

THE TRINITY REVIEW

For though we walk in the flesh, we do not war according to the flesh, for the weapons of our warfare [are] not fleshly but mighty in God for pulling down strongholds, casting down arguments and every high thing that exalts itself against the knowledge of God, bringing every thought into captivity to the obedience of Christ. And they will be ready to punish all disobedience, when your obedience is fulfilled.

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Math and the Bible

J. C. Keister

Editor's note: Many Christians, perhaps most, think that the verse quoted in the masthead of the Review is nice poetry: It sounds good, but it means nothing. We don't. When Paul wrote that he demolishes arguments so as to make every thought obedient to Christ, he was speaking literally and precisely. Past issues of this Review have demolished many non-Christian arguments, from natural law to science to behaviorism. With "Math and the Bible," Dr. Keister is breaking entirely new ground; for no one, to our knowledge, has ever before attempted to base arithmetic on the Bible. The following essay is a major step forward in the defense of sola Scriptura and in the critical work of systematizing all knowledge under the axiom of revelation. For too long, Christians have held a two-source theory of truth: They think that math, or science, or history, or logic, or common sense furnishes men with truth in addition to the Bible. They have even coined a wonderfully ambiguous and eclectic slogan to express such a view: All truth is God's truth. But it is our position—and the position of the Bible itself, we believe—that only that is true which is explicitly stated in the Scriptures or may be deduced by good and necessary consequence—by logic—from the Scriptures. God's truth is all truth. "Math and the Bible" opens up new territory in Christian apologetics. We hope that you, the reader, are as enthused about it as we are.

The purpose of this article is to sketch (very briefly) the status of differing beliefs about the foundations of mathematics, discuss the content of a number of articles and books dealing with Christian views of mathematics, and, finally, present what I believe to be the very beginnings of a Biblical construction for the foundations of arithmetic. As will be seen, the differing philosophical views of mathematics lead to differing views of what constitutes a mathematical proof. This suggests that the authority for absolute truth in mathematics lies outside the mathematics itself. Furthermore, while the Christian articles I have read so far have been useful and informative, none has attempted a Biblical construction for the foundations of mathematics. It is believed (by this author at least) that since the ultimate source of truth is the Bible, there is a real need to start with the Bible to see what can be established as foundational in mathematics.

The Different Philosophical Views of Mathematics

Currently, there are three different philosophical views of mathematics: logistical, formalistic, and intuitionistic.¹ The logistical philosophy starts with the premise that mathematics is a branch of logic—that all mathematical statements and theorems can be reduced to statements within the framework of logic itself.² The chief thrust of the formalist view is that all formulas in mathematics can be reduced to

symbols, emptied of meaning. All one needs to do to prove any theorem is to use appropriate relationships among symbols established by previously proved theorems or axioms. Application is established when the symbols are used to represent objects in the "real world."³

The third view (that of the intuitionist) starts with the notion that all mathematical truth is generated from within the mind of man (intuition).⁴ Therefore, any proof that in principle cannot at any point be visualized in the mind of a man is not valid.⁵ This view is supplemented by the idea that all proofs must be direct and not indirect. The upshot of the intuitionist philosophy is this: (1) All truth in mathematics is contained in the mind of man; and (2) mathematical statements may be true, false, or meaningless (undecidable). This latter idea has sometimes been called "3-valued logic," or denial of the law of the excluded middle.⁶

These three philosophies of mathematics are in obvious conflict (especially the first two with the third). A *reductio ad absurdum* argument would be a valid proof for those who espouse the first two philosophical positions, but would not be valid for someone who espoused the last view (intuitionist). A proponent of the intuitionist view would say that the theorem in question would simply be meaningless unless proved positively with a finite number of visualizable steps. Thus, we see that there is disagreement among mathematicians about the proper criteria for an effective proof. Furthermore, in 1935 Kurt Godel⁷ showed that within any of the three frameworks, it is impossible to derive all the mathematical truths that could in principle be established. In effect, he was able to prove that any mathematical system is either inconsistent or incomplete. Furthermore, it may be impossible to establish whether or not a given axiom is a necessary supplement to or is inconsistent with a given set of axioms. Godel's proof in effect stated that the ultimate source of truth in mathematics lies outside the system of mathematics.

In summary: There is no uniform agreement about all allowable proof procedures in mathematics; furthermore (by a proof within mathematics itself)

the authority for absolute truth in mathematics lies outside mathematics itself.

Christian Books and Articles about Mathematics

My reading of Christian articles and books has been at most a sample. Nonetheless, it appears as though the thrust of these pieces falls into one or more of the following three categories:

1. Critiques of the three main contesting philosophies of mathematics.⁸⁻¹⁵
2. Praising the usefulness and practical value of mathematics, as a valuable gift from God to man.^{14, 15}
3. Praising the aesthetics of mathematics as reflecting the mind of God, with examples of absolutes and infinity.¹⁴⁻¹⁷

Praise to the Lord has been done eloquently by the authors mentioned in categories 2 and 3, and it would be presumptuous to summarize what they have done so well. In category 1, good criticism has been leveled at all three mathematical philosophies. The main point, of course, is that all three philosophies are essentially man-centered, or at the very least contend that mathematics is truly independent of the existence of God. Intuitionism goes one step farther, contending that truth in mathematics is found explicitly in the mind of man. The authors cited have gone into the analysis of these problems with far greater depth than I have here, and I would refer the interested reader to them for further information.

However, for all the value of these articles and books, I have not seen any article or book dealing with a specifically Biblical treatment of the foundations of mathematics (i.e., arithmetic, geometry, etc.). This is by no means a criticism of the above authors; it was not their intent to write about these matters. Yet, it would be good to see just what the Bible does say about mathematics, which leads us into the next section.

Biblical Statements About Mathematics

This author has scanned the Bible to take specific note of mathematical references and various mathematical problems. There are at least 150 references to arithmetic and geometry in the Old and New Testaments. To get an idea of some of these references, turn to Genesis where it says:

When Adam had lived one hundred and thirty years, he became the father of a son in his own likeness, according to his image, and named him Seth. Then the days of Adam after he became the father of Seth were eight hundred years, and he had other sons and daughters. So all the days that Adam lived were nine hundred and thirty years, and he died (*Genesis 5:3-5 NASB*).

Among other things, this particular passage states that:

$$130 + 800 = 930.$$

An example of multiplication is contained in the New Testament, where it says:

And when they had come to Capernaum, those who collected the two drachma tax came to Peter, and said, "Does your teacher not pay the two drachma tax?" He said, "Yes." And when he came into the house, Jesus spoke to him first, saying, "What do you think, Simon? From whom do the kings of the earth collect customs or poll-tax, from their sons or from strangers?" And upon his saying, "From strangers," Jesus said to him, "Consequently the sons are exempt. But lest we give them offense, go to the sea, and throw in a hook, and take the first fish that comes up; and when you open its mouth, you will find a stater. Take that and give it to them for you and me" (*Matthew 17:24-27 NASB*).

Now, a stater is equivalent to four drachmas. Therefore, the passage is saying (among other things), that:

(2 drachmas/person) x (2 persons) = 4 drachmas, or more simply still,

$$2 \times 2 = 4.$$

A subtraction problem is contained in:

In the fourth year the foundation of the house of the Lord was laid, in the month of Ziv. And in the eleventh year, in the month of Bul, which is the eighth month, the house was finished throughout all its parts and according to all its plans. So he was seven years in building it" (*1 Kings 6:37-38 NASB*).

$$\text{Or, } 11 - 4 = 7.$$

There is reference to the magnitude of pi (see *1 Kings 7:23-26*) wherein the diameter and circumference of a circular bath are specified. It should be noted that the breadth of the container brim needs to be taken into account,¹⁸ at which point it is clear that the value of pi obtained by dividing the circumference by the corrected diameter is within 1 percent of the actual value of pi. Since the measurements themselves are not absolutely precise (an error of 1/8 percent in the diameter measurement would account for the difference in the calculated value and actual value of pi), the correspondence is remarkable indeed.

Fractions are mentioned in *Leviticus 27:27* and *32*, and inequalities are either mentioned or implied in *Matthew 12: 41-47* and *Genesis 18:24-32*. So it appears that the basic operations of arithmetic are presumed in various scriptural passages.

The Axioms of Arithmetic

We have seen evidence of the use of mathematics in Scripture. In addition, the rules of arithmetic are presumed. To see how this is so, let us examine the basic axioms of arithmetic:

1. $a + 0 = a$ (additive identity)

2. $a + b = b + a$ (commutative law of addition)
3. $(a + b) + c = a + (b + c)$ (associative law of addition)
4. $a \times 1 = a$ (multiplicative identity)
5. $ab = ba$ (commutative law of multiplication)
6. $(ab)c = a(bc)$ (associative law of multiplication)
7. $a(b + c) = ab + ac$ (distributive law of addition)
8. If $a = b$, then $b = a$ (reflexive law)
9. If $b = c$, then $b + a = c + a$ (identical addition operation)
10. If $b = c$, then $ab = ac$ (identical multiplication operation)
11. $a + (-a) = a - a = 0$ (definition of -a)
12. $a \times 1/a = 1$ (definition of $1/a$)

The methods used to show that these axioms are illustrated in Scripture are basically the same as those used for any scriptural exegesis. Scripture is used to clarify Scripture, equivalent statements (mathematical in this case) are substituted where necessary, and any established generalization is used to help establish other generalizations (axioms in this case). Let us illustrate this commutative concept with the law of addition:

For from now on five members in one household will be divided, three against two, and two against three (Luke 12:52 NASB).

This passage is a clear illustration of the axiom that $a + b = b + a$; specifically, it states that $3 + 2 = 2 + 3$.

A second illustration of one of the axioms is the following:

Rule 3: Associative Law of Addition: $(a + b) + c = a + (b + c)$

(*i.e.*, parentheses in addition processes don't matter):

The sons of Eliezer: Hodaviah, Eliashib, Pellaiah, Akkub, Johanan, Delaiah and Anani—seven in all (*1 Chronicles* 3:24 NIV).

Or, $1 + 1 + 1 + 1 + 1 + 1 + 1 = 7$.

The son of Dan:

Hushim.

The sons of Naphtali:

Jahziel, Guni, Jezer and Shillem.

These were the sons born to Jacob by Bilhah, whom Laban had given to his daughter Rachel—seven in all (*Genesis* 46:23-25 NIV).

Or, $(1 + 1) + [1 + (1 + 1 + 1 + 1)] = 7$

Thus, we have two separate parenthetical additive groupings yielding 7—an example showing that parentheses don't matter with addition (*i.e.*, the associative law of addition is true).

The third and most complicated axiom is the following: $a(b + c) = ab + ac$ (distributive law of addition).

When they brought their offering before the Lord, six covered carts and twelve oxen, a cart for every two of the leaders and an ox for each one, then they presented them before the tabernacle. Then the Lord spoke to Moses, saying, "Accept these things from them, that they may be used in the service of the tent of meeting, and you shall give them to the Levites, to each man according to his service."

So Moses took the carts and the oxen, and gave them to the Levites. Two carts and four oxen he gave to the sons of Gershon, according to their service, and four carts and eight oxen he gave to the sons of Merari, according to their service, under the direction of Ithamar the son of Aaron the priest (*Numbers* 7:3-8 NASB).

These passages (in effect) state the following:

$$(1) 2 \text{ (carts)} + 4 \text{ (carts)} = 6 \text{ (carts)}$$

and

$$(2) 4 \text{ (oxen)} + 8 \text{ (oxen)} = 12 \text{ (oxen)}$$

From *Matthew* 17:24-27, we find that $2 \times 2 = 4$. Using this in (2) above yields: $(2 \times 2) + 8 = 12$

From the Old Testament:

And twelve lions were standing there on the six steps on the one side and on the other; nothing like it was made for any other kingdom (*1 Kings* 10:20 *NASB*).

Or, $12 = 2 * 6$. Thus, (3) becomes:

$$(4) (2 \times 2) + 8 = 2 \times 6.$$

Now, *Numbers* 7:3-8 is used again for $6 = 2 + 4$, transforming (4) into:

$$(5) (2 \times 2) + 8 = 2 \times (2 + 4).$$

But if a man dies very suddenly beside him and he defiles his dedicated head of hair, then he shall shave his head on the day when he becomes clean; he shall shave it on the seventh day. Then on the eighth day he shall bring two turtledoves or two young pigeons to the priest, to the doorway of the tent of meeting (*Numbers* 6:9, 10 *NASB*).

Or, $7 + 1 = 8$.

There are six things which the Lord hates, Yes, seven which are an abomination to him: haughty eyes, a lying tongue, and hands that shed innocent blood, a heart that devises wicked plans, feet that run rapidly to evil, a false witness who utters lies, and one who spreads strife among brothers (*Proverbs* 6:16-19 *NASB*).

Or, $7 = (1 + 1 + 1 + 1 + 1 + 1) + 1$.

Substitute $(1 + 1 + 1 + 1 + 1 + 1) + 1$ for 7 in the expression for 8:

$$[(1 + 1 + 1 + 1 + 1 + 1) + 1] + 1 = 8.$$

Using our associative law of addition, we have:

$$8 = (1 + 1 + 1 + 1) + (1 + 1 + 1 + 1).$$

From *1 Chronicles* 9:24, we have:

The gatekeepers were on the four sides, to the east, west, north, and south.

$$\text{Or } 4 = (1 + 1 + 1 + 1)$$

Thus $8 = 4 + 4$; or, 2 4's are 8—simply shorthand for saying $8 = 2 \times 4$.

Space does not permit to show how this procedure works for each axiom, but there are sufficient references (with the exception of the commutative law of multiplication) to illustrate every one of the arithmetic axioms in Scripture. Even with the axiom commutative law of multiplication, it should be noted that *1 Kings* 10:20: "And twelve lions were standing there on the six steps on the one side and on the other; ..."

This passage indicates that $12 = 6 \times 2$. Had the passage stated, "And twelve lions were standing there, on one side and on the other, on the six steps..." (which would correspond to saying that $12 = 2 \times 6$) the meaning would have remained unchanged. Thus it is that we can rely upon the axioms of arithmetic as much as the Ten Commandments, as far as our lives are concerned. The Bible, in using these laws in various passages, indicates that God's authority extends over mathematics as well as other areas.

Conclusion

This article is meant to be only a start into the problem of showing what mathematical axioms and procedures are either stated in or presumed by Scripture. It is hoped that further work along these lines can be accomplished showing which mathematical axioms are scripturally sound and which are not. In this way, we can overcome the pitfalls of Godel's theorem, with the confidence that the foundations of mathematical truth are as reliable as God's Word.

The Second American Revolution

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1. Max Black, *The Nature of Mathematics*, 1965, 7.
 2. Black, 7-8.
 3. Black, 9.
 4. Black, 172.
 5. Black, 10.
 6. Black, 10, 195, and 196.
 7. Reference mentioned on page 167 of Max Black.
 8. Hadley Mitchell, *Ordinary Arithmetic and Theistic Presuppositions*, 1978 (unpublished).
 9. Hadley Mitchell, *Some Implications of Godel's Theorem*, 1979 (unpublished).
 10. Robert Brabenec, "The Impact of Three Mathematical Discoveries on Human Knowledge," *Journal of the American Scientific Association*, March 1978.
 11. Charles R. Hampton, "Epistemology to Ontology," *A Christian Perspective on the Foundation of Mathematics*, ed. Robert Brabenec (unpublished).
 12. Joseph Spradley, "Recent Parallels Between the Philosophy of Science and Mathematics," *A Christian Perspective on the Foundation of Mathematics*, ed. Robert Brabenec (unpublished).
 13. Vernon S. Poythress, "A Biblical View of Mathematics," *Foundations of Christian Scholarship: Essays in the Van Til Perspective*, ed. Gary North (Ross House Books, 1981).
 14. Math Conference on the "Christian Philosophy of Mathematics," Wheaton, Illinois, 1977.
 15. Math Conference on the "Christian Philosophy of Mathematics," Wheaton, Illinois, 1979.
 16. C. Ralph Verno, Kronecker; "Creation and Christianity," *Torch & Trumpet*, April 1970.
 17. C. Ralph Verno, "Mathematics in the Christian Philosophy of Life," *Torch & Trumpet*, December 1969.
 18. Harold Lindsell, *The Battle for the Bible*, Zondervan, 1976; 166.

John Whitehead, a good friend of Trinity, has recently published *The Second American Revolution* (Elgin, Illinois: David C. Cook Publishing Company, 1982, 253 pages, index). We are pleased to recommend his book to our readers who are and ought to be interested in the present battle for Christian liberty. Here are some excerpts from the book to give you an idea of its flavor:

Humanism, contrary to popular belief, is not a tolerant system. It preaches against religious "dogmatism," but imposes its own. Professor Harvey Cox of the Harvard Divinity School has noted in his work *The Secular City* that humanism, or secularism as he calls it, is an "ideology, anew closed world view which functions very much like a new religion..." (40).

Jefferson has often been cited as being hostile to biblical theism. That is not altogether true. As founder of the University of Virginia he recommended that students be allowed to meet on the campus to pray and worship together, or, if need be, to meet and pray with their professors on campus. He was the author of the first plan of public education adopted for the city of Washington, which included the Bible and the Isaac Watts Hymnal as the principal books to teach reading to students (100).

History has not been one of the Supreme Court's better subjects (101).

The concept of human rights is a fertile source of confusion because of our persistent failure to be specific about the nature and source of what we call human rights. From a biblical perspective, "rights" as such do not exist but grow out of duties and limits. There is no explicit "right to life" in the Bible, but an explicit prohibition of the taking of innocent life, from which the right to life emerges. Indeed, even in the Bill of Rights, the first

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ten amendments to the Constitution, the rights are established by setting limits to the power of the federal government (116).

The Supreme Court cannot execute its own decisions. The entire system depends on people following what the Court says. The time may have come when a local community or a state may have to disobey the Supreme Court or other federal and state agencies that act contrary to the principles of the Bible (158).

A Christian Manifesto

Francis Schaeffer's *A Christian Manifesto* (Crossway Books, 1981, 157 pages, index) is a best-seller by any standard, but you won't find it on the best-seller lists. Over 250,000 copies have been sold, but the secular culture that surrounds us is oblivious to that fact. May it remain so until it is too late for the secularists to do anything about it. The following excerpts from the book will give the reader some idea of its importance:

The basic problem of the Christians in this country in the last eighty years or so, in regard to society and in regard to government, is that they have seen things in bits and pieces instead of totals. They have very gradually become disturbed over permissiveness, pornography, the public schools, the breakdown of the family, and finally abortion. But they have not seen this as a totality—each thing being a part, a symptom, of a much larger problem. They have failed to see that all of this has come about due to a shift in worldview (17).

What the Reformation did was to return most clearly and consistently to the origins, to the final reality, God; but equally to the reality of Man—not only Man's personal needs (such as salvation), but also Man's social needs. What we have had for four hundred years, produced from this clarity, is unique in contrast to the situation that had existed in the world

in forms of government. Some of you have been taught that the Greek city states had our concepts in government. It simply is not true (29).

A Time for Anger

Franky Schaeffer has just published *A Time for Anger, The Myth of Neutrality* (Crossway Books, 1982, 206 pages). Together with his father's most recent book, *A Christian Manifesto*, and John Whitehead's *Second American Revolution*, *Anger* presents the case for Christian action in opposition to growing state power. *Anger* is based on the proposition that the neutral state is impossible, that the state that ignores Christianity is not neutral, but actually anti-Christian. Here are a few short excerpts from *A Time for Anger*:

History is made of ideas, and ideas are power (14).

The greatest danger we face in this era as Christians is from ourselves, not the opposition (23).

All law is, in fact, some form of legislated morality. The question is whose morality will dominate (25).

In due course, the program [*Whatever Happened to the Human Race?*] was aired [on Channel 7 in Washington, D.C.], and was followed by a review on the second of January by Judy Mann in *The Washington Post*. The headline of the article, "No Matter How Moving, Show Still Propaganda," basically summed up her "neutral" point of view.... Parroting the Abortion Rights letter, the review went on to call Channel 7 to task for being willing to show [the time was purchased: "you usually have to purchase time for programs from a Christian perspective"] a film that is "propaganda masquerading as public affairs programming." This would be a good slogan for PBS to adopt for itself (30).

The roots of American constitutionalism, the concept of government limited by a system of checks and balances, grew out of Reformation Europe. Without knowing it at the time, two men laid the philosophical foundation for both the American Revolution and the Constitution that followed: Martin Luther and John Calvin (62).