ISSN: 2055-222X

SCIENCE, RELIGION & CULTURE

...AND THE LIFE EVERLASTING, AMEN.

Journal	Science, Religion and Culture
Manuscript ID	SANDF20150319160318
Manuscript Type	Original Research Article
Date Submitted by the Author	Thu, 19 Mar 2015, 04:13 PM
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ABSTRACT OF THE ESSAY
…AND THE LIFE EVERLASTING, AMEN.

In Chapter 20 of Luke's Gospel, Jesus debates the reality of personal immortality with a group of Sadducees. Jesus believed in personal immortality. The Sadducees, like many people today, did not. Christians hope for the life hereafter that Jesus promised, but belief is often difficult.

Surprisingly, Albert Einstein's theory of relativity supports Jesus' affirmation to the Sadducees. Relativistic eternal life differs though from the eternal life announced by Jesus, the life Christians hope for. Christians believe each life has a beginning, a short earthly phase, and an infinite heavenly phase. A relativistic eternal life, though it may be lived through all of time, is finite. Each life has a beginning, a middle, and an end.

Although relativity doesn't prove the reality of the Christian concept of personal immortality, an understanding of Einstein's theory can lead to an enhanced understanding of the likelihood of the kind of immortality Christians hope for.

3135 words

...AND THE LIFE EVERLASTING. AMEN.

- REFLECTING ON THE GOSPEL ACCORDING TO LUKE, 20:37-38
IN LIGHT OF THE SPECIAL AND GENERAL THEORIES OF RELATIVITY

In November 2010 at St. Peter's church in downtown Chicago, I attended a Saturday evening Mass in which the gospel reading was from Luke, Chapter 20. In Chapter 20, Jesus debates the reality of personal immortality with a group of Sadducees. The Sadducees, like most Jews of that day (and this day too) did not believe in personal immortality. Jesus was arguing that there is personal immortality. In verses 37 and 38 of the Gospel, Jesus says, "...But that the dead are raised, even Moses showed, in the passage about the bush, where he calls the Lord the God of Abraham and the God of Isaac and the God of Jacob. Now he is not God of the dead, but of the living; for all live to him." [1]

The pastor of St. Peter's, Father Kurt Hartrich, said that Mass. In his homily he spoke of an elderly friar he knew when he was a young seminarian. For this friar, life hereafter was more than a theoretical possibility. As time went on it was more real and proximate. He could almost see it. It was almost here and now.

It seems to me the argument Jesus makes in Luke is weak. When God speaks to Moses from the bush in Exodus, 3: 6, proclaiming "I am...the God of Abraham, the God of Isaac, and the God of Jacob.", he does not seem to be implying that Abraham, Isaac, and Jacob are alive at the time. His words only proclaim that he is the God of the three. Whether they are currently dead or alive is another question.

Belief in personal immortality is a crucial element of the Christian faith. But believing is often difficult. A believer who struggles with unbelief, I thought about the day's scripture reading and homily long after the Mass was over. And I thought about relativity. For modern physics is by no means irrelevant to Luke's Gospel.

Albert Einstein's theory of relativity supports Jesus' affirmation that the three Judaic ancestors, Abraham, Isaac, and Jacob, thought by most Jews to be dead and gone, were still alive not only when God spoke to Moses but also while Jesus was alive. According to relativity, Abraham, Isaac, and Jacob were alive two thousand years ago, four thousand years ago, one hundred thousand years ago, one million years ago and more, and they will be alive one million years from now and beyond. Each event that occurs, has ever occurred, or ever will occur on earth occurs ***now***. And ***now*** means pretty

well for all time. Such a claim by a secular science would certainly have astonished the Sadducees of Jesus' day, and the claim continues to astonish many people today. The claim is worth explaining. What follows is an attempt.

Relativity is based on the experimentally proven fact that for any observer, regardless of the velocity of the observer or the velocity of the source of light, the speed of light appears to be a constant, about 186,000 miles per second or about 300,000 kilometers per second. It follows from this fact that two events which are simultaneous when observed from one vantage point may not be simultaneous when observed from another vantage point.

A simple thought experiment illustrates the astonishing relativity of simultaneity: Imagine a long platform.[2] Origin (O_r) is at the center of the platform, A is a certain distance from Origin at the left end, and B is an equal distance from Origin on the right end.

From the center of the platform, O_r , a ray of light is emitted and travels to the left and right at its constant speed. An observer on the platform at O_r will note that light reaches A and B simultaneously. Event A is when the light hits A, Event B is when the light hits B. Events A and B simultaneously occur, according to an observer at O_r .

An observer OBS outside the platform, stationary with respect to the platform, will agree. Events A and B occur simultaneously.

<<<<<<<<<<<<<<<<<<<<<<<<<light>>>>>>>>>>>>>>>>>>>>>>>>>

A----------O_r----------B

OBS

But now let us suppose something else.

<<<<<<<<<<<<<<<<<<<<<<<<<light>>>>>>>>>>>>>>>>>>>>>>>>>

A----------O_r----------B

>>>>>>>>>> v >>>>>>>>>v>>>>>>>> v >>>>>>>>>> v >>>>>> v >>>>>>>>>

OBS

Suppose that the platform is moving from the left to right at velocity v relative to the outside observer, OBS. This is the same as supposing that OBS is moving from right to left relative to the stationary platform. *According to an observer at O_r on the platform,* ***light will still reach A and B simultaneously.*** *Light is sent off to the left and to the right at its constant speed, c, and reaches both equidistant ends at the same moment.*

But the outside observer, OBS, sees the left end of the moving platform, A, traveling toward the approaching light beam, and the right end, B, moving away from it. ***According to OBS, then, light will reach A first and B later. When OBS observes Event A, this event is still in the future, according to the observer at O_r. And when OBS observes Event B, this event is in the past, according to O_r.***

If the platform is moving from right to left, which is the same as saying the platform is stationary and the observer is moving left to right, the situation is reversed. ***According to OBS, then, light will reach B first and A later. When OBS observes Event B, this event is still in the future, according to the observer at O_r. And when OBS observes Event A, this event is in the past, according to O_r.***

The picture of a platform and an outside observer moving relative to one another provides a particular illustration of this principle of the theory of special relativity*:* ***Observers moving relative to each other have different conceptions of what is present, past, and future. The disparity between their conceptions increases as their distance from each other and their velocity relative to each other increases.***

An observer a long way from earth, stationary with respect to earth, shares with us on earth a common point in time. What is *now* to the observer is also *now* to us. But if the observer begins to move away from earth, what is presently occurring on earth as far as the observer is concerned happened in the past according to us earthbound earthlings. And if the observer begins moving toward earth, what the observer would consider to be present earthly events would be future events to us.

The disparity between conceptions is measured by the equation: [3]

$t_d = (v/c^2) (x_{earth})$

when

t_d = time difference between a distant moving observer and a stationary earth observer..

v = velocity of the observer relative to earth.

c^2 = speed of light squared.

and x_{earth} = the distance of the distant observer from earth.

When movement of the distant observer is away from earth, v is positive and thus t_d is also positive. When movement is toward earth, v is negative and thus t_d is also negative.

When using the equation, compatible units of measurement must be used throughout. For instance if v is in miles per hour, c must also be in miles per hour. $c = 6.7 \times 10^8$ miles per hour. $c^2 = 44.89 \times 10^{16}$ miles per hour. Vast distances are often measured in light years. A light year is the distance light travels through a vacuum in one year. If light years are used to measure x_{earth}, the light years must be converted to units compatible with the other elements of the equation. One light year = 6×10^{12} miles. When miles and hours are used in the equation, t_d will be given in hours. The hours may be converted to years by the appropriate division.

With a little arithmetical skill and the equation $t_d = (v/c^2) (x_{earth})$, it is possible to easily create the following scenario:

Astronaut Mary Brown is preparing tea in a space vehicle a few hundred thousand miles out in space from her home planet, Ru. While she prepares tea on the rear console of the cabin, she works on the computer in the front console, which controls the vehicle and its cameras and telescopes. She silently praises the Supreme Designer, who in Her wisdom has given each Ruvian two heads, four arms and hands, and two sets of retractable legs. One head and set of arms face forward and the other head and set of arms

face to the rear, which makes it easy to multi-task, as she is doing now. This morning she is on a mission to photograph a particular area of space. Her task is part of an ongoing Ruvian quest to discover how and when the universe began, if it had a beginning.

Mary's vehicle is powered by light from not only Ru's home star, but from all the distant stars. The vehicle is thus environmentally friendly and has been named The Green Machine by the Ruvian Space Agency.

Ru is far away, ten billion light years (10^{10} light years) away, from a planet named earth. The Ruvians have no idea earth exists. Nor do earthlings have any idea that Ru exists. As Mary makes tea and manipulates her telescopes, the Green Machine is absolutely stationary with respect to earth.

Mary takes a first sip of the tea. It is hot. At the very moment Mary takes a sip of tea, on the distant planet earth in a city named Chicago it is 5:15 p.m. on Saturday November 6, 2010. In a church named St. Peter's, the pastor, Father Kurt Hartrich, is at the pulpit and about to begin reading the Gospel. In today's Gospel, Jesus is debating with a group of Sadducees. Jesus believes in personal immortality. The Sadducees do not. Jesus believes the forefathers Abraham, Isaac, and Jacob still live. "All live to [God]", he tells the Sadducees, who believe the three Judaic ancestors are dead and gone. Outside the church, downtown Chicago is bustling with shoppers. Even though Thanksgiving has not yet come, Christmas shopping has already begun.

Mary takes a second sip of tea, and decides she will have to change locations to get the photographs she wants. She powers up the Green Machine and sets off at a velocity of 130 miles per hour. She is moving away from earth. She takes another sip. At the moment of this sip, on the earth, on a continent that will some day be named North America, at the southwest corner of a Great Lake, birds sing in the swamps and in woods beyond. There are no humans around. Only a few hunter-gatherers live around the shores of the Great Lake. The hunting is good, for the woods around the lake teem with wildlife. The winters are rough though. In another part of earth, east of a Great Sea which will some day be named the Mediterranean, in a bustling city named Jerusalem, a messianic itinerant teacher is debating with some Sadducees in the temple court. The teacher, Jesus, believes that there is life after what appears to be death. The Sadducees believe that when you're dead, you're dead.

In the Green Machine, Commander Brown takes another sip of tea while increasing her velocity away from earth. She is now traveling at 230 miles per hour away from earth. At the moment of Mary's latest sip, on earth, in a region named Midian, a region which is near the Great Sea not far from the ancient land of Egypt, a man named Moses is out in the countryside tending his father-in-law's flocks. He sees a strange sight: a bush is burning but is not consumed by the flames. He goes to investigate. A voice calls from the bush. Moses looks around. No one is in sight. The voice booms: "I am the God

of your fathers..." Terrified, Moses hides his face.

Faraway, a small band of hunters with spears walks single file through a wood at the south end of the Great Lake. The hunters are descendants of people who came from Asia thousands of years earlier to this continent, which will some day be called North America.

In the Green Machine, Mary takes another drink from her teacup, and increases her velocity. She is now traveling 295 miles per hour away from earth. She takes another drink of tea. At this moment, on the earth in a land east of the Great Sea, in a region roughly between ancient Egypt to the south and west and ancient Mesopotamia to the north and east, a semi-nomadic sheep and cattle man named Abraham is celebrating with his wife Sarah. Though they both are very old, Sarah has just had a baby, her first. They name him Isaac.

On the Green Machine, Mary adjusts her speed slightly. Faraway, on planet earth, at a certain place in the region east of the Great Sea, Isaac - now more than forty years old - is celebrating with his wife Rebekah, who has just given birth to twin boys. They name the boys Esau and Jacob.

On the Green Machine, Mary Brown quickly takes a series of photographs. She finishes her tea, which is beginning to get cold, and then slows the Green machine to a point at which it is stationary relative to the planet earth. Mary fills her small teapot with more water. As she does so, faraway on planet earth, in a big bustling city named Chicago, the 5 p.m. Mass at St. Peter's on Saturday November 6, 2010, has just ended. Father Kurt greets parishioners as they file out. A small number of the congregation remains in the church listening to music director Andrew Paul Fredel at the organ. Often for five minutes or so after the Saturday Mass, he shows what the organ can do. It's always magnificent music. Among those remaining is an old man who is not only listening but also meditating on the gospel, the homily, and the theory of relativity. "How remarkable it is," thinks the man, "that a scientific theory formulated by a brilliant 20th century European Jew who was probably an agnostic can cast so much light on ancient mysteries of the Christian faith."

Back on the Green Machine, Astronaut Brown pours a second cup with her right rear hand while with her front hands she manipulates the controls. She has decided on another location, and sets the vehicle on a course of 130 mph toward earth.

On earth it is November 6, 4010 - if humans still use the same calendar which was used 2,000 years ago....and if there are still humans on earth. It would be fascinating to

look! Better not. Not right now.

Brown, in a little more time than it takes to drink a cup of tea, has lived in the time of the Judaic ancestors Abraham, Isaac, and Jacob. She has been a contemporary of Moses, Jesus the Christ, and Barack Obama, who - as the astronaut pours her second cup - is a figure in ancient history, an American president who lived two thousand years ago. In the universe are practically countless vantage points similar to Brown's. And all of the vantage points are equally valid. None, including yours and mine, are any more valid than any other. Any event in earth's entire history from the planet's beginning to its end is occurring now, has occurred, or is in the future, all at once. Present, past, and future are all the same, rendering the tenses meaningless. As Paul Davies and John Gribbin have written in their book *The Matter Myth*, relativity has "removed from the picture any vestige of a personal "now." or the division of time into past, present, and future. Einstein once expressed this point in a letter to a friend regarding the subject of death. 'To us who are committed physicists,' he wrote, 'the past, present and future are only illusions, however persistent.' " [4]

It seems to me the elderly friar Father Kurt referred to in his homily felt deeply what Einstein expressed in the letter. For him, the future was now.

Looking at things from a relativistic view, each life is lived throughout much or

most of time, all of time, or forever, depending on how the universe evolves and on whether or not the cosmos had a beginning or will end. Relativistic eternal life is different though from the eternal life announced by Jesus, the life Christians hope for. Christians believe each life has a beginning, a short earthly phase, then a heavenly phase extending to infinity. A relativistic eternal life, though it may be lived through all of time, is finite. Each life has a beginning, a middle, and an end. It is short.

Although special relativity unfortunately does not prove the reality of the Christian concept of personal immortality, an understanding of what Einstein's theory says about time can lead to an enhanced understanding of the nature of God, the connection between creator and creation, and the likelihood of the kind of immortality Christians hope for.

The relativistic view - in which past, present and future are one - opens the door to a clearer comprehension of the theological mystery of a timeless tense-less God, I Am Who Am. As well, understanding of the general theory of relativity, which teaches that

time slows near mass, also is surely an aid to an understanding of God's timelessness. To us on earth in the 21st century, the length of time between Jesus' life and our own is about 2,000 years. To an observer near a massive black hole, the time between Jesus and us

might be hours or minutes. That is not quite how God sees it, but it's closer to God's view than our own. To a timeless God there is no time all between us and Jesus. To a timeless changeless God everything happens ***now***. This has long been one of the mysteries of our faith, but is now a little less mysterious, it seems to me, thanks to relativity physics.

God, according to the old classical view, created a universe in which time ticked relentlessly on at a constant rate through all of space and the past was irrevocably gone and the future always not-yet. The revolutionary new post-relativity cosmos, in which past is future is present and time slows and may almost stop in places, seems much more than the old a credible offspring of the Supreme Being who is eternally now, in whose realm the march of time completely vanishes.

In the light of relativity, it seems easier than ever before to affirm with Jesus: "...all live to him." All who are now, have ever been, or will ever be, do live *now* in this moment forever in God.

Footnotes.

1 *Common Bible, Revised Standard Version*, 1973

2 The platform described here is based on a diagram of a train on page 111 of *Physics For Poets*, Robert H. March, McGraw-Hill, New York, 1978.

The platform described here is also based on a description of a rail car on page 55 of *The Fabric of the Cosmos*, Brian R. Greene, Vintage Books, Random House, New York, 2005

[3] The equation is from calculations on page 504 of *The Fabric of the Cosmos*, Brian R. Greene, Vintage Books, Random House, New York, 2005

4 Page 82, *The Matter Myth*, Paul Davies and John Gribbin, Simon & Schuster, New York, 1992.