

BIBLICAL CHRISTIAN INTERPRETATION OF MATHEMATICS

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These notes formed James Nickel's first lectures on mathematics.

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The Principal: Bev Norsworthy.

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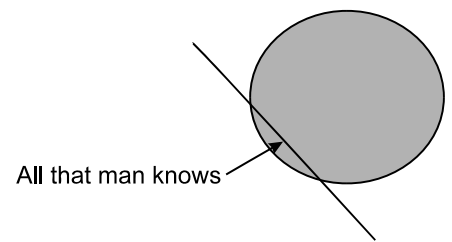
INTERPRETATION AND TRUTH

GODLESS APPROACH

1. Man acquires knowledge without reference to the God of all knowledge.
2. Presuppositional assumption: man is the origin and source of truth.
3. Facts are interpreted in and of themselves.

CHRISTIAN APPROACHES

1. Facts of the different subject disciplines are taught plus the Bible (as a separate subject).
 - a. The Bible and the subject disciplines are disconnected.
 - b. Instruction in the Bible connects *only* to the individual, the family, the church, and life hereafter.
 - c. Engenders the sacred/secular dichotomy.
2. The Bible is “tacked-on” in an attempt to “spiritualize” the “secular.”
 - a. Using a Scripture quotation to justify a mathematical topic.
 - b. “We must learn math for God’s glory.”
 - c. Engenders “artificial” connections and hypocrisy.
3. God is the foundation of all knowledge.
 - a. God is the source of all Truth.
 - b. God’s character is revealed to us as we acquire knowledge of each discipline.
 - c. Mathematics is a way to describe the patterned order of God’s creation and God’s creation reveals God’s nature and eternal power (Romans 1:19f).



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HISTORICAL SURVEY

“For no man can lay a foundation other than the one which is laid, which is Jesus Christ”
(I Corinthians 3:11)

Nature	Balanced Interplay	Grace
<i>Postdiluvian Civilizations</i>		
<ol style="list-style-type: none"> 1. Governed by anti-God presuppositions (Genesis 11) and nature worship. 2. Priesthood kept many mathematical “secrets” in order to retain power. 3. Egyptian mathematics was not child’s play: Pyramids, irrigation canal systems, granaries, tax collecting provided the applications for the development of algebra, geometry, and trigonometry. 		
<i>Classical Greece (600 BC to 300 BC)</i>		
<ol style="list-style-type: none"> 1. Anaxagoras, “Reason rules the world.” 2. Pythagoras, “Number rules the universe.” 3. Plato, “Nature is the world soul ... god eternally geometrizes ... the knowledge at which geometry aims is the knowledge of the eternal.” 4. Aristotle, “Nature is unchangeable, eternal, uncreated, self-generating, and ration ... nature creates.” 5. Euclid – <i>Elements</i> of Geometry confirmed the notion that deductive reasoning is <i>the</i> pathway to truth. 		
	<i>Early Christianity (Birth of Christ to 500 AD)</i>	

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Nature	Balanced Interplay	Grace
	<ol style="list-style-type: none"> 1. Augustine, "Every good and true Christian should understand that wherever he may find truth it is his Lord's ... beware of mathematicians [astrologers] ... the danger already exists that the mathematicians have made a covenant with the devil to darken the spirit and to confine man in the bonds of hell." 2. Boethius – Seven Liberal Arts (Greek heritage): <ol style="list-style-type: none"> a. Trivium (Grammar, Rhetoric, Logic) b. Quadrivium (Arithmetic, Geometry, Music, and Astronomy) 3. A vibrant Christian faith could handle Greek scholarship without compromise. 4. A weakened faith will compromise. 	
		<i>Middle Ages (500 to 1500)</i>
		<ol style="list-style-type: none"> 1. Negative: <ol style="list-style-type: none"> a. The rise of ecclesiastical absolutism (church centered Christianity). b. Submission of Scripture to pagan thought forms (i.e., Aristotle) including stationary earth (geocentrism). c. Pagan thought forms were resisted by some of the medieval scholastics.
	<ol style="list-style-type: none"> 2. Positive. 	

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Nature	Balanced Interplay	Grace
	<ul style="list-style-type: none"> a. Infused the great thinkers of the Renaissance and the Reformation with the belief that nature was the creation of the Biblical God and that God's creation could be understood b. Key ideas developed: <ul style="list-style-type: none"> i. Functions. ii. Symbolic Algebra. iii. Inertial theory of motion. iv. Coordinate geometry. v. Infinitesimal. 3. Mathematics flourishes in a culture that allows freedom of inquiry and encourages study of the real world (induction). 4. Morris Kline, "... willingness to think about ideas suggested by physical problems in an abstract form that makes no promise of immediate or practical return. Then paradoxically, a new insight into nature, a richer, broader, more powerful understanding, is achieved, which in turn generates deeper math activities" (<i>Mathematical Thought from Ancient to Modern Times</i>, p. 205). 5. Induction: "Nature is the matrix from which ideas are born." 6. The doctrine of the knowledge of God is the matrix by which all things are to be interpreted. 	

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Nature	Balanced Interplay	Grace
	<i>Scientific Revolution (1500 to 1800)</i>	
	<ol style="list-style-type: none"> 1. Copernicus, “The hand of God is in the marvelous correlation between mathematical conclusions and the actions of nature. 2. Kepler, “The chief aim of all investigations of the external world should be to discover the rational order and harmony which has been imposed on it by God and which He revealed to us in the language of mathematics.” 3. Newton, “Everywhere in the universe is the evidence of God’s majestic design and of His constant and continuous concern to keep the universe running according to plan.” 4. Leibniz, “There is a pre-established harmony between thought and reality ... Nature is the art of God ... It seems to be that the principle goal of the whole of mankind must be the knowledge and development of the wonders of God.” 5. Morris Kline, “The work of the 16th, 17th, and most 18th century mathematicians was a religious quest; the search for mathematical laws of nature was an act of devotion which would reveal the glory and grandeur of His handiwork ... they sought, for the most part, to do no more than to understand God’s marvelous design.” 6. Gordon Clark, 	

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Nature	Balanced Interplay	Grace
	<p>“Experimental science must be framed in a philosophy of science. This determines its range of activity and limitations.”</p> <p>7. Two key recognitions.</p> <p>a. Each discovered law was hailed as an evidence of God’s infinite wisdom, not the investigator’s.</p> <p>b. Since God’s thoughts are higher than man’s thoughts, man’s mathematics <i>must be limited</i>.</p>	
<i>Mathematics Absolutized (1800 to 1930)</i>		
<p>1. Descartes, “The universe is a mechanism whereby everything that is in it runs, not by divine intervention, but according to mathematical law ... the intellect by its own power may arrive at a perfect knowledge of all things.”</p> <p>2. Laplace, speaking of God the Creator, “I have no need of this hypothesis.”</p> <p>3. Gauss, “Thoughts about God have nothing to do with mathematics or the search for mathematical laws of nature ... Thou, nature, art my goddess, to thy laws my services are bound.</p> <p>4. Mechanistic philosophy.</p> <p>a. Supernatural out.</p> <p>b. Nature absolutized.</p> <p>c. Scientific knowledge is the sole gateway to truth in the whole realm of knowledge.</p> <p>d. Never absolutize the</p>		

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Nature	Balanced Interplay	Grace
<p>relative or relativize the absolute.</p> <p>5. Idolatry judged.</p> <p style="margin-left: 20px;">a. With the discovery of new geometries, algebras, and arithmetics, mathematicians began to inspect the foundations of their discipline.</p> <p style="margin-left: 20px;">b. They soon discovered serious cracks and began to reconstruct the foundations using human reason alone.</p> <p style="margin-left: 20px;">c. This led to four divergent schools of thought, each with a starting point of man.</p> <p>6. Gödel (1906-1978) dropped a bomb on these foundations in 1930.</p> <p style="margin-left: 20px;">a. “Mathematics is too big for the human mind ... the possible relationships about numbers are as unlimited as the parade of numbers itself.”</p> <p style="margin-left: 20px;">b. He declared that the reason of man is not sufficiently powerful to place mathematics on an indubitable foundation.</p> <p style="margin-left: 20px;">c. The ultimate source of truth in mathematics lies <i>outside</i> the system.</p>		

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STARTING POINTS

Mathematics:

<i>...enables man to discover order in a pre-established universe.</i>	<i>...enables man to create order out of a universe of chaos.</i>
Charles Hermite (1822-1901), "There exists a world which is the collection of mathematical truths, to which we have access only through our intellects, just as there is a world of physical reality; the one and the other independent of us, both of divine creation ... the synthesis of the two is revealed partially in the marvelous correspondence between abstract mathematics on the one hand and the physical world on the other."	Morris Kline, "It may be that man has introduced limited and even artificial concepts and only in this way has managed to institute some order in nature ... nature itself may be far more complex or have no inherent design."
Sir James Jeans (1877-1946), "Nature and our conscious mathematical minds work according to the same laws."	Morris Kline, "The plight of man is pitiable. We are wanderers in a vast universe, helpless before the devastations of nature, dependent upon nature for our food and other resources, and uninformed about why we were born and what we should strive for. Man is alone in a cold and alien universe. He gazes upon this mysterious, rapidly changing, and endless universe and is confused, baffled, and even frightened by his own insignificance ... The life of man is solitary, poor, nasty, brutish, and short. He is the prey of contingent happenings. Endowed with a few limited senses and a brain, man began to pierce the mystery about him ... his quest is the quest for order ... his chief accomplishment, the product of man's own reason, is mathematics."
Albert Einstein (1879-1955), "I concur with Leibniz that there is a pre-established harmony in the universe."	<i>It is religiously essential for humanistic mathematicians to create their own world and hence their own mathematics. Since there is not God, there is no "mathematic," [an ultimate order that mathematical theory dimly reflects] only various man-created mathematics.</i>
Pierre Duhem (1861-1916), "It is impossible for us to believe that this order and this organization [revealed by mathematical theory] are not the reflected image of real order and organization."	
Hermann Weyl (1885-1955), "There is inherent in nature a hidden harmony that reflects itself in our minds under the image of simple mathematical laws."	

NATURE/GRACE

THE PROBLEM

NATURE
MANY
PARTICULARS

Absolutized: Particulars are just unrelated and meaningless facts.

Result: Confusion (e.g., the present state of humanistic mathematics).

GRACE
ONE
UNIVERSAL

Absolutized: Particulars are invalidated and therefore unessential.

Result: Authoritarianism (evidence does not matter).

THE TRINITARIAN SOLUTION

Jean Paul Satre, “If a finite point does not have an infinite reference point, it is meaningless and absurd.”
Particulars must have a reference point: The Infinite, personal, triune God of Scripture.

There is only one God but, in the unity of the Godhead, there are three coeternal and coequal persons (the Father, the Son, and the Holy Spirit), the same in essence (all three God) but distinct in existence (the Father is not the Son, the Son is not the Holy Spirit, etc.).

There are no *particulars* (Father, Son, and Holy Spirit) not related to the universal (One God).

Particulars are ultimate.

There is nothing universal that is not fully expressed in the particulars (the Father is fully God, the Son is fully God, and the Holy Spirit is fully God).

The universal is ultimate.

The particulars and the universal are both equally ultimate in the ontological Trinity.

THE SOLUTION APPLIED

“For since the creation of the world His invisible attributes, His eternal power and divine nature have been clear seen ...” (Romans 1:20).

When the Biblical God, the infinite, personal, One and the Many, creates, He externalizes His essential nature (three in one) in what He makes. Creation therefore reveals the “One and the Many.”

The universal gives meaning to the particulars, for no particular is a fact apart from God.

No fact can have a valid interpretation in and of itself.

Creation is made up of particulars (number and space) that give expression to the universal.

God created the real world with inherent relationships as a testimony of His ontological being.

The particulars (experienced through the senses *a posteriori*) and the universal (known in the mind *a priori*) are both equally ultimate in the created reality.

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TRUTH IS THE CORRECT INTERPRETATION OF THE FACTS.

Cornelius Van Til, “The facts are what they are, and the universals are what they are, because of their common dependence upon the ontological Trinity.”

The Biblical Christian world view: the self-contained and triune God is the final reference point in all interpretation.

The humanistic view: the self-contained man is the final reference point in all interpretation.

We live in a “cut-flower” Western Civilization. Biblical Christianity is its roots, but man has severed the connection – the flower, being cut, is wilting and dying.

THE CREATION CONTEXT

THE HEAVENS AND THE EARTH

ALL THINGS CREATED BY GOD

Genesis 1:1f, “In the beginning God created the heavens and the earth ... and the Spirit of God was hovering over the face of the waters. Then God said ... and God saw that it was good.”

Psalms 104:25, “O Lord, how many are Thy works! In wisdom Thou hast made them all ...”

The One God,
 Father (thought),
 Son (word), and
 Spirit (breath),
Created all things
 by His power,
 in His wisdom, and
 reflecting His goodness.

Colossians 1:16, “For in Him [The Son] all things were created, in the heavens and on earth, visible and invisible, whether thrones or dominions or rulers or authorities – all things have been created through Him and for Him.”

The universal quantified (all things) implies that mathematics is included.

What, then, do we mean by mathematics?

1. The historically growing field of knowledge consisting of the thoughts of mathematics. NB. Isaiah 55:8, “For My thoughts and not your thoughts ...”
2. The objectively real structure and order in creation (what is “out there”) that can be modeled mathematically.
 - a. Godfrey H. Hardy (1877-1947), “I believe that mathematical reality lies outside of us ...”
 - b. Heinrich Hertz (1857-1894), “One cannot escape the feeling that these mathematical formulas have an independent existence and an intelligence of their own; that they are wiser than we are, wiser even than their discoverers; that we get more out of them than was originally put into them.”
 - c. Nikolai I. Lobachesky (1793-1856), “There is no branch of mathematics, however abstract, which may not someday be applied to the phenomena of the real world.”
 - d. George Temple (1901-1992), “Mathematics is the language of physics ... a language can be considered in at least two different ways, either in relation to the purpose which it serves as a medium for the expression of ideas or in relation to its internal structure.”

ALL THINGS SUSTAINED BY GOD

Colossians 1:17, “... In Him all things hold together [cohere].”

Hebrews 1:3, “... upholds all things by the word of His power.”

Thoughts to ponder:

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1. Jacob Bronowski (1908-1974), “Mathematics is in the first place a language in which we discuss those parts of the real world which can be described by numbers or by similar relations of order” (*Science and Human Values* [Pelican, 1964], pp. 84-85).
2. Larry Zimmerman, “Mathematics is an entity which always exists in the mind of God, and which is for us the universal expression of His creative and sustaining word of power ... So we would expect the deepest scientific probes into the micro- or macro-cosmos to reveal a language fabric in which are woven the forces and relationships governing the tangible creation. This language fabric should itself be suggestive of an intellectual antecedent, an orderly, powerful, infinite universe of thought, ‘a terra incognita of pure reasoning’ which ‘casts a chill on human glory.’”
3. Vern Poythress, “In exploring mathematics one is exploring the nature of God’s rule over the universe; i.e., one is exploring the nature of God Himself.”

MAN

IMAGE OF GOD

Genesis 1:26 “... Let Us make man in Our image, according to Our likeness; and let them rule ...”

Man, created in the image of God (set apart to live dependently upon Him), was made to rule (power) the creation as a vice-regent.

1. Prophet: to know and to interpret God’s creational structure.
2. Priest: to relate all things to the Creator.
3. King: to tend (cultivate) the garden and name the animals of God’s creation (Genesis 2).

FALL

Genesis 3 – man as god.

Romans 1:18, “For the wrath of God is revealed from heaven against all ungodliness and unrighteousness of men, who *suppress* the truth in unrighteousness.”

In the historic, space-time fall, man became his own god. This autonomy produces fragmentation in every area of life (including mathematics). Therefore, we expect that the mathematical structure of creation will be misunderstood and perverted by fallen man for he is guiltily blind to the glory of God revealed in the unique mirror of mathematics.

Man is either a covenant-keeper or a covenant-breaker. As a covenant-breaker, he is *anxious* to keep from seeing the facts for what they really are – the handiwork of God.

AUTONOMOUS MATHEMATICS

Book titles: *Mathematics: the Man-made universe*.

Morris Kline, “Mathematics is a man-made, artificial subject ... a body of knowledge containing no truths.”

FRAGMENTATION

David Hilbert (1862-1943), “Mathematics is a meaningless, formal game.”

Bertrand Russell (1872-1970), “Mathematics is the subject in which we never know what we are talking about, nor whether what we are saying is true.”

CRY FOR ANSWERS

Eugene Wigner, Nobel Prize winner in Physics (1960):

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1. “The enormous usefulness of mathematics in the natural sciences is something bordering on the mysterious ... there is no rational explanation for it ... it is difficult to avoid the impression that a miracle confronts us here.”
2. “The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift which we neither understand nor deserve. We should be grateful for it, and hope that it will remain valid in future research and that it will extend, for better or for worse, to our pleasure even though perhaps also to our bafflement, to wide branches of learning.”

Morris Kline, “But where and what are the physical agents that produce the effects mathematics describes? ... There are no answers ... Why does mathematics work? We are faced with a mystery ... The study of mathematics and its contributions to the sciences exposes a deep question. Mathematics is man-made. Yet with this product of his fallible mind man has surveyed spaces too vast for his imagination to encompass, he has predicted and shown how to control radio waves which none of our senses can perceive, and he has discovered particles too small to be seen with the most powerful microscope. Cold symbols and formulas completely at the disposition of man have enabled him to secure a portentous grip on the universe. Some explanation of this marvelous power is called for.”

Adam did not create the animals; he just named them. Man does not “create” mathematics autonomously. With the mind given to him by God, he “discovers” the mathematical reality that lies outside of him.

Godfrey H. Hardy, “... our function is to discover, or observe it [mathematical reality], and that the theorems which we prove, and which we describe grandiloquently as our creations are simply notes on our observations.”

RESTORARION

Psalms 8:6, “Thou dost make him to rule over the works of Thy hands; Thou has put all things under his feet.”

Hebrews 2:7-9, “... for in subjecting all things to him, He left nothing that is not subject to him. But now we do not yet see all things subjected to him. But we do see Him, ... namely, Jesus ...”

Only in Christ can man be fitted with the proper eyeglasses with which he can see creation with a clear (true) vision; i.e., to see the mathematical structure of God’s (not nature’s) manifold works and to give honor to Whom honor is due.

Only the man redeemed by Christ and renewed in mind can shine the pure light of God’s truth into the darkness of humanistic, autonomous mathematics.

APPLICATION

“We all know that $2 + 2 = 4$ in the base 10 number system.”

Is this a “neutral” statement?

Does this statement exist independent of any presuppositions?

QUESTIONS

What is truth? Is this statement true in a pragmatic or absolute sense? How do we *know* it is true?

1. Do we know it to be true *a priori*? Is it true because of the internal evidence of our intuition which is *independent* of our experience?

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2. Do we know it to be true *a posteriori*? Is it true because of the external evidence of our experience?

Nicholas Bourbaki (collective pseudonym for a group of French mathematicians), “Mathematics appears thus as a storehouse of abstract forms ... and it so happens – without our knowing why – that certain aspects of empirical reality fit themselves into these forms, as if through a kind of preadaptation.”

John W. N. Sullivan, “Why the external should obey the laws of logic; why, in fact, science should be possible, is not at all an easy question to answer.”

Cornelius Van Til, “sinners use the principle of chance back of all things and the idea of exhaustive rationalization as the legitimate aim of science. If the universe were actually what these men assume it to be according to their principle, there would be no science. Science is possible and actual only because the non-believer’s principle is not true and the believer’s principle is true. Only because God has created the universe and does control it by His providence, is there such a thing as science at all.”

Is this an *isolated* truth? Is this truth merely *unity*? Or, does it have a relationship to other experiences? Is this truth *diversity*?

Who is the “we all know”? What is the nature of man? Why can he communicate and know? How can he communicate and know?

What does it mean?

Put two apples in an empty bag, add two more, and then count that there are four. To do this, you must presuppose:

1. Man has memory (I remember that I put two apples in the bag).
2. Man has the ability to distinguish one thing from another (I can distinguish one apple from another apple).
3. Man has the ability to count (I can count four apples: 1, 2, 3, 4).
4. Man knows the meaning of addition in the context of counting (addition is counting forward).
5. Man knows the basic principles of logic (either this object is an apple or it is not an apple).
6. Man knows that the universe does not operate by chance (the apples will remain apples while I am counting them).
7. Man knows that time is sequential, not circular (events are distinct from one another and act linearly).

Why does the “inherent” concept of “twoness” and “fourness” apply to the real world?

What is its purpose?

What is the motivation for knowing this?

ANSWERS

ALL THINGS CREATED AND SUSTAINED BY GOD

In order to effectively use mathematics, we must presuppose that the word is:

1. Really “out there” as an objective reality.
2. Orderly.
3. Makes sense.
4. Holds together.

Man’s mind, with its intuitive capabilities, and external reality, which can be experience, *cohere* because God, the One and the Many, created them both. The Biblical God is the *personal* unifying factor that reconciles what is irreconcilable in the humanistic context.

Two clear-cut choices:

1. None of mathematics originates with God’ i.e., it is just the project of man’s autonomous reason and the answer to the coherence problem will forever remain a mystery.

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2. All of mathematics originates in God (in a perfect “mathematic” of reason, wisdom, order, and coherence – only found in the mind of God).

MAN

Because man is created in God’s image, he can know, understand, and use God’s creation.

Because man is only the image of God, his knowledge is not exhaustive.

1. Man’s mathematics is limited.
2. Man can discover more about mathematics!

Because man is made in the image of God and coherence exists between his mind and external reality, then he can count, remember, distinguish, and communicate.

$2 + 2 = 4$ bears witness to God because He is the author of it. Man, in his fallen state, *suppresses* this truth.

Dr. Remo J. Ruffini (physicist at Princeton University), “How a mathematical structure can correspond to nature is a mystery. One way out is just to say that the language in which nature speaks is the language of mathematics. This begs the question. Often we are both shocked and surprise by the correspondence between mathematics and nature, especially when the experiment confirms that our mathematical model describes nature perfectly.”

Dr. Ruffini admits that this problem can be solved by positing God. But he prefers to deny the theoretical possibility of a correlation and meaning than to admit the reality of the Creator God.

Man, redeemed by Christ, is motivated to do all things, including his mathematics, for the glory of God.