

COUNTING, INFINITY, AND THE FOUNDATION OF KNOWLEDGE

BY JAMES D. NICKEL

The counting numbers are also known, in mathematics, as the set¹ of natural numbers. Mathematicians have chosen to denote this set by the symbol \mathbb{N} . The rule for constructing this set is that we start with 1. We calculate the next number by adding 1 to 1 (we get 2). Next, we add 1 to 2 to get 3, continuing the process *ad infinitum* (a Latin phrase meaning “toward infinity or endlessly”).

$\mathbb{N} = \{1, 2, 3, 4, 5, \dots\}$ where $=$ is the symbol for equals², $\{\}$ are the brackets symbol that encapsulate the members of the set, and \dots (called an ellipsis) means *ad infinitum*.

There is no smallest among the small and no largest among the large; but always something still smaller and something still larger.
Anaxagoras (ca. 500-428 BC)

We cannot write the last number of this set³ because *there is no last number*; this sequence “goes on forever.” The set of all counting numbers, which continues indefinitely, is infinite.⁴ Numbers, remember, are basically abstract ideas in our minds. We can think of numbers, but we cannot think of them all. We cannot think of the largest number because all we need to do is add 1 to it and we will get a larger number.

At the very beginning of mathematical foundations, with simple counting numbers, we are introduced to a concept that transcends and perplexes human comprehension. We can conceive of the concept of infinity (through the counting numbers) *only* because we are made in the image of the *infinite, eternal, and personal* God of the Scripture.

The first truth that we must understand about the Biblical God is that He is transcendent. Transcendent means “surpassing, to rise above, to stand beyond, to overpass, to surpass, to exceed, to be exalted above” or “beyond human experience” or “a basic and inescapable premise that is prerequisite to the coherence of all human experience.” By *eternal*, we mean “without beginning or end.” God is not subject to time. He existed before time. Before time there was only eternity; nothing existed but the unbeginning, uncreated God. Think deeply about that. By *infinite*, we mean “without limitation.” God is not subject to any limitations. He is without

Time is not an aspect or a fragment of Eternity, nor is Eternity an endless extension of Time; the two concepts belong to different categories.

Dorothy L. Sayers, *Creed-or-Chaos*, p. 81.

¹ A set is a group or collection of objects that generally have something in common or follow some pattern (some unifying principle that ties their diversity together). In this example, the objects are the counting numbers. A synonym for set is class (derived from classification). For example, the 6th grade in Windsor School is a class containing 16 objects or students.

² The equals sign ($=$) is basic to all of mathematics. This sign sets two quantities or ideas (one of the left-hand side of the equals sign and the other on the right-hand side of the equals sign) as equal in magnitude (value) or meaning. In our example, $\mathbb{N} = \{1, 2, 3, 4, 5, \dots\}$ defines the meaning of the set of natural numbers (symbolized by the letter \mathbb{N}). Most commonly, the equal sign is used in mathematical *equations* like $2 + 3 = 5$.

³ The set of natural number is also called a sequence because these numbers follow a prescribed order. In specific, this set is an arithmetic sequence because there is a common difference (i.e., 1) between every term in the set.

⁴ The mathematical symbol for infinity is ∞ . The English mathematician John Wallis (1616-1703) first introduced this symbol in 1655.

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boundary limitations. We see that in the set of natural numbers there is a dim reflection of the nature of this transcendent God. Although this set has a beginning (the number 1), it has no end. This set also has no limitation or boundaries; there is no largest number in this set. The set of natural numbers gives us a faint glimpse of what transcendence means.

The second truth that we must understand about the Biblical God is that He is imminent (means “within human comprehension”). By *personal*, we mean God communicates with man in an understandable way by revelation. God communicates with man in two ways: (1) *implicitly* (implied or understood but not directly expressed) through creation and (2) *explicitly* (fully or clearly expressed) through the Bible. Let’s look at the implicit communication first. Genesis 1:1 states, “In the beginning God created the heavens and the earth.” God also created man in His image. God created the universe by His word, called *logos*⁵ which is centered in Jesus Christ (see John 1:1-14), and His word structures (or patterns) the creation. This external order reflects mathematical principles that can be discerned internally by the human mind that has also been structured by God to think mathematically (i.e., the ability to think mathematically can be called a “sixth sense”). It is only in the revelation of the Creator God that we not only have a sense of number (hence, able to count) but find coherence between our mathematical thoughts and the outside world.

It is not surprising that if a reasonable God created the universe and put me in it, He should also correlate the *categories of my mind* to fit the universe, simply because I have to live in it.

Francis Schaeffer, *Trilogy*, p. 333.

Sadly, the entrance of sin (see Genesis 3) shattered (1) our understanding of how we are able to count and (2) our understanding of mathematical coherence between our minds and the external world. Take note of what the British philosopher and scientist John W. N. Sullivan (1886-1937) said in 1925, “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.”⁶ Note also the statement of American mathematics historian Morris Kline (1908-1992):

Finally, a study of mathematics and its contributions to the sciences exposes a deep question. Mathematics is man-made. The concepts, the broad ideas, the logical standards and methods of reasoning, and the ideals which have been steadfastly pursued for over two thousand years were fashioned by human beings. 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 disposi-

⁵ Logos (λογος) is Greek for word; the concepts of lawfulness, wisdom, reason, interconnectedness, communication, and logic are nuances of its meaning.

⁶ John W. N. Sullivan, “Mathematics as an Art,” *The World of Mathematics*, ed. James R. Newman (New York: Simon and Schuster, 1956), 3:2020.

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tion of man have enabled him to secure a portentous grip on the universe. Some explanation of this marvelous power is called for.⁷

Both Sullivan and Kline said these things because they refused to submit to the Biblical doctrine of creation. For Kline, mathematics is purely and only *man-made*. For Sullivan, “We are the law-givers of the universe; it is even possible that we can experience nothing but what we have created and that the greatest of our mathematical creations is the material universe itself.”⁸

Because of the infectious nature of sin, men refuse to submit to the revelation of God *implicit* in creation (external and internal). In fact, they do everything in their power to suppress this knowledge (see Romans 1:18-32). Hence, man needs, in a profound sense, to know the redemptive action of God in the Lord Jesus Christ. The imminence of God means that He comes to sinful man and speaks to Him out from His mercy, grace, and love. This is where the *explicit* communication of God enters the scene. The written word, the Scriptures, testifies to God as both Creator and Redeemer. Creation, redemption, and Scripture give man a true epistemological⁹ (theory of knowledge) foundation for the study of mathematics.

Psalms 36:9 states, “In Thy light, we see light.” Light stands for knowledge, understanding, and wisdom. Man can truly know *only* in the light of God’s knowledge. Job 32:8 states, “But there is a spirit in man, and the breath of the Almighty give him understanding” (see also Psalm 94:10-12). God is the ultimate teacher of knowledge. What man thinks he “creates” or “invents” God has known already from eternity to eternity. Without God’s knowledge (light) as a foundation, man’s knowledge is cloaked in darkness. This is why Sullivan and Kline are baffled by the coherence between mathematics and the physical world. And, this is why the unbelieving mathematician cannot truly account for man’s ability to count.

Proverbs 1:7 states, “The fear of the Lord is the beginning of knowledge.” A proper respect of the Biblical God is the foundation (the superstructure, the starting point) of knowledge. Fools despise wisdom and knowledge in their disrespect of the Biblical God. According to Romans 1:22, “Professing to be wise, they become fools.”

As Christians we must not allow that even such a thing as enumeration or counting can be *accounted for* except upon the supposition of the truth of what we are told in Scripture about the triune God as the Creator and Redeemer of the world.

Cornelius Van Til, in E. R. Geehan, ed., *Jerusalem and Athens*, pp. 90f.

How then does the unbeliever, one who rejects the revelation of God in creation and Scripture, know anything? According to American theologian and educator Rousas J. Rushdoony (1916-2001):

The unbeliever is thus able to think and work only on the basis of a practical reason which presupposes the Christian frame of things.... On his own premises, he can know nothing; on bor-

⁷ Morris Kline, *Mathematics and the Physical World* (New York: Dover Publications, [1959] [1980]), p. ix.

⁸ Sullivan, 3:2021.

⁹ *Epistémé* is Greek for knowledge or understanding. It literally means “to cause to stand.”

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rowed premises, he is able to think and work, but for all his results, he remains in the paradoxical position of the cattle rustler.... He has no knowledge on the basis of his own principles, he has valid knowledge only as a thief possesses stolen goods.¹⁰

In other words, the unbeliever can count without being able to account for counting. Unbelievers can count but they cannot offer a philosophy that accounts for their practice of counting. *Only* the believer, redeemed by grace through Christ and in subjection to God's written word, can *truly* account for the ability to count.

¹⁰ Rousas J. Rushdoony, *By What Standard?* (Tyler, TX: Thoburn Press, [1958] 1983), pp. 61-62.