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# One Mathematician's Journey Through Mathematics and The Faith Equation: One Mathematician's Journey in Christianity (Book Reviews)

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# Book Reviews

Bittinger, Marvin. *One Mathematician's Journey through Mathematics*. Addison-Wesley, 2004. ix + 212 pages. ISBN: 0321241509
Bittinger, Marvin. *The Faith Equation: One Mathematician's Journey in Christianity*. Literary Architects, 2007. xxv + 290 pages. ISBN: 1933669071.
Reviewed by Calvin Jongsma, Professor of Mathematics at Dordt College.

Judging by numbers of books written plus copies sold, Marvin Bittinger may be the world's most successful college mathematics textbook author. Counting different editions, during his forty-year career as a mathematics educator at Indiana University-Purdue University at Indianapolis, Bittinger has authored or co-authored around 195 books, selling more than 12 million copies. These are primarily in the area of developmental mathematics, exhibiting Bittinger's zeal for helping at-risk college students succeed in learning mathematics.

The two books under review were originally intended as a single work, but they are now companion pieces published by different companies. I suspect this separation is due to the overt religious tone of the second work, which aims at a very different audience than the first. They sketch some of Bittinger's life and interests, though they are not written as autobiographical accounts, and neither book is bashful about acknowledging Bittinger's Christianity. In *One Mathematician's Journey* (2004), however, Bittinger merely mentions his religious beliefs and practices in the course of talking about his passion for mathematics, writing, and various hobbies, without making them a specific focus. Nevertheless, already there he says, "I hold to the strong belief that all scientists, including mathematicians, should return to a union of faith and reason [elsewhere: "integration of mathematics and theology"] in their daily and professional lives" ( 1, 202). The second book, *The Faith Equation* (2007), shows Bittinger's way of combining these.

Although raised as a Christian from birth by his maternal grandparents after his mother's death, Bittinger experienced Christianity as an oppressive system of *thou shalt nots* operating through guilt manipulation, so he rebelled in his adolescent years, adopting a more nominal religious stance in adult life. After a heart attack ten years ago, Bittinger devoted his life more genuinely to doing what he understands to be God's work. *The Faith Equation* is a major result of that re-dedication; I will concentrate on this book in the remainder of my review.

Bittinger notes that one is not trained by graduate courses to think about connections between one's faith and one's field of study. So how does one learn to integrate these things? An abundance of books and articles, and even journals, conferences, and organizations, now address this for mathematics and natural science. Bittinger seems largely ignorant of these resources, though he does cite a few such works in his bibliography. Nevertheless, his apologetic approach to the issue of integration is not that different from that of many other Christians in science and mathematics. He contributes some original ideas to this topic, but much of what he writes is pretty standard for evangelical Christian mathematicians concerned with integrating faith and learning.

Readers of *Pro Rege* may not be well acquainted with or sympathetic to Christian apologetics, the practice of mounting a rational defense of the Bible and its teachings. As Nicholas Wolterstorff states in his 1993 autobiographical essay *The Grace that Shaped My Life*, within the Kuyperian Christian tradition that he and many of us embrace, "Nobody offered 'evidences' for the truth of the Christian gospel; nobody offered 'proofs' for the inspiration of the Scriptures; nobody suggested that Christianity was the best explanation for one thing and another. Evidentialists were nowhere in sight. The gospel was report, not explanation" (*Philosophers Who Believe*, 263). Along with Augustine and Calvin, Kuyperians seek to live and reason from out of their faith rather than provide a rational evidentiary foundation for holding it.

Apologetics is alive and well, however, outside of Kuyperian circles. Evangelical Christians generally find the Kuyperian assessment of apologetics wrong-headed and perplexing. The main motivation for Christian apologetics given by many, Bittinger included, is the commendable goal of leading others to become followers of Christ. By making the Christian faith appear reasonable, apologists think unbelievers will not have to take such a large leap of faith in order to believe the truths of Scripture and thus be saved. Yet this approach naively accepts the religious neutrality of a rationalist methodology and misconstrues the true nature of and connection between faith and reason. Faith underlies all we do; it is not an irrational leap taken after reason has laid the necessary groundwork. I realize this critique begs to be expanded and refined, stipulating where and how rational argumentation properly functions within the Christian life, but this will have to wait for a more appropriate venue.

Bittinger uses a framework of mathematics for his

apologetic defense of Christianity. This takes several forms. Going in one direction, he uses the axiomatic structure of mathematics to propose an attitude toward Christian beliefs. The existence of axioms as a deductive basis for mathematical theories can encourage us to adopt a set of faith axioms such as *God exists and is good and loving* or *The Bible is reliable* as the basis for our spiritual lives. Gödel's Incompleteness Theorem, on the other hand, supposedly shows that even if we did have a full set of faith axioms, we still would not be able to deduce everything from them that is true – thus pointing out the intrinsic limitations of all faith knowledge. Of course, Bittinger realizes that analogical inferences from mathematics to religious faith are tenuous at best because our system of beliefs is not a deductive system and also does not include arithmetic as a subsystem. So although these connections are born of genuine piety, I suspect that few people not already predisposed toward accepting religious "faith axioms" would be moved closer to genuine faith by such comparisons.

Acceptance of faith axioms, according to Bittinger, should be the result of a dialectical process of questioning and believing, evaluating evidence for and against these beliefs. Here more traditional apologetic arguments, buttressed by calculations, come into play. For example, Scripture must be considered reliable because so many prophecies have come true. Bittinger quantifies the probability of various components of a complex event to calculate a conservative upper bound on how probable the predicted event might be. Finding this probability to be very small, similar to that of finding a single red grain of sand in a pile filling an enclosed sports arena, he concludes that the prophet could not have just gotten it right by chance; it must have involved divine foreknowledge. He argues that because this happens time and time again, we can trust the Bible throughout, even with respect to predictions that have yet to occur.

Regarding end-time predictions, Bittinger uses data-based exponential population models to determine when the number of evangelized people will be equal to the total world population. The two population curves intersect at 2033, 2000 years after Christ's death and resurrection. Bittinger stops short of concluding that this establishes the date of Christ's second coming (though the inference must have been tempting), both because his models may need tweaking as the exponential curves draw closer together (there obviously cannot be more evangelized people than people in total) and because Christ said nobody but the Father knows the time of his return.

Bittinger's apologetics also seems to move from religious beliefs to mathematical ideas, at least for initial motivation. Because so much in the Christian faith goes beyond human comprehension (the two-fold nature of Christ, the composition of the Trinity, God's sovereignty vs. human responsibility, etc.), Bittinger recognizes the need to acknowledge mystery. Following some contemporary Christian thinkers, he formulates this as being "embroiled with paradox" ( 50). To make this an apologetic insight, however, he first looks for something similar in mathematics. The concrete examples of paradoxes that he locates in mathematics, though, are due to limited comprehension, uneducated intuitions, tricky diagrams, or fallacious arguments. Conflicting viewpoints largely disappear once the matter is correctly understood. The mode of reasoning known as proof by contradiction, which he identifies as the best mathematical embodiment of paradox since it starts by supposing the opposite of what is to be proved, concludes by rejecting the original assumption as absurd – hardly the sort of thing we want to do with our limited understanding of the paradoxical mysteries of faith.

One major apologetic strategy used by Bittinger that I (and maybe most mathematicians) do find attractive is his use of higher dimensionality. Here Bittinger draws upon E.A. Abbott's well-known book *Flatland*, first published in 1884, which describes the difficulty two-dimensional creatures would have conceiving of three-dimensional existence. In a similar way Bittinger offers a number of illustrations to indicate why humans might be unable to grasp the full meaning of a theological concept or the truth of a paradoxical belief. In some instances he uses higher dimensions simply as a metaphor. The Trinity, he suggests, is like a three-pronged fork entering a two-dimensional world. We would either perceive three separate points without seeing their unity in the fork itself, or we would see their unity in the handle without seeing the separate tines. At other times his use of higher dimensionality borders on being a rational explanation of certain miraculous events, like Christ suddenly entering a locked room with his disciples. Jesus, existing in more than three (geometric) dimensions, might easily appear and disappear in our three-dimensional world, much like a solid can suddenly materialize in a planar region without ever moving through its two-dimensional boundary. God's omniscience might be similarly modeled or explained: existing in dimensions outside our space-time continuum, God could easily know what is happening in other parts of our four-dimensional world of events.

Bittinger also uses multidimensionality (along with modern string theory) to offer an end-times model that readers may find strange. He paints a scenario in which Christ provides enormous energy to open up a wormhole for transporting (rapturing) the redeemed to a new parallel universe (the new Jerusalem) just before our world collapses back upon itself (the Big Crunch), becoming a fiery Hell on earth for those who remain. I will let the reader ponder the value and validity of this and other uses of higher dimensionality to support various theological notions.

In conclusion, I enjoyed reading these books, even though I am not especially attracted to Bittinger's project of using mathematics in the service of Christian apologetics. I would rather work at developing the converse relationship:

spelling out how a Christian worldview can provide a salutary perspective on and direction for mathematical practice. Yet as a mathematics educator, like Bittinger, I find that certain mathematical habits of mind and ways of perceiving reality are second nature, and I invariably exercise these as I think about other things. I perceive the importance of mathematics in the world all around me, but some things lie outside its sphere of primary relevance. Establishing the credibility of our faith is one of them. Nevertheless, I appreciate seeing how mathematicians with a different outlook try to work out connections between mathematics and their Christian faith. Although I disagree with Bittinger's overall thrust, his second book might prompt good discussion among mathematicians or college mathematics students in a capstone course as they explore the relation between Christian faith and mathematics.

Angier, Natalie. *The Canon: A Whirligig Tour of the Beautiful Basics of Science*. New York: Houghton Mifflin, 2007. 304 pp. ISBN: 978-0-618-24295-5. Reviewed by David J. Mulder, Adjunct Instructor of Education at Dordt College and teacher at Sioux Center Christian School

One of my major teaching goals is to open students' eyes to the wonders of Creation through scientific ways of thinking and point them toward the Creator. However, both my middle-school science students and elementary science-methods undergraduates often express skepticism that science has anything to do with them. Their facial expressions and body language speak volumes: "I'm just not 'into' science—I'm here because I'm required to be; you aren't actually trying to make me *learn* anything, are you?"

Thus, I both enjoyed and empathized with Natalie Angier's *The Canon: A Whirligig Tour of the Beautiful Basics of Science.* She encapsulates conventional wisdom regarding "science" as a realm inhabited by two distinct subsets of humanity: The first group, elementary schoolchildren who relish beating the tar out of hands-on exhibits at children's museums; the second, those few disciplined souls who have plumbed the arcane depths of their hyper-specialized scientific fields to become The Experts. Prevailing thinking is that everyone else who has to deal with science (such as middle- school students and non-science major undergraduates) does so grudgingly. Angier asks us to reconsider. No matter our age, station in life, vocations, or avocations, the realm of science is—and should be—home turf for us. Angier explains the conventional arguments for understanding science, such as the idea that a more scientifically literate society would be less taken by superstition and fraud (think astrology and playing the lottery) or that greater scientific awareness is necessary because "so many of the vital issues of the day have a scientific component: think global warming, alternative energy, embryonic stem cell research, missile defense, and the tragic limitations of the dry cleaning industry" (7). However, she proposes a much more fundamental reason that everyone should take an interest in science: understanding how the world works is pleasurable in and of itself. Although I am not entirely certain about this as a primary reason for understanding science, I agree with her that science *is* fun.

Angier, a Pulitzer prize-winning science writer for the *New York Times,* has a vision of creating a more scientifically literate society. She has published a number of books and many articles in a wide variety of popular magazines, all with the general aim of popularizing science and winning people over to—if not a *love* of science—understanding the incredible prevalence and impact of scientific research on our culture. More than that, Angier's own love of science is evident, and her writing style captures even the most hardened science-phobe's imagination and sparks a desire to engage in discovery. She infuses her prose with allusions that draw from a range of literary, historical, and popular subject matter. For instance, her introductory chapter, "Sisyphus Sings with a Ying," marries imagery from classical Greek mythology with the nimble imagination of Dr. Seuss. The Herculean challenges of understanding science are also playful and fun.

Angier intends to take us on a tour of the scientific landscape, highlighting what everyone should know about all things scientific. To do so, Angier asked hundreds of scientists to name a few things they wished everyone understood about their field, to explain what it means to think scientifically and to elaborate on things in their field that still surprise them. In short, she asked them to describe what every non-specialist, non-child should know about science, and why they might actually enjoy it.

The book begins with a few chapters to explain the scope and limits of scientific thinking, relating the importance of developing evidence, making arguments, and building consensus in scientific enterprise. Science is, after all, primarily a way of thinking, a scheme for organizing and investigating the Creation. By way of a number of thought experiments (such as estimating the number of piano tuners in a city the size of Chicago, or the number of school buses in Montgomery County, Maryland), Angier explains the role of probabilistic thinking in scientific enterprise, the skepticism necessary in conducting scientific investigations, and the importance of accepting the resulting levels of uncertainty with the outcomes. She also outlines difficulties imposed by the scales of the subjects of science, from the impossibly infinitesimal to the overwhelmingly enormous. For instance, Angier explains the scale of the solar system this way: