1.1 Foundations

Terms, Symbols & Concepts Introduced
1. Algebra
2. *al-jabr*
3. *Anno Domini*
4. Arithmetic
5. *Arithmos*
6. cf.
7. Elohim
8. ff.
9. Geometry
10. i.e.
11. *imago Dei*
12. *Logistica*
13. *Logos*
14. Mathematics
15. Naming as a tool of dominion
16. Number
17. Ontology
18. Onto-relational
19. Perichoresis
20. Trinity

Charles Lutwidge Dodgson (1832-1898), or Lewis Carroll of *Alice in Wonderland* fame, was not only a writer, he was a mathematician. In his book, *Through the Looking Glass*, he engages a narrative between the White Rabbit and the King:

> The White Rabbit put on his spectacles. "Where shall I begin, please your Majesty?" he asked. "Begin at the beginning," the King said very gravely, "and go on till you come to the end: then stop."

The Bible tells us about the beginning of time and space as we know it;[1] and it is at this beginning, a beginning that tells us about the Creator and the creation, that we commence our journey into the world of mathematics.

Creation

> In the beginning God created the heavens and the earth (Genesis 1:1).

The Hebrew for God is ***Elohim***, a plural noun.[2] This plurality is exemplified in the phrase "Let Us make" (Genesis 1:26). In the next verse, we see the Spirit[3] of God hovering over the face of the waters (**cf.**[4] Genesis 1:2). Then, Elohim created all things by the speaking forth of His Word, by the breath of His mouth (Genesis 1:3**ff.**[5]; Psalm 33:6).[6]

In the first three verses of the Bible, the act of creation is circumscribed in plurality: God, Spirit, and Word. In the New Testament, we discover Elohim in the fullness of plurality in unity, Elohim is **Trinity**, One in Three and Three in One: Father, Son, and Spirit.

> Creation is "poetry in motion" – the great dance being played out through the scenes of our lives.
>
> C. Baxter Kruger, *The Great Dance: The Christian Vision Revisited* (2000), p. 88.

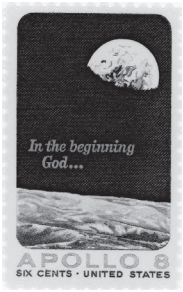

Figure 1. Source: United States Postal Service.

In the beginning was the Word [*logos*], and the Word was with

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[1] The why of this beginning, the creation, is the extravagantly loving purpose of the Triune God for humanity, a plan secured before the creation of time and space. See Ephesians 1:1-14 and II Timothy 1:7-10.

[2] The masculine plural form of this word may be regarded (1) as intensive to indicate God's fullness of power, (2) as majestic to indicate God as one being above all, or (3) as an allusion to the plurality in the being of God Himself.

[3] Spirit, in the Hebrew, is transliterated into the English as *ruach*. It is a feminine noun that means spirit, wind, or breath. In the Greek, spirit is the neuter πνεῦμα (*pneuma*). In John 16:13, πνεῦμα is linked to the neuter ἐκεῖνος (that one), but used in connection with masculine personal "he will guide" (ὁδηγήσει), "he will speak" (λαλήσει), "himself" (ἑαυτοῦ), "he may hear" (ἀκούσει), and "he will declare" (ἀναγγελεῖ). Irrespective of grammatical gender, she, it or he, by the Spirit being deeply relational, beautifully ordering, and fellowship-oriented, a communion that runs side to side with power, we know what it means to be an authentic person.

[4] cf. is the Latin abbreviation of *confer,* meaning "compare with."

[5] f. is the Latin abbreviation of *folio,* meaning "next page." In this instance, ff. means "the following verses."

[6] Thus, the Spirit and the Word, albeit distinct, are tied together since they are both linked to the voice of Elohim. The image given is that the Word is the articulate sound of Elohim, the Spirit is the wind, the breath of that voice.

> God, and the Word was God. He was in the beginning with God. All things came into being through Him, and apart from Him nothing came into being. [What] has come into being in Him was life, and the life was the light of men … And the Word became flesh, and dwelt among [in] us, and we saw His glory, glory as of the only begotten from the Father, full of grace and truth (John 1:1-3, 14).[7]
>
> For by Him [Christ, the ***logos*** of God – JN] all things were created, both 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. He is before all things, and in Him all things hold together (Colossians 1:16-17).

THE CREATOR

God's speech in Genesis 1 is the Word, the *logos* (in Greek, λογος) of God, the Lord Jesus Christ. In the beginning, this Word already existed, and this Word was in face-to-face fellowship with God the Father. This Word has always been of the same essence, the same being as the Father. All things, the heavens and the earth, came into existence through this Word. Without this Word, not one thing, not one iota of creation, came into existence. What has come into existence is in this Word and this Word is life, the life who is the light of everyone.

Logos means reason, intelligence, wisdom, the living voice, eternal self-communication.[8] The Apostle John connects the person of Christ to the reason of creation, a reason grounded in relationship. Christ, the Word of God, is the source of the rationality that pervades the universe in its many forms. Since *logos* is centered in the person of Christ, all reasoning, to be valid reasoning, must also be grounded in Christ. Since Christ reveals the Father (John 14:9), and the Spirit of God reveals Christ (John 16:14), to say that Christ is the ground of rationality is also to say that the Father and the Spirit are the ground of rationality.

> Christ the Word envelops both Scripture and Creation.
> James D. Nickel

God is three persons in one being. God's triune nature is a joyful and self-giving mutual indwelling and interpenetration, union with distinction, indeed, a dance of three persons who share the same being, or the same essence. Using Greek words developed by the Nicene[9] church fathers of Cappadocia (4th century AD), God is three *hypostaseis* in one *ousia.* (In the Greek, *treis hypostaseis en mia ousia*.) To grasp the nature of this reality (John 10:38, John 14:10-11, 20; John 17:23), later theologians used the Greek word **perichoresis**, from *perichoreo,* meaning "to encircle," "to encompass," "reciprocal containing," "mutual inexistence," or "mutual indwelling."[10] The dance metaphor comes from the Greek word *perichoreuo*, meaning "to dance around." *Choreuo* is the root word used in choreography, the science of the sequence of steps and movements in a dance.

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[7] Concerning the [What] addition, the New American Standard Version of the Bible does not translate the third verse in this way. The flow of the Greek text allows for it, though, since it has no punctuation marks. The New Revised Standard Version changes the punctuation based on that movement of thought. [Note: the Greek word translated "among" in verse 14 is εν (en). This preposition means "in." Note how John uses this preposition in the rest of the first chapter, specifically verses 2, 4, 5, 10, 23, 28, 31, and 33.]

[8] In contrast to ancient Greeks who understood *logos* as the impersonal principle of the universe. *Logos*, understand in its Hebraic framework, means "God's eternally self-communicating being." In Harold Wells, *The Christic Center: Life-Giving and Liberating* (Maryknoll: Orbis, 2004), p. 113.

[9] By Nicene, we mean the date of the writing of the Nicene-Constantinopolitan Creed (ca. 325, 381 AD). AD is an abbreviation of the Latin ***Anno Domini***, which means "in the year of our Lord.

[10] G. L. Prestige, *God in Patristic Thought* (London: SPCK, 1952), pp. 289-291.

God is Trinity. Father, Son, and Spirit are involved in one another, an involvement of intimate fellowship, deep and penetrating union. God is being in communion. **Ontology** is the study of the nature of being or existence. With this explanation in mind, we can say that the God of Scripture is **onto-relational**, being in relationship.

A post-Nicene church father, Aurelius Augustine (354-430) said that "we think God's thoughts after Him" when we study Scripture. Since the words of Scripture bears witness to Christ, the Word or Voice of God, studying Scripture is a way to relate to Him who is life eternal (John 5:39). In Genesis 1, we see God speaking creation into existence. His Word, Jesus (John 1:1-3), is an expression of His thoughts. Creation is the consequence of God's thoughts, or His plans, plans that came to fruition by His Word.

The astronomer Johannes Kepler (1572-1630) encountered the Living God as he explored the mathematical relations of God's harmonious creation. After developing the law of the elliptical[11] motion of the planets around the Sun, he fell to his knees and exclaimed, "My God! I am thinking Thy thoughts after Thee!"[12]

The scientist Albert Einstein (1879-1955) believed that the deeper one penetrates into nature's rational order, the greater one's respect for God. Although not a believer in the onto-relational Trinity of Christian orthodoxy, Einstein followed the thought of Scottish physcist James Clerk Maxwell (1831-1879), a believer, who said that in science, relation is the most important thing to know.[13] With this input from Maxwell, Einstein echoed Kepler's thoughts by saying, "What we [physicists] strive for ... is just to draw His lines after Him."[14]

There is a perichoretic structure, a dance, in creation. This dance is the unity behind the diversity of the cosmos,[15] the rational ground of all that exists. This unity exists because all things cohere in Jesus Christ, the Word of the Father, God the Son made flesh (John 1:14), who reveals to us the perichoretic nature, the dance of the dynamism of His relationship to His Father in the Holy Spirit.

NUMBER

> Human mind and culture have developed a formal system of thought for recognizing, classifying, and exploiting patterns. We call it mathematics.
>
> Ian Stewart, *Nature's Numbers* (1995), p. 1.

One aspect of the perichoretic structure of creation is **number**. Number is the rational order of things that makes the universe accessible to quantification (Lesson 2.1), **i.e.**[16], "to find out how much." We quantify objects by counting, by measuring, or by developing valid expressions using determinate, or fixed, quantities.[17] The dance of number is the dance of this rational order. **Mathematics** is the study and development of the rational order of the universe revealed by number.

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[11] We will explore the ellipse in later lessons. It is an oval-shaped curve.

[12] Cited in Colin Humphreys, "Can Science and Christianity Both Be True?" in R. J. Berry, ed., *Real Science, Real Faith* (Eastbourne: Monarch, 1991), p. 116. Kepler exulted, with pleasure, in the works of God (Psalm 111:2). In 1604, Kepler wrote, "I may say with truth that whenever I consider in my thoughts the beautiful order, how one thing issues out of and is derived from another, then it is as though I had read a divine text, written into the world itself, not with letters but rather with essential objects, saying: Man, stretch they reason hither, so that thou mayest comprehend these things." Cited in Max Caspar, *Kepler* (Mineola: Dover Publications, [1959] 1993), p. 11.

[13] Maxwell also developed a relational way of understanding and doing mathematics. He named it embodied mathematics (Lesson 8.9). When he designed the famous Cavendish Laboratory in Cambridge University in 1874, he ordered this Latin inscription to be placed over the entryway: *Magna opera Domini exquisita in omnes voluntates ejus*, meaning "The works of the Lord are great, studied by all who delight in them" (Psalm 111:2).

[14] Cited in Thomas F. Torrance, *Theological and Natural Science* (Eugene: Wipf and Stock, 2002), p. 25.

[15] The cosmos is the physical universe. The word signifies "embroidery" giving the idea of the orderliness and harmony of its patterns. We get the word cosmetics from cosmos. Applying cosmetics to the face brings its elements into harmony and beauty.

[16] i.e. is the Latin abbreviation of *id est,* meaning "that is."

[17] For more about the meaning of determinate, see footnote 3 of Lesson 2.8, Lesson 9.1, and footnote 4 of Lesson 13.10.

Number, as a word, has an interesting derivation. The Old English or Anglo-Saxon, the English language from the 5th century to the 12th century[18] AD, used the word *rim* when referring to number. *Rim* also means "part." Middle English, the English language from the 12th century to the 16th century AD, used *nombre*, which came via Old French from the Latin *numerus*. We can trace this word to the ancient Greek word νεμο (*nemo*), meaning "distribute" or "share." It is of interest to note that we can recognize this word in νεμεσις (*nemesis*[19]), meaning "allotment" or "portion" of the anger of a god or goddess.

God's creation is imbedded with the rationality, the dance, of numerical and spatial patterns. Number forms the basis for **Arithmetic**[20] and **Algebra**.[21] Space, understood in the context of number, provides the basis for **Geometry**.[22] Number, the basis of the rational process of counting and measuring, reports on the nature of reality, a reality that is grounded in the person of Christ. Numerical and spatial patterns bring to light the rational order, the beauty, the perichoretic dance of creation.

The Triune God is the foundation, the ground, of all things, and our ability to count and measure is one of those things. God has ordered the things of creation by measure, number, and weight. Therefore, when we study mathematics and discern numerical and spatial patterns, we are in tune with the Triune God's ordering of things.

On the sixth day, the Triune God created man, male and female, in His image. The Latin for "image of God" is ***imago Dei***. Image in this sense means a reflection, to a limited and finite extent, of the person and character of the Triune God, the Creator. His dance is therefore in us. We are wired for perichoresis.

DOMINION

The Earth is the created gift of the Triune God to humanity, given to the *imago Dei* to form, to develop, to cultivate, to rule:

> The heavens are the heavens of the Lord, but the earth He has given to the sons of men. (Psalm 115:16)

The Father, Son, and Holy Spirit then told man to take dominion over the Earth with specific attention given to the animal creation (Genesis 1:26-27). An example of intelligent rule is Adam's naming of these animals. Note that God presented the animals before Adam in order "to see what he would call them" (Genesis 2:19). Although God named the stars (Psalm 147:4; Isaiah 40:26), He gave Adam the charge of naming the animals, i.e., the freedom to create names for the animals. The Triune God gave man the ability to observe the animals and the liberty to choose an appropriate name that aptly described their characteristics, i.e., the dance of their patterns. The Biblical understanding of naming is two-fold:

1. A name of an object reflects the characteristics, the essence, of that object, the meaning and value God gave to it, the discernment of its place in the cosmos, and
2. A person cannot name an object unless he has previously been given dominion over it; the object to be named is God's gift to mankind. Therefore, **naming is a tool of dominion**.

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[18] Note how the century numbers are used, 5th and 12th. This usage speaks to the sequence of order. See Lesson 1.4.

[19] From the ancient Greek goddess of retribution, *Nemesis*.

[20] The ancient Greeks understood Arithmetic, ***arithmos***, as the "theory of numbers." They used another word to describe the skill of calculation with numbers: ***logistica***. We shall study the elements of both.

[21] Algebra is a shorthand way, using symbols, of generalizing Arithmetic to help solve specific problems involving number. The word itself is Arabic, ***al-jabr***, meaning "transposition" or "reunion." *Al-jabr*, used in a non-mathematical sense, was something a barber did in medieval times. A barber not only cut hair, he mended bones. Thus, an *algebrista* was a bonesetter. In Galatians 6:1, the Apostle Paul said, "Brethren, even if anyone is caught in any trespass, you who are spiritual, restore such a one in a spirit of gentleness; each one looking to yourself, so that you too will not be tempted." The Greek word for restore means "to join back together" as in setting a broken bone or "to mend" as in repairing torn nets. The Greek word for restore means the same as the Arabic word *algebrista*.

[22] Geometry is derived from two Greek words, *geo* and *metron*. It literally means "the measure of the earth."

Adam observed God's created order and, by naming it, classified it for use. What is the connection with math? The fixed patterns of God's creation are ordered by His lovingkindness, or covenant, a rulership grounded in the onto-relational Trinity.

> Thus says the Lord, "If My covenant for day and night stand not, and the fixed patterns of heaven and earth I have not established, then I would reject the descendants of Jacob and David My servant, not taking from his descendants rulers over the descendants of Abraham, Isaac and Jacob. But I will restore their fortunes and will have mercy on them." (Jeremiah 33:25-26)

For example, the rising and setting of the Sun constitutes a daily pattern. Seedtime and harvest, cold and heat, winter and summer, day and night (Genesis 8:22) manifest the faithfulness of God in the seasons of the year. The motion of the Moon, the planets, and the stars is patterned or cyclical. In the context of creation, *logos* means its law-like patterns that can be understood using reason. As we have noted, Christ is the foundation of the rational structures of creation and it is the duty of man, as a dominion bearer following in the footsteps of Adam, to observe this patterned reality and classify it for use.

Since humanity is created in the image of God, everyone has received the gift of reason and the gift of observational skills. These gifts include a sense for number and a feeling for space. Scripture reveals God thinking, God counting, and God measuring, albeit on a level far above ours (cf. Isaiah 55:8-9; Psalm 147:4; Isaiah 40:12). The *imago Dei*, therefore, thinks, counts, and measures "after God." As we have noted, our thinking, measuring, and counting are not exactly like God's. In our exploration of creation, we can see only, as it were, "through a glass darkly" (I Corinthians 13:12). Our seeing is never in the perfection that God sees, *but we can see!* This means that we can know truly but that we cannot know everything wholly.[23] We see only in part; only the Triune God can see everything perfectly. We see in part the observable patterns that originate in the Triune God's thoughts. We observe what the Father, Son, and Holy Spirit have created, i.e., the external world, and we are free to choose a name for the patterns we observe. Because we the *imago Dei*, the Trinity has gifted us (1) with the ability to see the patterns of the physical creation and (2) with the liberty to formulate relationships and consequences that both explain and predict.

What, then, is the ultimate reason to learn math? We learn math to catch a glimpse of the rhythm, the dance, of God's creational speech. We use our knowledge of that speech to:

1. Get "in step" with God's dance. Doing so will result in transformational change.
2. Steward God's creation under Him.

As we learn mathematics, we learn to discern the patterned order of creation. As we learn this patterned order, we are one step away from encountering the interpenetrating dance of the Living God, the source and sustainer of it.

EXERCISES

Define or explain the following terms and abbreviations:

1. *Elohim*
2. cf.
3. ff.
4. Trinity
5. *Logos*
6. Ontology
7. Onto-relational

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[23] Although we can apprehend God the Father Almighty through the revelation of Jesus Christ by the Holy Spirit, we can never comprehend the Father in completeness.

8. *Anno Domini*
9. Perichoresis
10. Number
11. i.e.
12. Mathematics
13. Arithmetic
14. *Arithmos*
15. *Logistica*
16. Algebra
17. *Al-jabr*
18. Geometry
19. *imago Dei*
20. Naming is a tool of dominion

21. Find and define at least ten words that have the suffix of *logos* in the form -logy.

> … the Word of the Father is Himself divine, that all things that are owe their being to His will and power, and that it is through Him that the Father gives order to creation, by Him that all things are moved, and through Him that they receive their being.
>
> Athanasius, *On the Incarnation* (4th century AD; 1996 reprint), p. 25.