] 2 Peter 3:8
[24] Matthew 20:1-16
[25] Mark 12:41-44
[26] Aristotle, "Nicomachean Ethics" in *An Introduction to Aristotle*, ed. Richard McKeon, p. 318
[27] 1 John 4:8
[28] Chesterton, *Orthodoxy*, p. 95-100

The implication of this for mathematical philosophy is that there is room within Christianity for passionate disagreement. What there is no room for is apathy. The position that it doesn't matter is unacceptable. It may seem that this response is an evasion, however it is no evasion to say that the philosophical matter is not settled, and to call for continued intellectual vigilance. Christianity is not a dogmatic prison, meant to end questions but a doctrinal liberty, meant to allow for them. The Christian approach to a philosophy of mathematics, then, is simply to continue to question everything, and hold fast to what is good.[29] As Christians we are called to a theocentric approach to life. A Platonic philosophy that the objective ideal truths of math are mirrored in the visual world is unacceptable to Christians. We do not look to mathematics to teach us about the character of God, for mathematics, like nature, is not a teacher. If we decide that mathematics can teach us about God's character, then we may believe that God is beautiful because mathematics is beautiful. We may believe that God is efficient because math is efficient. We may believe that God is indifferent because math is indifferent. We may believe that God is incomplete, because math is incomplete.

As Christians, we do not begin with math, or with logic, or with reason. We begin with God. Beginning with God means that we do math philosophy with a pre-existing faith and conviction about God's character. Beginning with God means that when our math philosophy teaches us to undermine the value of human life, we re-evalute and rework our math philosophy, we do not rework our understanding of who God is.

What is the significance of this on the actual practice of mathematics?

First, the practice of mathematics is the teaching of mathematics. A Christian teaching of mathematics must not be philosophically and theologically neutral. The existence of conferences in which so-called "pure math" and philosophy of mathematics are discussed side-by-side is very much a step in the right direction.

The second practice of mathematics is the application of math to practical science. Practicing mathematicians are hired by governments, companies and firms to perform calculations and build models. A Christian mathematician is called to be a Christian first and a mathematician second. Christian mathematicians cannot be ambivalent or indifferent to the moral application of their work. An actuarial mathematician, for example, may be hired by an insurance company to calculate the risk of payment, and increase the company's chance of profit. A Christian must be conscious of the ethical aspect of this work, and must continue to be a Christian while calculating. It may not be possible for many Christian mathematicians to work for many insurance companies.

Finally, the practice of mathematics is the practice of developing mathematical theories, proofs and formulae. Mathematicians do not necessarily work on applying math, and a Christian mathematics must be pertinent even to those who do not apply. It is not only in the application, but in every aspect of mathematics that Christianity is relevant. This means that a Christian mathematician working on—say finding the 43rd Mersenne Prime, or solving one of Hilbert's problems—must do so with a theological understanding of God's character. This means that a Christian mathematician's intellectual task is greater than that of a secular mathematician, and this should be

[29] 1 Thessalonians 5:21

expected, for Christ calls for an ethic of intellectual rigor—for disciples as cunning as serpents and as innocent as doves[30].

The usual approach to a Christian perspective of math is a Platonic one, that math is part of creation. Christian math philosophers like Howell and Bradley argue that since creation is good, a study of creation is also good. Study of mathematical theories is service of God in that it is a study, admiration and love of God's creation. This all assumes a Platonic mathematics. Like Kepler or Galileo, Howell and Bradley see math as God's creation, and a way of gaining access to God. While this may be true, it is incomplete. I suggest that it must be possible to address the cross as well as the creation, and that Jesus, Plato, math and theology can speak to each other in meaningful ways, and that finding out exactly how to do this is the task of the Christian mathematician.

[30] Mt 10:16

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