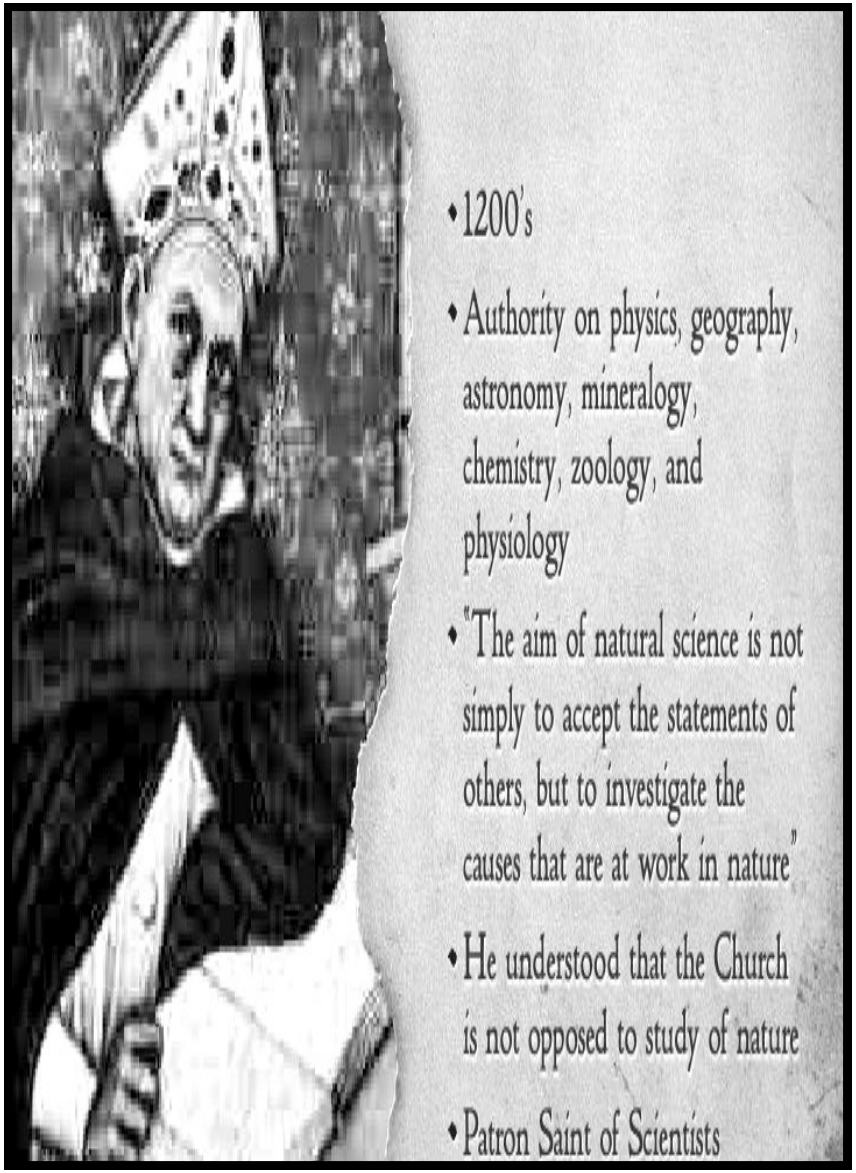
PLEASE VISIT THE WEBSITE: www.pamphletstoinspire.com

Catholic Physics - Reflections of a Catholic Scientist - Part 8

Mathematics the Handmaiden of Theology: Augustine and Cantor



Catholic Physics - Reflections of a Catholic Scientist - Part 8

Mathematics the Handmaiden of Theology: Augustine and Cantor

I had thought I could proceed in a nice orderly sequence about belief, knowledge, the limits of science, but articles keep appearing that I have to discuss. Here's an article by Adam Drozdek that has great insights on mathematics and its relation to theology: Beyond Infinity: Augustine and Cantor. Although I'll try to summarize the main points of his article, I urge the reader to go to the original article for a detailed exegis. First, here is Drozdek's summary of St. Augustine's (Hippo) ideas about mathematics, infinity and God.

"To summarize, there are three important aspects of Augustine's discussion of the problem of infinity. First, infinity is an inborn concept which enables any knowledge. Second, infinity can be found in the purest form in mathematics, and thus mathematics is the best tool of acquiring knowledge about God. Third, God is neither finite nor infinite and his greatness surpasses even the infinite. Augustine is original in combining these three aspects in his philosophy ; some of them can be found in other philosophers and theologians, but also in mathematicians."

Augustine anticipates later developments in mathematics, the mathematics of infinity put forth in set theory:

"God's infinity would still be of a higher magnitude, an infinity of different kind. His infinity is above all possible temporal (and spatial) infinity ; it is an infinity of infinities, whose magnitude can be dimly imagined by means of mathematical infinity. It is an infinity of infinities also in that "all infinity is in some ineffable way made finite to God," since no infinity is incomprehensible to God (De civ. Dei), he can count numbers without succession of thought. God is even able to count without numbers, which assumes that there is no number equal to the quantity of all numbers, that is, no number, to use modern parlance, expressing cardinality of integers (which is aleph zero). This is no hindrance to God who is able to see the entire sequence of numbers without looking at these numbers one by one. Infinity of these numbers can be grasped in one act of comprehension."

Drozdek points out that Augustine's view on God's infinitude differs from that of later Catholic theologians and philsophers–Roger Bacon, Thomas Aquinas, Duns Scotus–who emphasized the infinite nature of God.

"Augustine is an exception to this rule. To him, God encompasses infinity, himself not being infinite."

However, Augustine does have a worth successor, Georg Cantor (1845-1918) who proposed new ideas about infinity as a mathematically rigorous subject, by use of set theory. Cantor's motivation was theological and philosophical:

"mathematical statements are not divorced from reality, and, for instance, set theory makes certain pronouncements about things in themselves, about 'true being,' and 'the general set theory […] belongs entirely to metaphysics' and is its servant."

Like Augustine, Cantor believes that knowledge of infinity is innate: "…abstract knowledge is already in us, implanted and dormant, enlivened by our quest for it. In particular, infinity cannot be recognized unless it is inborn, since infinity "even inhabits our mind (Geiste)".21 Therefore, mathematics has not only a purely theoretical interest, but it is also of philosophical and theological bearing."

God, according to Cantor is the Absolute (what in modern mathematics is designated by the Greek upper-case omega):

"But whereas different transfinite levels can be known (erkanni), the Absolute can only be recognized (anerkannt), not known, not even approximately ; however, an 'absolutely infinite sequence of numbers,' i.e., sequence of all infinities, can be considered 'a suitable symbol of the Absolute'.25 Set theory shows that there is no set encompassing all sets, and yet God is able to comprehend all these infinities, hence he is above infinity, he is the Absolute. The transfinite, unlike the Absolute, 'clearly appears to us as limited, capable ofbeing augmented and thus related to the finite'. With this statement Cantor returnsto Augustine's conviction that 'all infinity is in some ineffable way made finite to God.' "

Like Augustine, Cantor believed that the concept of infinity is put within us, as a Divine implant:

"The transfinite numbers are not pure creations of our mind, they are only discovered in the mind and in the world. They cannot be our creations since they precede our very existence and the existence of the world. As Augustine, whom he quotes, Cantor believes that God utilized numbers to create the world."

My wife, who is NOT a mathematician, in reading all the above, recognized that there is at the basis a Platonic philosophy, that is to say, an assumption that there is a reality to mathematical ideas that is different from the reality of concrete things, the world of sensation. Other mathematicians (not all of whom are theists) are also Platonists, for example Roger

Penrose, who proposes three worlds, the platonic (ideas), the physical, and the mental. (see The Emperor's New Mind)

If Drozdek's article stirs you up, you can also go to Rudy Rucker's fine book on the same subject, "Infinity and the Mind", which gives more mathematical detail than Drozdek's article.

From a series of articles written by: Bob Kurland - a Catholic Scientist

***

"It is also necessary—may God grant it!—that in providing others with books to read I myself should make progress, and that in trying to answer their questions I myself should find what I am seeking.

Therefore at the command of God our Lord and with his help, I have undertaken not so much to discourse with authority on matters known to me as to know them better by discoursing devoutly of them."

St. Augustine of Hippo, The Trinity I,8.

This is to be a blog about the consonance/compatibility of science and the teachings of the Catholic Church. If you ask why yet another blog about science and religion, I'll answer that I hope to bring a different perspective, as a late convert to the Church (at the age of 64, 18 years ago) and as a physicist (now retired after 60 years in academia and medical physics).
Being a physicist (since 1951), I should, according to popular opinion, be an atheist, or at worst an agnostic with no clear idea of whether God exists or that He acts in the world. That opinion, given loud voice in the media and on the internet, is of course not correct. There are many physicists, among them Nobel Prize winners, who are believers (to be listed later) just as there are many who are not.

So, scientific achievement is not in itself a basis for crediting or discrediting belief in God, nor should it be on rational grounds. There are intelligent people who are atheists, and there are intelligent people who are theists. And it is not true, despite claims of evangelical atheists to the contrary, that one either lacks intellectual acuity or has to suppress one's critical faculties in order to believe in God.

What then are the roots of faith, and in this context, by faith I mean belief in God? The purpose of this blog is to explore (but not necessarily answer) this question in both a general and personal way. To begin, I offer a general apology (not apologia): I am not a professional philosopher although I have done much undirected reading in this last decade. What philosophical discourse I'll attempt will be distilled from such reading and, of course, can be subjected to critical analysis by those more academically versed in philosophical arguments.

First, I'll discuss what might be rational (and sometimes irrational) grounds for belief, particularly belief in God. Next, I will give a personal account of my own (rather later) road to belief, which was, unlike St. Paul's, a top-down conversion. Finally, I will examine what the world around us tells us about the existence and intervention of God, in both a scientific and supra-scientific context.

I will also try to show (as a quondam practicing scientist) the "Limits of a Limitless Science" (the elegant phrase used by Fr. Stanly Jaki) and, in particular, that my faith as a Catholic is entirely consonant with what science tells us about the world.

From a series of articles written by: Bob Kurland - a Catholic Scientist