Thoughts in a Maze

by

Arthur O.R. Thormann

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This book is for my grandchildren,
Garett, Megan, Samantha, and Jordan.
I sincerely hope to provide them
with some food for thought.

And my gratitude goes to my wife, Renate, my daughter Nancy, and my friends Diana McLeod and Pamela Sigvaldason for their valued corrections of my typos and faulty construction; also, to Christine Dixon, who assisted me with the background color scheme.
All mistakes that remain are entirely mine.

Preface

It seems to me that my entire life consisted largely of a number of question marks.

The first of these that I can recall goes back to a time when I was one-and-a-half years old. My parents decided to take in a movie but had no babysitter. My father was concerned, but my mother assured him that I would be fine, since it was my bedtime and, besides, I could not climb out of the crib. I was still awake when they returned and greeted them with a "ha." This questionable event stayed with me to the present day.

The next question in my life came in the summer of 1939. I was just five years old, but I sensed an anxiety around me. The reason for this became apparent when Hitler attacked Poland. My mother was fuming, but my young mind tried to reconcile the event with its Sunday school teachings.

In the next few years, I learned more about Hitler's shortcomings than other youngsters my age. My mother had made friends with a group that called themselves *The Kaiser People*. They were under the illusion that the old regime could be reestablished, and they spent most of their time criticizing the new regime – especially Hitler. Eventually, they were hauled away, one by one, to concentration camps. I always wondered, even to this day, why my mother, who was very outspoken, escaped this fate.

Then came the first bomb that hit Berlin. An apartment building, on a street were my paternal

grandparents lived, was completely in ruins. Everyone who had been in the building was killed. My mother and I had joined a crowd of gawkers who looked at the remains. The people were more amazed than horrified. I was not yet eight years old, but I asked myself, what could incite people to such a cruelty?

Soon afterwards, my father was drafted into the army. His parting words were, “You’re the man in charge now! Look after your mother and sisters.” But I did not get much of a chance to do that until after the war. The government separated me from my mother and sisters and sent me to the country to be cared for by foster parents. I always questioned this logic. Later, after they did not know how to treat gangrenous frostbite on my right foot, my foster parents sent me off to join my mother and sisters, who had been moved to a small village 120 km southeast of Berlin.

The next big event that created a question in my eleven-year-old mind was a steady stream of Russian tanks that lasted for three days, heading towards Berlin. I was thinking, what will happen to the poor people who are still living in Berlin? But I did not have long to wait to find out. After we heard that the war had ended, my mother decided to pack a few belongings and my sisters onto a cart and start walking towards Berlin. We spent our nights in empty churches and railway cars. When we arrived in the city, we could not believe our eyes: Few buildings had remained standing. I asked myself, what is the sense behind all of this? Does any of it have any value? And, if so, what is it? I never found an answer.

Our apartment building had also been demolished. Fortunately for us, one of my mother's aunts who lived in a garden colony gave us permission to use her apartment in the city. But when we entered the apartment, we found another aunt dead. We could never determine how or when she had died. Maggots had already more than half devoured her. The stench was unbearable.

Surviving in Berlin after the war was another matter. I won't bore you with the details of coping with deplorable sanitary conditions, lack of drinking water, lack of clothing, lack of coal and firewood, and, most importantly, insufficient food rations. Fortunately, my Canadian grandparents sent us the occasional CARE package to keep us alive.

My maternal grandfather had immigrated to Canada in 1930, but he was unable to take along his whole family – not even his wife. Every few years he saved enough to bring another family member to Canada. Sadly, World War II prevented our turn, and, after the war, a lot of red tape stalled our departure from Germany until 1951.

But Canada posed more questions for me. My first job was on my grandfather's farm near Barrhead, Alberta. However, farming was not my forte; I wanted to get back into my mechanical trade. So, I found a job as a machinist in Edmonton. A year later, I signed up with a uranium mine as a mill mechanic. At the mill, I admired the work of electricians. So, upon my return to Edmonton, I entered the electrical trade. Thanks to this trade and my pious boss, my mind meandered in

totally new and different philosophical, mathematical and scientific directions. I developed a whole new way of looking at things and the world. Nevertheless, I must admit that my thoughts did not get out of a maze.

So, I decided to share these thoughts with you, my grandchildren and my readers, in the hope that you will progress from where I left off.

Arthur O.R. Thormann
Edmonton, April 2005.

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Introduction

There's no doubt that on many subjects our thoughts are in a maze. Some of these subjects may represent concrete concepts and some may represent abstract concepts, and most of these subjects will remain mysteries to us as long as we live. Some of these subjects that were mysteries to me I have listed in the following pages for you to think about. Perhaps a few of them will not be or stay mysteries to you. That is good. That is what progress is all about.

You may wonder about the variety of the subjects and why some of them should represent mysteries to me. I will try to explain this as well as I can. It has been my experience that many apparently simple subjects do not represent mysteries to me as long as I do not give them much thought. But as soon as I start delving deeper into these subjects, mysteries pop up, and I find myself, my thoughts, in a maze.

Now, theoretically, there should be a way out of the maze. Sometimes I am able to find it – perhaps with the help of others – but many times I end up deeper in the maze, and I am completely lost. I believe I am not alone. This probably happens to many of us, even our scientists – maybe especially our scientists. But sometimes, when we believe we found some simple answers, we think we have found our way out of the maze, and perhaps we have. Only time will tell.

Arthur O.R. Thormann

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Simplicity, I believe, is probably the key to many solutions. We tend to overcomplicate many situations. I am sure that you must have, as I did on occasion, breathed a sigh of relief when you found out how simple the answer to a complex or complicated problem really turned out to be. So, when you are looking for a way out of the maze, keep simplicity in mind.

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Infinitesimal Infinity

Infinity is probably a widely misunderstood concept. In all likelihood, the misunderstanding started with our dictionaries. One of the definitions for "infinity" in *Funk & Wagnalls Standard Dictionary*, for example, states, "A very large amount or number." Therefore, it is only natural that we are led to believe that infinity is a finite concept, which leads to all kinds of other misconceptions.

For example, in the nineteenth century, mathematicians still supported equations like, one divided by zero equals infinity. The logic behind this thinking was simple: Any number (like one) divided by a smaller number yields a larger number, and if the smaller number is infinitely small the larger number must be infinitely large; thus, when you divide by zero, you get infinity.

In the twentieth century, mathematicians have not completely abandoned this logic, but, with the introduction of calculators and computers, the division by zero could not be accomplished, and, consequently, we were told: Thou shalt not divide by zero – although no good reason for this command was offered, except that our computers will yield error messages.

Many years ago, after reading George Gamow's book, *One Two Three…Infinity,* I thought I had mastered this concept well enough to write my own

book. I was going to give it the title, *From Zero to Infinity*. Well into the book, I asked myself, to where? Infinity? Where's infinity? Is it some place I can visit when I feel like it? And the illogic of this title suddenly became clear to me. But I should not be too embarrassed about this, even Albert Einstein used the phrase "towards infinity" several times in an address to the Prussian Academy of Sciences in Berlin on January 27th 1921.

I decided to revisit George Gamow's book and found more of the same illogic. For example, George Gamow describes three infinities: the number of all integers and fractional numbers; the number of all geometrical points, on a line, in a square, or in a cube; and, the number of all geometrical curves. And here is what he says about these three infinities:

> "But the number of all geometrical points, though *larger* than the number of all integer and fractional numbers, is not the *largest* one known to mathematicians. In fact it was found that the *variety of all possible curves, including those of most unusual shapes, has a* larger *membership than the collection of all geometrical points, and thus has to be described by a third number of the infinite sequence."* [The emphasis on "larger" and "largest" is mine.]

George Gamow gives us three notable propositions in this quote: 1) He gives us three infinities; 2) He compares the sizes of these infinities; and 3) He implies that these infinities are represented by different numbers, to wit, "… *and thus has to be described by a third number …"* – after some thought, none of these propositions makes much sense.

If you disagree, substitute "endlessness" for "infinity." Then, ask yourself these questions: Is it possible to represent this concept ("endlessness") by a number? Can you visit "endlessness"? Is there more than one "endlessness?" Does "endlessness" exist at all, or is it just an abstract concept? Can you provide any logical, or even halfway satisfying, answers to these questions? I think not. "Endlessness" cannot be given a number; it is neither large nor small; you cannot visit it; it has no cousins; it is simply endlessness; and, as such, it has no concrete existence!

Now, take a look at the numerous assertions that give infinity a concrete existence (including your dictionaries). Can you then appreciate why you cannot divide by zero and get infinity, or why you cannot divide by infinity to get zero? If infinity has no concrete existence, be it space or a number, how can you assign such an existence to it by dealing with it in connection with other, concrete existences? Not easy, is it? But it happens daily everywhere. The result is nonsense, of course.

Friedrich Nietzsche, in his major work *Thus Spake Zarathustra,* used Zarathustra to teach and develop the ancient philosophy that everything that happens in the universe must, after an enormous period of time, eventually reach the end of all its possible combinations and, thus, repeat itself, starting a *perpetual return*. And, since human beings will be part of this perpetual return, only supermen will be able to cope with all the miseries of the world that will also perpetually return.

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The notion of repetition of things that are happening and will happen also has some roots in the Bible:

> "That which hath been is now; and that which is to be hath already been; and God requireth that which is past." (Eccl 3:15).

A word of caution, though, to those who wish to build on this verse: research your translations. Luther's German translation, for example, says: "What happens has happened before, and what will happen has also happened before; and God revisits the past." Note the essential difference in the last part of the verse.

My reason for mentioning the notion of perpetual return is twofold: Firstly, it ties time to infinity – makes it eternal, and, secondly, it raises an important question: Is it really possible for the combinations of all that is or could be happening to be finite? I think not. I think that the combinations of all that could be happening will continue endlessly and, therefore, also represent infinity. However, I am not pressing this opinion too hard, because I do not wish to disappoint those who strongly believe in the notion of perpetual return.

Some astronomers also view the notion of perpetual return favorably. They believe that the expanding universe resulted from an enormous explosion, and that the various parts (the stars, etcetera) will eventually find their way back and cause another enormous explosion – *ad infinitum*. The obvious question arises: How will these parts find their way back? The answer is simple: Imagine a circular

universe. This is also an easy way to dispose of the notion of infinity that uses a straight line continuing endlessly in both directions. It is much easier to think of infinity using a circle, i.e., to travel endlessly in this circle. Albert Einstein referred to it as an unbounded but finite continuum when he tried to establish some proof that the universe is finite.

Let us talk some more about zero. The concept of zero has certainly presented some mysteries to me. The most frequent occurrence in our daily lives is in connection with temperatures or bank accounts. We certainly know what zero means when it comes to temperatures or bank accounts, or water or electricity stopping to flow. At least, we think we do.

Temperatures present a little bit of a problem, though – they depend for zero on whose scale we use. Now, Celsius resolved this issue by using the freezing point of water for his zero. I am not sure how Fahrenheit came up with his zero, but Kelvin had a better idea: He determined the point where all molecular motion stops and called this "absolute" zero and this is –273.15º Celsius. Theoretically, I suppose, there could be temperatures lower than this "absolute" zero, but we have no way of measuring it since all molecular activity has stopped at this point.

An easier concept of zero to understand is when water or electricity has stopped to flow, although it becomes more complicated if the flow is negative. But there is no doubt about a zero flow, just as there is no doubt about a zero bank account balance, which could also be negative. Mathematicians mark a point on a

line and tell us that numbers to the left of that point are negative and numbers to the right of that point are positive, which is what makes the point zero. These marker zeros are easy enough to understand, but what about other zeros?

First, let us take "nothing." We could certainly be made to believe that "nothing" is zero. However, we also know that "zero" is something, so how can "nothing" be zero? In the year 1970, a friend of mine gave me a book to read which gave him some problems, and he was hoping that I could help him solve these problems. The book was written by Wilbert B. Smith, B.A., M.A., and titled *The New Science* (1964). The first chapter in it starts out as follows:

> "Whatever might be the origin of this Universe; of one thing we can be reasonably sure, that it is within "nothing at all". If it "started", then it must have started from nothing at all. If it always was, then it has nothing at all around it. Whatever there might be beyond this "nothing at all" we have no way of knowing for we are within and of this Universe and have no concept beyond it.
>
> This idea of nothing at all is a most difficult one to come to grips with, but it is an absolute necessity to an understanding of even the first ideas of cosmology. Nothing at all means exactly what it says, nothing at all: no space, no time, no substance, no energy, and no change. To approach it one must slough off all reality and proceed deliberately into the void of nothingness…"

Well, I will stop there. If you are interested in more, you can probably still get the book somewhere. I hope, though, that you were able to detect some of the illogic in this short quote.

However, some interesting questions come to mind: How and when did it all get started? The Bible, of course, tries to answer these questions for us:

- In the beginning God created the heaven and the earth. (Gen 1:1)
- In the beginning was the Word, and the Word was with God, and the Word was God. (Jn 1:1)

But when, exactly, was this beginning? Some theologians still believe it was about 5,000 years ago, although most theologians have abandoned this idea in view of convincing evidence that takes us back billions if not trillions of years. Here is another question that remains unanswered: If God created the heaven and the earth in the beginning, how was God created? Does the quote from St. John provide us with the answer?

Well, one problem we human beings should face is that we want everything too neatly packaged. We want a definite beginning and a definite ending. Perhaps there never was a real beginning and there never will be a real ending. Perhaps there is only a continuum. Perhaps beginnings and endings are only markers along this continuum. If you are looking for a neat package, the continuum certainly takes care of that. You can forget about both the infinite and the infinitesimal. You can then believe that time has always existed and will always exist – even if our universe ends up in a heat death, as some scientists think it might. Of course a heat death is only feasible in a finite environment, in other words, a finite universe, as Albert Einstein believed it is. But then, a heat death could still exist in a continuum. In other

words, time would continue, although it would no longer be measured.

On the other hand, if our universe is circular (i.e., spherical), there may be many more universes beyond ours – perhaps infinity of universes – and a heat death in one universe may not affect any of the other universes.

Here is some food for thought for those who like to think of infinity as something finite: Suppose we compare our universe to an atom. How many atoms are there in a grain of sand? How many atoms are there in a cube of sugar? How many atoms are there in Mount Everest? How many atoms are there in our planet? How many atoms are there in our solar system? How many atoms are there in our galaxy, the Milky Way? How many atoms are there in all the billions of galaxies in our universe, including the black holes? Then, how many atoms are there in all the other universes beyond ours? And, were we able to answer these questions with enormous but finite numbers, we would still miss the concepts of zero and infinity.

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