June 2014

Poythress's Trinitarian Logic: A Review Essay

Calvin Jongsma
Dordt College, calvin.jongsma@dordt.edu

Poythress's Trinitarian Logic: A Review Essay
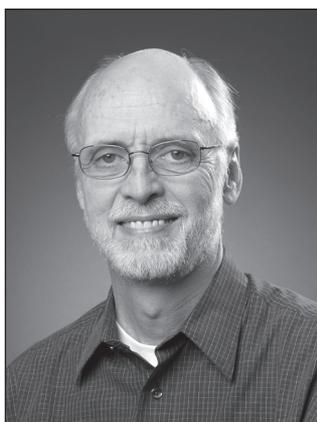
by **Calvin Jongsma**

Poythress, Vern Sheridan. *Logic: A God-Centered Approach to the Foundation of Western Thought.* Crossway, 2013. 733 pp. ISBN: 978-1-4335-3229-0

In the "quick-summary" from an online video taken at a Westminster Seminary dessert social held a year ago to celebrate this book's publication, Vern Poythress claims, "This is a Christian approach to logic. It challenges everything in Western civilization from Aristotle onward. I believe that logic is rooted in the Trinitarian character of God, and nobody, virtually, has said that." Again, in words from early in the book itself, the author asserts, "This foundation … in logic [for] the

---

Dr. Calvin Jongsma is Professor of Mathematics, emeritus, at Dordt College. Over the past three decades he regularly taught an introductory logic course for the philosophy department and a transition course in mathematics focused on logic and proof.

whole of Western thought has to be redone." Providing a genuinely alternative Christian approach to the logical basis of Western thought seems an outrageously grand goal, but one that is worth examining in an essay review. Unfortunately, while Poythress almost predictably promises more than he delivers, I believe he also delivers more than he should have promised.

One expects from the title of the book and the blurb on the back cover that this work could be an ideal (though massive) textbook for the beginning study of logic at a Christian college or seminary, so I will review it largely from that vantage point. As I do for any such text, I will examine its approach, analyze its main components and ideas, and see how these things are developed. After beginning with a few practical matters, I will focus extensively on several substantive technical issues. I will conclude by reviewing the theological matrix in which the logic is embedded.

Educational Considerations

Logic does indeed treat topics typically appearing in an introductory logic textbook: Aristotelian syllogistic logic (AL), propositional logic (PL), and first-order predicate logic (FOL), among other things. And it places the study of logic within a broader Christian context. But, having taught introductory logic at Dordt College for over three decades in both philosophy and mathematics classes, I would not choose this as my textbook, for a number of reasons.

From a practical point of view, *Logic* lacks a sufficient supply and range of exercises to be con-

sidered a self-contained textbook. Each section concludes with questions "For Further Reflection," but these are rather limited, and not enough of them help students consolidate their understanding of the material. Moreover, the book is organized into 68 chapters and 22 appendices of varying lengths, with little pedagogical guidance for how the various sections might be combined into appropriate-sized lessons and units to be taught and studied in a more formal educational setting. It is even unclear how central some of the topics might be; for instance, the Preface and the Part headings make it seem as if PL and FOL might

---

Unfortunately, while Poythress almost predictably promises more than he delivers, I believe he also delivers more than he should have promised.

---

not be all that necessary for learning elementary logic. And, since the author is so intent on providing *A God-Centered Approach to the Foundation of Western Thought*, Trinitarian theology gets pride of place. The more systematic technical material (logic proper) doesn't begin until 192 pages into the book, and even then, it is often eclipsed by theological reflections. Furthermore, as I will document below, there are a number of significant deficiencies in Poythress's exposition of logic's main ideas and systems. At best, I would consider using this book as supplementary reading on the theological perspective it espouses. For that purpose, you can't beat the price, for the author has posted the entire text on his website as a searchable PDF to be freely downloaded.

In addition to elementary classical logic, Poythress touches on a wide range of topics not ordinarily included in a first course in logic: Boolean algebra, lattice theory, the formal axiomatization of logic and mathematics, set theory and Russell's Paradox, the theory of computability, Gödel's Completeness and Incompleteness Theorems, model theory, intuitionistic logic, and modal

logic. These are mostly treated summarily in the supplementary appendices, though a number of them appear in the later chapters as enrichment topics. While these areas are of interest to modern logicians, I doubt that many will connect well with the typical reader beginning to learn basic logic. Their inclusion may reveal more about the author's graduate training in abstract algebra (under Garrett Birkhoff) and mathematical logic (under Hilary Putnam and Saul Kripke) than about any pressing need to include them in an introductory survey of logic.

Logical Content and Methodology

As indicated, Poythress's academic pedigree is impeccable. A Putnam fellow in 1964, he received his Ph.D. in mathematics from Harvard University in 1970. Poythress is obviously familiar with the logic and the mathematical foundations he discusses. Nevertheless, these credentials don't guarantee that he presents his material on logic in the most fitting or up-to-date manner; nor does it keep him from making some major mistakes.

Let me begin with a small but irritating stylistic preference. Poythress notes in defining a concept, such as the truth-functional connective *or* (235), that he will use the conditional *only if* instead of the fuller and more accurate biconditional *if and only if* (hereafter, *iff*) because he finds the former more natural/less pedantic. In my experience, he is in a tiny minority on this; mathematicians (and occasionally Poythress himself) tend instead to use the oppositely directed *if* as an informal substitute where *iff* is called for. They do so because uninitiated students find the meaning of *only if* confusing; in fact, it seems to have tripped Poythress up. After saying that the compound sentence *p or q* is false *only if* both sentences *p* and *q* are false (i.e., if *p or q* is false, then both *p* and *q* are false), he completes his truth-functional definition of *p or q* by saying that otherwise it is true (i.e., if it is not the case that both *p* and *q* are false, then *p or q* is true—the logically redundant contrapositive of the clause he just asserted), which, taken strictly, still leaves open the truth value of *p or q* when both are false—that could be true without violating the definition.

More important problems surface in how

Poythress perceives the central goals of logic and how he subsequently tries to achieve them in developing the three main systems of formal logic. Poythress never gives his reader a succinct definition of logic, though he formulates some statements by others that he seems to accept: logic aims to codify the basic forms of valid reasoning and to point out some common fallacious/counterfeit forms so that a knowledgeable practitioner can properly analyze and evaluate arguments. In accord with this view, Poythress notes that logic is largely and rightly unconcerned with the truth and specific meaning of the statements involved in an argument (material irrelevance), focusing only on whether the premises logically imply the conclusion—though he, like some, may want to place logic within the larger context of seeking and communicating the truth about whatever is being investigated.

I am not unhappy with emphasizing valid argumentation and logical implication as central to logic, but Poythress adheres to this viewpoint rather unevenly, and this emphasis fails to cover two other key concerns of logic. In opposition to this goal of validity, but only superficially so, logic is also intensely interested in the notions of truth and logical truth, since they are tied to a criterion for validity and can be used in a certain sense to articulate some basic laws of logic. Strangely enough, as we will see, although Poythress doesn't identify truth at the outset as a central concern of logic, this becomes almost his sole interest when he turns to consider PL and FOL.

A third main aim of any system of logic is to provide an adequate inferential basis for constructing conclusive arguments. This aim requires one to choose and use a set of inference rules for making deductions. Concentrating only on logical implication is insufficient; derivations or proofs provide a level of logical discourse that goes beyond valid argument forms. Poythress does present a number of deductions in the book, but too few of these illustrate how rigorous derivations can be constructed using rules of inference, and so opportunities are lost for showing students the value of what is being studied. Deductions of conclusions from premise sets ought to be presented for each system of logic on the basis of an appropriate inferential infra-structure that validates their construction, but these are largely missing.

Once a logic's system of inference rules for deducing conclusions is stipulated, one can also investigate two meta-logical properties tied to this: whether the system of logic is deductively *sound* (*whatever can be deduced from a premise set using the inference rules is logically implied by the premises*) and whether it is deductively *complete* (*whatever is logically implied by a set of premises can be deduced from them via the inference rules*). Poythress does explore some of these properties in his treatment of PL and FOL, but he does so in a rather narrow way, as we will note further below.

Before discussing those modern systems, however, let's look briefly at how Poythress presents AL. Since traditional syllogistic logic was the reigning system of logic for almost 2200 years following its inception in Aristotle's *Prior Analytics* (c. 330 BC), students should get to know a version of this system if they want to understand what Western thinkers long considered deductive reasoning to be, whether they accepted it as foundational (e.g., Aquinas) or challenged it as useless (e.g., Bacon and Locke). Poythress does discuss the various forms of syllogistic inference, but he focuses mainly on the four most basic first-figure moods—*Barbara, Celarent, Darii,* and *Ferio* (Chapters 26 - 29)—relegating the other 20 valid moods to the appendices (A2 and A3).

In addition to establishing the validity of the basic forms via Venn Diagrams, Poythress explores their logical interrelationships by deducing them one from another (Chapter 28). In order to do this, he must make use of some (unidentified) immediate inference rules (*Obversion* rules as well as a *Double Negative* rule), which he treats as pertaining to sentence retranslation rather than to the deduction process *per se*. Furthermore, in comparing the syllogistic form *Darii* with its stronger counterpart *Barbara*, he acts as if the former is a special instance of the latter and should therefore be accepted; but of course this conclusion doesn't follow. The conclusion of *Darii* can, in fact, be deduced from its premises using *Barbara* as an inference rule, but in addition, a number of other rules and proof strategies must be employed (*Reductio ad Absurdum* [*RAA*] along with *Obversion* and *Conversion*;

else *RAA* along with the second-figure form *Camestres* suffices, without *Barbara*). Poythress later (Appendix A2) shows conversely that *Barbara* can be derived from *Darii*, but he again uses *RAA* and some immediate inference rules, still treating the latter as relevant to rephrasing statements instead of inferring with them. His deductions thus form a patchwork of sentence inter-translations, proof by contradiction (without setting out the traditional *Square of Opposition*), and syllogistic conclusions.

Syllogistic logic is a wonderful first system to explore with students because, in addition to its historical significance, it relates well to everyday kinds of argumentation. Also, it can be used to nicely and simply illustrate the main concerns connected to any formal system of logic: validity (assessed by Venn Diagrams and counterarguments), derivations (using some system of inference rules), soundness, and completeness. Poythress considers only validity for AL and ignores the other matters: he rarely presents an argument that goes beyond a simple syllogistic form, and the fact that he never identifies a basic set of inference rules to be used for constructing deductions means he is unable even to entertain the potential soundness and completeness of AL.

When Poythress begins systematically to study PL and FOL in Chapters 39 and 50, he seems to forget his earlier circumscription of the purposes of logic (valid arguments, logical implication). Now his aim seems instead to be to identify and derive all *logical truths* or *tautologies*, statements like the *Law of Excluded Middle*, "*p or not-p*," which are always true, under any interpretation of the sentence *p*. Truth tables naturally provide an effective means for showing this for PL, but, evidently following Whitehead and Russell in **Principia Mathematica**, Poythress chooses to treat PL primarily as an axiomatic system of tautologies. To derive complex logical truths from a chosen set of axioms, one must use just two rules of inference, *Modus Ponens* and *Substitution*. The first rule is crucial for constructing all sorts of garden-variety arguments, but it functions primarily here in the restrictive context of deriving tautologies from tautologies. Such derivations can be extremely artificial, long, and complicated, even for rather simple results. Poythress thus expands his list of infer-

ence rules to a more natural collection, originally proposed to capture the ways we typically reason in mathematics and elsewhere, but he continues to use them as a means for deriving logical truths as theorems. This is far too narrow a focus for an introductory logic course. Students (along with mathematicians) aren't really interested in proving logical truths from axioms; they want to use inference rules to deduce conclusions from premises, none of which are typically logical truths. Moreover, operating within Poythress's constrictive view of deduction, one finds that the properties of soundness and completeness are likewise limited to claims about logical truths.

Given the understanding that a major (even if not the sole) goal of logic is to study valid argumentation, an introductory text ought to clearly explain when a set of premises *logically implies* its conclusion, or, to put it in other words, when a conclusion *logically follows from* or is a *logical consequence of* its premises. This is something that can and should be discussed first in general terms,

---

Given the understanding that a major (even if not the sole) goal of logic is to study valid argumentation, an introductory text ought to clearly explain when a set of premises logically implies its conclusion, or, to put it in other words, when a conclusion logically follows from or is a logical consequence of its premises.

---

proposing broad intuitive criteria, but it should also be specialized for each system of logic under consideration. **Logic** is inadequate on both counts. Two common criteria for testing logical implication make use of the notions of *truth-values under all interpretations* (*a conclusion logically follows from a set of premises iff it must be true whenever the*

premises are) and *information content* (*a conclusion logically follows from a set of premises iff the information contained in the conclusion is already contained in/doesn't go beyond the premises*). Poythress never highlights these (or any other) principles as criteria for deciding whether a conclusion is a logical consequence of a set of premises, though they lie behind how one evaluates arguments as valid or invalid for all the systems of logic. For instance, the *information-content* criterion justifies the use of Venn Diagrams to represent and test syllogistic reasoning, but this background is never explicitly spelled out. Instead Poythress appeals to the theological doctrine that "the persons of the Trinity *indwell* one another" (203), a truth that he claims provides an "uncreated foundation for [the] spatial relations" exhibited by these diagrams. Similarly, the above *truth-value* criterion (with its side-kick, *counter-arguments*) provides the necessary foundation for evaluating valid arguments in PL and FOL, but Poythress doesn't explore this criterion much for either system, presumably because his strong interest in logical truth leaves little room for other concerns.

A reader of Poythress's **Logic** may feel I'm being unfair in claiming that PL lacks a proper focus on validity and implication. After all, doesn't the text analyze logical implication and logical equivalence in some detail when it introduces the *if-then* and the *iff* connectives? Sadly, no. What Poythress does instead by presenting these PL connectives as formally capturing the meaning of logical implication and logical equivalence is to perpetrate a serious error that an elementary logic text ought to forestall and oppose, not propagate. Poythress may be following Whitehead and Russell here, too, for their early twentieth-century work is a historically important source for this regrettable equivocation.

As Poythress correctly notes early on, whether a conclusion logically follows from a premise set doesn't depend on the actual truth values of the statements; it depends upon the interrelationship of their logical forms. On the other hand, whether a conditional statement is true completely depends upon the truth values of the sentences involved. That alone should alert one to the fact that logical implication cannot be encapsulated by the conditional PL-form *if p then q* (nor logical equiva-

lence by the form *p iff q*), not even if you factor in some sort of fuzzy idealization process. The real connection is actually captured by an important meta-logical result that can be used to motivate or justify the peculiar conventional truth-functional definition given for the conditional connective *if-then* (*if p then q is true just in case q is true or p is false*). This result is a semantic version of the **Herbrand-Tarski Deduction Theorem**: *a premise p logically implies its conclusion q iff the associated conditional if p then q is logically true*. Poythress nowhere alerts his reader to this important linkage. He instead obscures the connection by glibly reading the conditional sentence *if p then q* as asserting *p implies q*, thereby reinforcing the confusion instead of dispelling it. Naturally there are times when Poythress mentions logical implication and logical equivalence when that really is what he wants, but his identification of these semantic *relations* with logical *operators* within PL is a category mistake. Collapsing a meta-logical semantic claim into a particular syntactically formed statement inside PL is analogous to identifying the *relation* of *divisibility* in number theory with the *operation* of *division*.

Logical implication is relevant, of course, for much more than single-premise arguments in PL (something Poythress fails to emphasize), but in the context of that system of logic, full-fledged implication is best explicated by means of an extended truth table, showing that whenever a valid argument's premises are jointly true, so is its conclusion. No such table for or analysis of a valid argument is to be found in **Logic**. Poythress chooses instead to derive a conclusion from its premises by means of a deduction, but then only for statements that are tautologies proved from the system's axioms. Using an extended truth table in this context, where all statements are logical truths, would be rather silly; the conclusion is always true, whatever the truth value of the premises—nothing really needs to be checked except the truth value of the conclusion.

There are other difficulties with Poythress's technical development of logic, but I will note only one more—his treatment of completeness. Logic has several notions of completeness, and the terminology for naming them has not been fully

standardized. Poythress takes up a couple of these, which I will call *deductive completeness* and *theory completeness*. Deductive completeness, defined above, is a system-dependent property of the *logic* under consideration: *a formal system of logic is deductively complete iff whatever is logically implied by a set of premises can be deduced from them using the inference rules chosen for the system*. Well-designed variants of both PL and FOL are deductively complete, an important result first proved by Gödel in 1929. Theory completeness, on the other hand, is a property of a *theory* rather than of the logic involved in developing it: in semantic terms, *a set of axioms is theory complete iff its logical consequences form a maximally consistent set*; i.e., *iff for any proposition formulated in the language of the theory, either it or its negation* (*but not both*) *logically follows*

 Since Poythress insists on developing modern logic in the style of Whitehead and Russell, as an axiomatic system, he has the possibility of examining PL and FOL from both points of view, but he fails to do either satisfactorily.

from the axioms. Since Poythress insists on developing modern logic in the style of Whitehead and Russell, as an axiomatic system, he has the possibility of examining PL and FOL from both points of view, but he fails to do either satisfactorily. Naturally, these systems of logic (as theories) are *not* theory complete. Logical statement forms include more than logical truths and contradictions: it is not the case for a primitive sentence *P* that either it or its negation *not-P* must be a tautology. In contrast, however, these systems of logic (as logic) *are* deductively complete; but here Poythress must be content with what we might call *weak deductive completeness*: whatever logical truth follows from the stipulated axiomatic basis (all such truths, of course) can be derived from the axioms. Whether

this result can be parlayed into the stronger, more interesting and desirable claim about the logical consequences of *any* premise set being derivable is never discussed. Logic is *de facto* about truth, it seems, not validity.

After noting that PL and FOL are (weakly) deductively complete, Poythress proceeds to explore whether mathematics is complete. Here he also appeals to Gödel, this time to his two *Incompleteness Theorems* (1931). Unfortunately for the unsuspecting novice, Poythress has subtly shifted to a second meaning of completeness, which he never defines, treating the new idea almost as if it were the same as or an extension of the former. He notes loosely that "any ordinary set of axioms for arithmetic is *incomplete* in the logical sense" (424), and he later equates an axiom system being complete with the possibility of deriving true results from the axioms (451), which in the absence of any further distinction is reminiscent of deductive completeness. Actually, what Gödel proved in his first theorem (refined by Rosser in 1936) was that if arithmetic is logically consistent, then it is not theory complete: one can generate sentences in the language of arithmetic that cannot be proved or disproved. But this does not mean, as one might falsely conclude, that there are arithmetic statements (FOL-) implied by the axioms that cannot be (FOL-) proved from them—FOL remains deductively complete when used for arithmetic as well as for any other theory. One can naturally claim, as Poythress does, that there are unprovable true arithmetical statements, but then one must tacitly take the notion of being arithmetically true in an absolute system-independent or extra-systemic sense while keeping the notion of provability restricted to the formal system of logic being employed. Regardless, the conceptual divergence between truth and proof shouldn't be articulated in a way that makes one think in vague terms that arithmetic is incomplete while logic is not: axiomatic logic is also (trivially) theory incomplete. To avoid creating confusion about all this, Poythress ought to define theory completeness and carefully distinguish it from deductive completeness before proceeding to explicate Gödel's *Incompleteness Theorems*.

It should be clear from the above analysis that, at least in its technical particulars, **Logic** falls short

of establishing an alternative foundation for transforming Western thought; it is not even a fully adequate exposition of elementary logic. Components essential to an introductory logic text (valid arguments, derivation) are missing or underdeveloped or artificial, and some important notions (implication, completeness) are wrong or confused. I think these problems may arise in large part because of what Poythress relies upon as his main resource for defining and treating logic—Whitehead and Russell's **Principia Mathematica** (1910-1913). That's a work that treats logic as an axiomatic theory of logical truths and that sees logical implication as captured by conditional statements. But given that Poythress wants to reject pagan and secular philosophy with its attendant dependence on the autonomy of logic and rationality, it's not clear to me why he would so strongly endorse their approach to logic. Russell is a well-known atheist whose passion was to create an absolutely certain foundation for all of mathematics by reducing it to logic. Since idolizing logic in this reductionistic way is diametrically opposed to the sort of foundation Poythress hopes to achieve, I expected him to distrust their logicist development of logic, but he seems on the contrary to admire it greatly (cf. 309 and 343-4).

A more modest aim regarding the role of logic would lead one to conceptualize and systematize logic differently. For instance, rather than taking logic to be the grand theoretical foundation for mathematics, a view that seems to require a Russell-style axiomatic approach, one can view logic as formulating the laws for valid and conclusive reasoning as it actually occurs in everyday life and in all rational disciplines. This aim is best met by adopting a more genuine natural-deduction approach to logic, an alternative that was first developed by Jaskowski around 1930, promoted by Fitch in 1952, and has now been adopted in some version by many logic texts. Organizing logic around the idea of capturing the deductive ways we ordinarily and correctly reason, one can give more balanced attention to the various components of logic as well as a better explication of the key meta-logical properties of soundness and completeness.

Theological Foundations

Having analyzed various methodological aspects of **Logic** in some detail, I will now turn to examine the theological basis Poythress has constructed for the field of logic. This is the part of the book that is most original with Poythress and on which he pins his hopes of providing something truly alternative. Since this is not my area of professional expertise, I will merely summarize his main points, make a few remarks, and raise some questions for further reflection. As Poythress discusses these matters at length throughout the book, more can certainly be said about this than I will do here.

Poythress notes in numerous places that he is setting out a theistic foundation for logic, in all its parts and aspects (cf. Chapters 26, 47, 49, 57, 59, 61, and 66). But this is too generic a description of his goal. Poythress wants to create a Christian theological foundation for logic in order to purify and transform the pagan and secular ways it has been pursued throughout the history of Western thought. For him this means relating logical ideas and procedures to the Trinitarian God of the Old and New Testaments. Which he does in great detail: his *Scripture Index* of cited texts runs to almost five pages, four columns each.

Poythress draws upon the Bible in several ways. There is first of all his use of Scripture passages to illustrate various forms of valid argumentation, something found in few other logic texts. But because these often involve statements that talk about Jesus Christ, God the Father, and the Holy Spirit, they also function as opportunities for him to expound on various attributes of God and point out relations holding among the three persons of the Trinity.

Since, according to Poythress, God is the Original while creatures, their properties, relations, and activities are all reflections of the Original, the more deeply we understand the nature of God from Scripture, the better we'll understand the true character of logic (cf. Chapters 7 and 11 – 13). God is constant, dependable, faithful to his nature, and self-consistent; human logic reflects this consistency. God is eternal and omnipresent; valid human arguments hold (insofar as is possible) everywhere and at all times, independent of when and where they are made. God is omnipo-

tent, absolute, and immutable; the laws of logic are constant, abiding, unchangeable, and necessary. God is truthful; the laws of logic are infallibly true and cannot be annulled.

I don't find the pervasive use of analogies to be a terribly persuasive way to argue for God being intrinsically related to logic. On the other hand, I'm certainly not opposed to making connections between the Creator and the creation (including logic), though I would mostly want to turn them around, adopting what might be termed a generalized incarnational approach. Our experiential knowledge of how the creation is structured and operates helps us to better understand the One who made it, also because, as Scripture indicates, the Creator has chosen to reveal himself to us by taking on certain features of his creation. Whether or not these are part of the essential nature of God, I'm unwilling to speculate about; I think this view transcends what we can rightly infer from Scripture and creation. We can know something of God's faithfulness to his creation from logical consistency, which follows from what might be called the harmonious agreement of reality; we can understand how God's sovereignty over creation functions within the realm of argumentation by seeing that valid reasoning must satisfy certain criteria for soundness, that certain principles are used in constructing conclusive arguments, and so on. The structure and richness and beauty and applicability of logic reveal in some small measure God's greatness and loving care for his creation, as do other aspects of human life and the wide world around us. But I don't think a Christian foundation for logic (or mathematics or any other creaturely reality) is properly laid by focusing on the being and character of God.

Poythress criticizes Western logic for severing all connections to God. While mainline thinkers may still recognize various salient features of logic, they refuse to ground them in God's nature, taking logic and rationality as autonomous. In particular, Poythress judges that pagan and secular thinkers exhibit their sinful rebellion against God by making logic impersonal, formal, and mechanical (cf. Chapters 8 and 22). He admits that logic does indeed have a sort of independence from humans and from specific meanings, but he says that when logic is made overly precise and formal, it is no longer related to a personal God. His alternative is to conceive of logic as personal. God is a person, so logic must be personal, too. I have difficulty grasping the exact meaning and full significance of Poythress's claim here, and I fail to see how developing a formal system of logic, seeing logic as applying to argumentation whatever the information content, promotes atheism. Certainly some Western thinkers asserted human autonomy from God and human mastery over the world by idolatrously elevating Reason over against divine Revelation, thus denying the biblical notion of God as sovereign Creator, but I don't see this as cause for rejecting the development of logic into formal systems for evaluating and constructing arguments. As noted above, I would find this anti-Christian trend instead a strong incentive for rejecting Russell's logicistic approach to logic and mathematics, but here Poythress seems hesitant to pull the trigger.

Besides emphasizing the personal nature of God, Poythress wants to ground logic in the mystery of the Trinity. He does this in a number of ways, treating them as providing different theological perspectives on the nature of logic (cf.

Poythress wants to create a Christian theological foundation for logic in order to purify and transform the pagan and secular ways it has been pursued throughout the history of Western thought.

Chapters 8, 9, 11, and Appendix F5). Here, too, I don't fully understand the import of his analogies. For instance, he says that God the Father created according to a certain plan in harmony with divine self-consistency (this corresponds to logical consistency), God the Son speaks reality into existence as the divine Word (corresponding to the articulation of logical laws), and God the Spirit holds creatures responsible to the plan for

their existence (thus, particular arguments cannot violate the laws of logic but instantiate them). Or, since logic depends upon language, the Trinitarian character of language contributes as well to a Trinitarian foundation for logic. Symbolic logic has a *referential component* for the meaning of its words and sentences, a *grammatical component* for properly combining words into sentences, and a *syntactic component* for writing or expressing words and sentences. According to Poythress, this is all based in the nature of the Trinity: meaning connects to God the Father, grammar to God the Son, and speech or expression to God the Spirit. If one were to query why this particular assignment, Poythress would likely appeal to the fact that God is one and that each person of the Godhead exhibits all the features of divine speech and logic in some respect.

These parallels may strike the reader as loose or far-fetched, but Poythress makes an even stronger claim about the intrinsic connection between logic and God. Based on John 1:1, which identifies Jesus as the Divine Word (Logos) made flesh, and on Genesis 1, where God speaks to create order from chaos, Poythress concludes, "This eternal Word is the eternal speech of God. He is therefore also the eternal logic or reason of God. … Now it becomes more evident why [logic] is personal. It is not only personal, but a person, namely, the Word of God" (71). Of course, Jesus is acknowledged to be more than divine logic, and all persons of the Trinity are deemed logical by virtue of their being self-consistent, but divine logic resides principally in the second person of the Trinity. This truth about logic stands behind all human logic, which is but a dim reflection of eternal logic: "Logic as we human beings experience it has roots in eternal logic, namely, the eternal Word, the second person of the Trinity, in fellowship with the Father and the Spirit" (86).

Having condemned Western thinkers for making logic autonomous, an autonomy that gives it a divine character usurping the place of God, Poythress recognizes the need to guard against a similar accusation of his own position. He admits that on his account "the laws of logic … look suspiciously like the biblical idea of God" (68). So the question naturally arises, "By claiming that the laws of logic have divine attributes, are we divin-izing nature? That is, are we taking something out of the created world, and falsely claiming that it is divine? Is logic part of the created world? Should we not classify it as creature rather than Creator?" (69). Those seem like excellent questions to me. His answer is that "logic seems to be independent of the world. We cannot imagine a world in which logic does not hold. This fact shows that we are confronted with a transcendent reality. … [Thus] logic as it really is … is an aspect of the mind of God" (69). God himself is not subject to logic, but His logic is no less divine, transcending created reality, because it is embodied in the second person of the Trinity. Poythress believes that this position doesn't divinize logic or abrogate God's transcendence over his creation because our immanent creaturely logic merely reflects God's original eternal logic. I don't find his response to the questions he posed very satisfying, though. It seems to trade upon fluctuating notions of "independence" and "transcendence," not to mention "logic." One man's analogy borders on another man's equivocation, I suppose.

Frankly, all the theological speculation about logic's divine attributes—how logic must be an aspect of God's nature, how it resides in the mind of God, and why it is personified as one of the persons of the Trinity—is enough to make the lay reader a little dazed and perplexed. How can such religious mysteries function analogically as a coherent theoretical or ontic foundation for logic? Without knowing what God's transcendent logic is, how can we tell whether our human logic is a faithful reflection of it? Where can we get trustworthy information about divine logic, from Scriptural discourse? Are tautologies such as the *Law of Excluded Middle* essential parts of God's nature? Could God have made the laws of logic different from what we experience them to be? Does God make paradigm valid arguments that we should emulate? Does God create elegant derivations of tautologies from axiomatic truths via *Modus Ponens* and *Substitution*? Does God have a favorite privileged set of natural deduction inference rules? Perhaps we need to press Poythress to provide an explicit and cogent definition of logic so that we can better assess just what all this mystical musing comes to. It certainly seems pious to locate logic in

the mind of God, to see an eternal version of logic as embodied in the second person of the Trinity, but I do not know why or that this is the case, nor, if it were true, what difference it would make in

Frankly, all the theological speculation about logic's divine attributes—how logic must be an aspect of God's nature, how it resides in the mind of God, and why it is personified as one of the persons of the Trinity—is enough to make the lay reader a little dazed and perplexed.

the organization and interpretation and application of logic, beyond providing a theological gloss.

Concluding Assessment

In the end, one might ask what this textbook does for Christian students who desire to learn elementary logic, positioning this knowledge within a broader Christian view of God's world.

Readers will certainly learn a number of standard things about classical systems of logic—what some basic syllogistic forms are and how to use Venn Diagrams to evaluate them, how to construct truth tables and use them to define truth functional connectives, how quantifiers and relations enter into deductive arguments, etc.—and they will be introduced to (a certain way of making) derivations and to various foundational linkages between logic and mathematics; but as I have indicated above, some significant parts of the logical presentation are incomplete, ill-conceived,

outdated, and even confused. The technical side of this work would no doubt have been improved by employing a knowledgeable editor or by submitting an early draft of the text for review to people who teach introductory logic.

In addition, students who use this book will be exposed to an extensive presentation of Cornelius Van Til's Trinitarian and analogical theology, developed specially for logic by Poythress. Some may consider this the genius of the work. Others, however, if they manage to make it all the way through the book, may find this aspect somewhat tiresome, wishing the logic would be more simply presented without overwhelming it at every stage with theological ruminations. While I appreciate seeing Poythress's viewpoint worked out, I am nevertheless sympathetic to this latter sentiment: less would have been more.

Personally, I don't find that an analogical theological approach generates a very helpful Christian viewpoint on logic. I don't think one should locate logic (any variety) in the mind of God or identify it with Jesus Christ. One need not make connections to God's nature and character in order to place logic in proper Christian perspective. Like other scientific endeavors, logic studies an important aspect of God's creation, attempting to determine and formulate the laws that hold for the part of the cosmos where logical consequences and deductive arguments are prevalent. Logic can be used to illuminate and enrich certain parts of human experience and various rational activities, so we are called to unfold this part of the creation. Its scope, however, is limited. Here I fully agree with Poythress: absolutizing logic and deductive rationality is an intellectual form of idolatry. But that very tendency also makes me refuse to locate logic within the divine character and being of God. There we may have to differ profoundly.