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GOD'S RELATION TO TIME

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1 INTRODUCTION

Virtually in any philosophical discussion involving the concept of God (particular in the monotheistic traditions of Judaism, Islam and Christianity) the question of God's nature in regards to time inevitably arises. Debates about divine foreknowledge, freewill, the origins of the universe, the problem of evil, how God came to exist (if God does exist), divine intervention—they all at some point ask what is God's relation to time?

The objective of this paper, having already made the assumption that God does exist, is to answer these problems: Does God exist inside time? If so, what do we make of the fact that something more fundamental and absolute than God might exist? If not, how did time start? Did God create it? And what does God's existence look like if it is not within time? These questions all stem from the thought that we usually think of God as being eternal, however, does this eternality mean being eternally *inside* of time (everlasting) or eternally *outside* of time (timelessly eternal)?

In tackling all these questions I take a large, but very important, tangent into the related question of what exactly time is. Obviously, the answer to this question will greatly affect the overall discussion on God's relation to time. Therefore, I devote most of this paper to this discussion. My belief is that time can simply be reduced to change, and that, rather than asking whether God exists in or outside of time, it is better and more accurate to ask whether God exists in or outside of change. This is a fundamental difference that I believe will assist greatly in the search for solutions in the God-related philosophical discussions I raised above and in many more similar discussions. I identify and discuss some of these consequences at the close of this paper.

As a means of simplifying the discussion and to increase its applicability to Western society, I have chosen to focus upon the Christian notion of God. There are obviously many similarities between Jewish and Islamic notions, especially when referring to the idea that God is unchanging. Now this idea certainly raises eyebrows if we have already concluded that time is simply change. For if, both these points are correct, then God (as unchanging) could be said to exist outside of 'time'. So my argument is that, if the Christian God exists, he at least at some point exists in a state of affairs where nothing is changing, and therefore, where 'time' does not exist.

2 GOD'S ETERNALITY

To lay the platform for the following discussion I will explore the Christian view of God's eternity, particularly as it relates to time, as defined from Biblical scripture and from Christian tradition. Although, this might seem to some as an early restraint put upon my philosophical work, I am sure the reader will understand that in order to make any progress downstream it is necessary to make a few assumptions upstream. I also believe that the assumptions that I do make, of the existence of God as determined by Christianity, should not adversely affect my conclusions too much as to make them irrelevant to equivalent discussions in other monotheistic religions.

Following the review of scripture and Christian tradition I will explore some of the various stances taken by philosophers throughout history in relation to God's existence in or outside of time. I argue for a mixed approach to the temporal definition of God's eternity—that is that he both exists and does not exist inside of 'time', which I define as change. However, the true realisation of how I reach this conclusion really only comes in the following section as I explore the nature of time itself.

2.1 SUGGESTIONS FROM SCRIPTURE

The Bible is a collection of smaller books that were written and compiled during a period of well over one thousand years. On top of this, none of these pieces of writing were written with the intent of being used in rigorous philosophical discussion (or at least as we know it today). For example James Barr (1962, in Helm, 1988, p.5-6) points out that there is a "very serious shortage within the Bible of the kind of *actual statement* about 'time' or 'eternity' which could form a sufficient basis for a Christian philosophical-theological view of time." As a result, it is necessary to take much of what we extract from the Biblical texts with a grain of salt, realising that transferring Biblical descriptions of God directly into philosophical discussions may not always be entirely accurate. However, in saying this, when it comes to talking about God as "everlasting" and "eternal" the Bible provides no short supply of references. And, as we shall discover, these references do succeed in presenting a very consistent, if philosophically open, theme that can help direct our discussion going forward.

In Psalm 90:2 God is described as being “... from everlasting to everlasting ...” The Hebrew words used here for ‘everlasting’ are versions of עוֹלָם (olam) which translates as long duration both in the past and into the future (The Lockman Foundation, 1998). This word is used more than 200 times in the Old Testament to refer to “forever”, more than 100 times in relation to “everlasting” and 30 times to “perpetual”. Many of these occurrences of the word are used in order to describe God’s nature; here are just a few more examples:

“... the steadfast love of the Lord is from everlasting to everlasting ...”

(Psalm 103:17)

“Stand up and bless the Lord your God from everlasting to everlasting.”

(Nehemiah 9:5)

“Blessed be the Lord, the God of Israel, from everlasting to everlasting.”

(Psalm 41:13)

“Blessed be the Lord, the God of Israel, from everlasting to everlasting.”

(Psalm 106:48)

“Trust in the Lord for ever, for in the Lord God you have an everlasting rock.”

(Isaiah 26:4)

As you can see, the concept of God as everlasting is engrained in Old Testament writing. From a very brief assessment we can know from these examples that the ‘everlasting’ the Biblical writers are referring to is meant in a temporal sense—in that it is not just an everlasting that might be associated with power, for example, an everlasting sunscreen might be one that can withstand getting wet and sweating without needing to be reapplied. On top of being temporal, God’s everlastingness operates in both directions: it is historically everlasting and futuristically everlasting. Isaiah 44:6 further emphasises this point: “I [God] am the first and I am the last”.

This theme of being everlasting in the past as well as into the future can be further elaborated with scriptural references that emphasise that this everlastingness also includes now. For example, “Holy, holy, holy, the Lord God the Almighty, who was and *is* and is to come” (Revelation 4:8, emphasis added). Again in Revelation: “‘I am the Alpha and the Omega’, says the Lord God, who *is* and who was and who is to come, the Almighty” (1:8, emphasis added). Similarly, in Isaiah 57:15 we read, “For thus says the high and lofty one who inhabits eternity, whose name is Holy”. In the original Hebrew “inhabits” is שָׁכַן (shakan or shaken) which means to abide or dwell and “eternity” is עוֹלָם

(ad) which means perpetuity (The Lockman Foundation, 1988), so we can understand Isaiah to be saying that God abides in a perpetual everlastingness, hence, “was, is and is to come”.

So, according to the scriptures, God exists at all times before, all times in the future and right now. We also find that God is supposed to have been in existence before the universe began:

“Ages ago I was set up, at the first, before the beginning of the earth.” (Proverbs 8:23) [*Here “ages” comes from the same Hebrew word “olam” that is translated above to mean “everlasting”.*]

“Have you not known? Have you not heard? The Lord is the everlasting God, the Creator of the ends of the earth.” (Isaiah 40:28)

And also that he created all things:

“In the beginning when God created the heavens and the earth ...” (Genesis 1:1)

“For from him and through him and to him are all things.” (Romans 11:36)

Not only was God in existence before the world began (and also created the world), but he was also in existence before “the ages” (which could be perhaps taken as “time”) began:

“This grace was given to us in Christ Jesus before the ages began ...” (2 Timothy 1:9)

“... the hope of eternal life that God, who never lies, promised before the ages began” (Titus 1:2)

“But we speak God’s wisdom, secret and hidden, which God decreed before the ages for our glory.” (1 Corinthians 2:7)

The two instances of “began” are the Greek word *xrónos* meaning a sequence, of which we might usually refer to as time (Helps Ministries, 2011). Then in the one instance of “before” the Greek word *πρό* is used which means “in front of, prior (figuratively, superior) to, above” (The Lockman Foundation, 1998). It is interesting to note that both of these uses of “began” and “before”, while obviously referring to time in some way, leave our definition of time wide-open (as we shall discover later, this is important when it comes to deciding between absolute and relativist theories of time). This is also significant because if 1 Corinthians 2:7 was to simply say “... before time began ...” it would not make much sense, because nothing can be “before” the beginning of time. However, the use of “before” here also has the spatial connotations of “in front of” and “above” that could suggest God acting somehow outside the dimension of time.

The use of the word “ages” in the three scriptures above is the Greek αἰών (*aiōn*) which means an era or time-span that is characterised by a specific quality or type of existence (Helps Ministries, 2011). So it is clear that the Biblical writers were portraying this idea that God existed before (possibly meaning “in front of”) the type of existence we now know. Though not spelling it out (for once again, these are not philosophical pieces of text) this seems to suggest that God ‘did’ (for want of a word that does not carry such temporal connotations) exist outside of what we now refer to as time, or at the very least, the existence of God prior to the world’s existence was characteristically different from our own existence. This idea of two very different types of existence is further confirmed in 1 Corinthians 15:40: “There are both heavenly bodies and earthly bodies, but the glory of the heavenly is one thing, and that of the earthly is another.”

Another, and potentially contrasting, facet of the biblical descriptions of God’s nature is that he is supposed to be very much “living”. In Jeremiah 10:10 the “living God” is compared to the lifeless idols made by men, “But the Lord is the true God; he is the living God and the everlasting King.” So although we might need to account for God’s existence being quite different from our own, we must still reconcile that he is very much alive. On top of this, the Bible frequently refers to God as possessing eternal life (for example, “He is the true God and eternal life” 1 John 5:20), so much so that when we think of God being living, we should assume the life he experiences is eternal in some way—for example, that it not only extends into the past and the future infinitely but it also is maximised at all moments. To understand this, if we consider objects in various levels of aliveness we would take a rock to have the least life, a plant to have more life, a human to have even more still and, therefore, God would be somewhere far beyond the aliveness even of humans. On this point it should also be noted that the Bible very much holds God’s aliveness to include interactions with our world, thus, within what we call time. So, whatever this aliveness may exactly look like, I cannot say at this point, but perhaps a deeper exploration into the nature of time (being such an integral part of *our lives*) may reveal something.

Finally, in Job 36:26 scripture talks about God being beyond the grasps of human wisdom: “Surely God is great, and we do not know him; the number of his years is unsearchable.” The nature of God being unsearchable and mysterious is a recurring theme throughout the Bible, but here it is interesting that it specifically refers to the measure of God’s age in years not merely being many or uncountable, but being utterly unsearchable. This suggests

that the concept of years very much does not apply to God, and if so, time as we know it may not apply to God.

In the above discussion I have provided a snapshot of what the Bible has to say on the topic of God's nature in regards to time. As a summary of what has been raised, we can understand the Bible to be saying that God:

- Is, temporally speaking and from our point of view, eternal both into the past *and* the future;
- Also exists now;
- Existed before (not necessarily in a temporal meaning of “before”) the world began in a characteristically different type of existence from the present;
- Acted before (again, not necessarily in a temporal meaning of “before”) this present existence, or age, began;
- These actions, even if it included nothing else, involved the creating of “the heavens and the earth”;
- Despite existing in another age (potentially “before” time), God is no less alive than we are, in fact he is infinitely alive (including having ongoing interactions with our world), and;
- Our usual measures of time (years and so on) are useless in calculating and searching God's eternity—again suggesting God has a different type of existence.

This definition obviously leaves many questions unanswered, particularly of how something could exist outside of our present existence while also being *in* it (“who *is*”) and also being infinitely alive—what exactly does this look like? Despite the lack of philosophical clarity that the scriptures give us we can use these points as guidelines going forward and perhaps the further deliberations of Christian tradition and interpretation of scripture may help to clarify matters even further.

2.2 SUGGESTIONS FROM CHRISTIAN TRADITION

As a means of exploring Christian tradition in regards to God's relation to time, I am here only going to focus upon The Westminster Confession of Faith (1646). To enable for other key periods of Christian history, especially pre-reformation, to be sufficiently well represented, I will shortly consider the philosophical work of Augustine, Aquinas and Boethius. For now, here are three sections of The Westminster Confession (emphasis added) that are particular poignant in our present discussion:

Chapter Two - Of God, and of the Holy Trinity

I. There is but one only, living, and true God, who is **infinite in being** and perfection, ... immutable, immense, **eternal**, incomprehensible, ... most absolute; working all things according to the counsel of His own immutable and most righteous will ...

II. God has **all life**, ... in and of Himself; and is alone in and unto Himself all-sufficient, not standing in need of any creatures which He has made, nor deriving any glory from them, but only manifesting His own glory in, by, unto, and upon them. He is the alone fountain of all being, of whom, through whom, and to whom are all things; and has most sovereign dominion over them, to do by them, for them, or upon them whatsoever Himself pleases ...

III. In the unity of the Godhead there be three Persons of one substance, power, and **eternity**: God the Father, God the Son, and God the Holy Ghost. The Father is of none, neither begotten nor proceeding; the Son is **eternally** begotten of the Father; the Holy Ghost **eternally** proceeding from the Father and the Son.

Chapter Four - Of Creation

I. It pleased God the Father, Son, and Holy Ghost ... in the **beginning, to create, or make of nothing**, the world, and all things therein whether visible or **invisible**

Chapter Five - Of Providence

I. God the great Creator of **all things** ...

II. ... God, the **first Cause** ...

It is interesting to note that later amendments to this confession have largely left these areas that describe God's nature untouched. This tends to suggest that they have been proven to be quite consistent with scripture. And it is clear to see within these points many of the same themes identified in my above survey of scripture, for example, that God is eternal, created the world, is fully alive, and was in existence before the world began. Indeed the Westminster Confession cites many of the same scriptures that I discussed above, for example, in paragraph I, "eternal" is referring to Psalm 90:2 ("... from everlasting to everlasting you are God")

As such the *Confession* adds little to what we have already discussed except to reaffirm and to raise just two other interesting points. Firstly, that God is immutable (unchanging)

which is a reference to both James 1:17 (“...the Father of lights, with whom there is no variation or shadow due to change”) and Malachi 3:6 (“For I the Lord do not change”). God’s immutability is an important point that we will come back to eventually. Secondly, the *Confession* adds further detail to the idea of God creating this world, that in doing so he is the “first Cause”.

2.3 PHILOSOPHICAL STANCES

In the philosophical world the question about God’s relation to time has enjoyed close ties to the related question of what exactly eternity is, and hence what it means to have an eternal being (like God). The two dominant schools of thought on this question have swayed either towards timeless eternity or toward everlastingness within time.

The first philosopher of note, Plato, actually comes from outside the Judeo-Christian sphere. He contrasted the timeless existence of his Forms with the temporally-bound created world. His thought was that time was created along with the world; so therefore, the Forms were eternally outside of time in some sort of timeless duration (Helm, 2010). Boethius (a Christian philosopher, 480-525AD) picked up on this theme when he said:

“God is eternal; in this judgment all rational beings agree. Let us, then, consider what eternity is. ... Now, eternity is the possession of endless life whole and perfect at a single moment. What this is becomes more clear and manifest from a comparison with things temporal. For whatever lives in time is a present proceeding from the past to the future, and there is nothing set in time which can embrace the whole space of its life together. ... For it is one thing for existence to be endlessly prolonged, which was what Plato ascribed to the world, another for the whole of an endless life to be embraced in the present, which is manifestly a property peculiar to the Divine mind.” (Boethius, 2004, V, vi)

So, for Boethius, although the world might yet be eternal in a time-bound everlasting sense, God’s eternity far surpasses this because he has access to all temporal parts of existence in one eternal present. Such an existence, says Boethius, is only possible for God.

One hundred years earlier, Augustine (354-430AD) also picked up on this idea of God existing in an eternal now:

“... in the Eternal nothing passeth, but the whole is present ... Who shall hold the heart of man, that it may stand still, and see how eternity ever still-standing, neither past nor to come, uttereth the times past and to come? Can my hand do this, or the hand of my mouth by speech bring about a thing so great?” (Augustine, 2002, XI)

Even though, for Augustine, eternity is this “ever still-standing” eternally present now, he does emphasise that this existence is no less than our own. For the argument could go that in such a state God would be unable to do anything and would be just stuck in a horrible reoccurring cycle of monotonous nows. For example, would not you want God, in His eternity, to be capable of thinking and creating and performing other God-like actions? Augustine tackles this objection by pointing out that life outside of time is vastly different from what we know it to be and that this issue is even more compounded by the fact that we do not actually know what time is:

“At no time then hadst Thou not made any thing, because time itself Thou madest. And no times are coeternal with Thee, because Thou abidest; but if they abode, they should not be times. For what is time? Who can readily and briefly explain this? Who can even in thought comprehend it, so as to utter a word about it?”
(Augustine, 2002, XI)

Here, for the first time, we encounter the question of what exactly time is. This is obviously a pivotal point upon which our question of God’s relation to time rests and one that I will return to very shortly.

Augustine and Boethius’ “eternal now” view is further supported by Aquinas, who said, “... nevertheless God knows contingent things not successively, as they are in their own being, as we do but simultaneously. The reason is because His knowledge is measured by eternity, as is also His being; and eternity being simultaneously whole comprises all time” (2006, I, 14, 13)

So we have in Boethius and Augustine (and to a certain extent also in Plato and Aquinas) a strong correlation to many of the points we raised when searching scripture: firstly, God created everything, of which Boethius and Augustine also include time; secondly, that his existence is very different from our own; thirdly, this existence is still very much alive and even infinitely so; and finally, that our measures of time will not help in calculating God’s age and existence. In the views of Boethius and Augustine I can see very little to disagree with the model that I inferred from scripture above.

Contemporary philosophers who pick up this same line of thought from Boethius and Augustine include Stump & Kretzmann (1981) who define Boethius' position on eternity as being "... the complete possession all at once of illimitable life" (p. 431). Any being who possesses this sort of eternity simply "cannot be temporal" (p. 433) for there is just too much life to be contained in one moment at a time. Nevertheless, they resist the idea of a static eternal "now" (as, for example, the existence typical of numbers) by maintaining that God's life involves its own special type of duration. Fitzgerald (1985) raises the objection that such duration is very difficult to understand and that talking about timeless eternity seems to always reduce into talk about mere duration-less points. However, while agreeing with Fitzgerald that eternal duration is very difficult to understand, I believe this difficulty stems from a lack of understanding about time itself and therefore of duration.

Leaving this point of understanding time aside, it is also interesting that Stump & Kretzmann seek to account for God's ability to interact with a temporal world through their model of ET-simultaneity. This allows an observer in timeless eternity to witness an event in the temporal world in much the same way as Einstein might explain his relative simultaneity between observers. For Stump & Kretzmann this is supposed to avoid reducing timeless eternity to temporality and vice versa. However, Ganssle (2007) points out that this comparison between relativity theory could potentially be a weakness. "To put an analogy at the core of a technical definition is pedagogically suspect, at the least. It may be that it masks a deeper philosophical problem," says Ganssle (2007). I believe that again any weakness in such an analogy can only be discovered once we come to terms with what exactly we are talking about when we consider time.

A slightly different approach to timeless eternity is taken by Leftow (1991) who argues that, although God does experience distinct moments that succeed one another, these moments are not temporal. He calls this Quasi-temporal Eternality (QTE) and explains that moments can be spatially related to one another (in a metaphysical way) rather than simply temporally related. Therefore, God is able to experience all moments at once. He also argues that a "when" is not necessarily a time, but can also be a place—in God's case this place (or "when") is called "eternity". In response, certainly the modern idea of space-time would support the merger spatial ideas with temporal ones, but it does seem difficult to extend this to the metaphysical spatial realms of eternity. And once again I draw the reader's attention to the need to clarify what exactly we mean by "time" in order to explain how a "when" could possibly be non-temporal.

I now turn to those philosophers who hold that God exists *inside* time. Ganssle (2007) points out that this often stems from an alternative, and purely temporal, interpretation of Psalm 90:2 (“from everlasting to everlasting”). Ganssle goes on to describe two key arguments used to support this position. The first appeals to God’s actions of not only creating the world but also sustaining it in time. If God is sustaining the world then he performs actions in time, if he is performing such actions then he is changing, and if changing then he is temporal. This obviously goes against the idea that God is in all things immutable, however, it does cure the problems associated with timeless eternity of God interacting with a temporal world.

This argument depends upon one showing that indeed the world does need sustaining moment by moment, and given that time is still yet to be defined this could be an audacious task. Further still and putting aside God’s sustaining of the world, Ganssle (2007, 6, a) points out that other actions of God that are felt in time may not necessarily have occurred within time:

“Perhaps the effects of God’s actions are located successively in time but his acting is not. In one eternal act he wills the speaking to Moses at one time and the parting of the sea at another. So Moses hears God speaking from the bush at one time and much later Moses sees God part the sea. But in God’s life and consciousness, these actions are not sequential. He wills timelessly both the speaking and the parting. The sequence of the effects of God’s timeless will does not imply that God’s acts themselves are temporal.”

The second common argument that Ganssle presents for God’s temporality comes from the desire to maintain that God is omniscient (all-knowing). The thought goes that if God were to know everything he must know certain things pertaining to being in the ever-moving ‘now’. For example, what day it is *today* and so on. However, if God is outside of time, and therefore does not experience this ever-moving now, then there will be something that he does not know. This problem is closely linked to the two different notions of time raised by McTaggart (1908) in his paper “The Unreality of Time”. His two notions are that time is either tensed (A-series), in that it is correct to say an event is “past” or “present” or “future”, or it is non-tensed (B-series), whereupon it becomes correct to say an event is “before” or “simultaneous” or “after”. The argument for God being in time from His omniscience relies on the A-series being the correct one and conversely, if you were to object to this argument it would seem you would need to appeal to McTaggart’s B-series.

However, rather than launch into the ongoing debate about which series is the correct one I should point out that McTaggart himself denied both series:

“Our conclusion, then, is that neither time as a whole, nor the A series and B series, really exist. ... The A series was rejected for its inconsistency. And its rejection involved the rejection of the B series.” (1908, p. 473)

My own belief is that the problem in deciding between the two series, in order to define time, stems from an even more fundamental question: whether time can be simply reduced to change.

As we have seen, many of the philosophical view points on God’s relation to time hit this hurdle of “well, it depends what you mean by time”. As a result, having briefly covered the key philosophical view points, I will divert this discussion into the search for a definition of time and, once an adequate definition is acquired, return to the philosophical and theological implications of that definition.

3 THE NATURE OF TIME

3.1 INTRODUCTION TO TIME

The question of God's relation to time ultimately hinges on the following more fundamental question: what exactly is time? From a pre-philosophic perspective this more fundamental question could seem like an unnecessary diversion away from my core inquiry into the nature of divine existence. However, as will be shown, our (as some people might call them) instinctive beliefs about time—that it exists, that it provides an absolute measure for events and that it does not rely upon those events—can be brought into question. Further, if we are to discover that time is actually something other than what we typically think it is then the question of whether God exists within or without time will need to be approached from a very different angle.

So the purpose of this section is to discover the true nature of this concept called 'time'. In this discussion I will introduce and analyse two dominant and opposing schools of thought. The first is absolutism (or, as it is sometimes called, Platonism with respect to time or substantialism). This roughly follows those pre-philosophic intuitions I have just now eluded to, namely that time is indeed something (it exists and is not just a construct of our own minds), that it is absolute (being independent of the events that occur within it) and that it therefore provides an absolute measuring device whereby we can make sense of events as they happen across a temporal continuum. Such a belief about time seems logical from the outset given the importance we place on time in almost all aspects of life from scientific investigation through to the structuring of daily routines.

The opposing position to absolutism is relativism (or reductionism) which asks the following: if there was no change—no ticking clocks, no spinning electrons, no rotating planets and no beating hearts—what then would be left of time? Is time nothing more than the regularities of change that such physical processes provide us with in order to measure the *relative* rate of change of other events? Essentially, relativism declares that when we measure the time of a certain event, there is nothing absolute from which the measurement might be compared—there are only other events that seem to display a regularity of their own when compared to yet other events and so on (for example, the

regularity of a clock is confirmed by its *relative* regularity to the rotation of the earth). Accepting this model of relativity means that our discussions about time become *reduced* to discussions about events of change (just like an hour of time corresponds to the change of a 1/24 rotation of the earth and one year of time to the change of the earth moving one full circumference around the sun).

After an initial discussion and background of these two theories I will provide a substantial analysis for both views and ultimately argue for a relativist position. In doing so, I do not totally rule out the conceptual possibility of absolute time, but I argue that it is inconceivable that people should have reason enough to believe in absolute time because ultimately even the best arguments for absolutism are tarnished by circularity, infinite regress and other weaknesses. On top of this, relativism has the following advantages:

- it has intuitive pre-philosophic advantages that out-weigh those of absolutism;
- science suggests it;
- even if all else was equal, it has far greater pragmatic and explanatory value to the philosopher.

Before delving into further detail about these arguments for relativism it is necessary to provide the background to this ancient discussion about time, beginning with the absolutist position.

3.2 THE HISTORY OF TIME

3.2.1 ABSOLUTISM

The absolutist notion of time—being a thing in and of itself, independent of events and a measurement of change—has a certain intuitive appeal that caught the eye of Isaac Barrow, a seventeenth century mathematician and physicist and one of the main proponents of absolutism.

“But does time not imply motion? Not at all, I reply, as far as its absolute, intrinsic nature is concerned; no more than rest; the quantity of time depends on neither essentially; whether things run or stand still, whether we sleep or wake, time flows in its equal tenor.” (*Lectiones geometricae*, lec. I, quoted in Burtt, 2003, p. 156).

One of Barrow's students, Isaac Newton, picked up the absolutist banner and declared, "All motions may be accelerated or retarded, but the flowing of absolute time is not liable to any change" (*Principia*, 1660, p. 8). Newton viewed time like an infinitely large container, existing independently of events, of which events are poured into: "All things are placed in time as to order of succession; and in space as to order situation" (1660, p. 8). So just like space is absolute to Newton, and provides a reference for the measure of non-absolute objects, so time is the absolute fixed point which enables events to be temporally measured and given a reference point.

Newton's own attraction to absolute time partially stems from his belief in absolute motion. To prove absolute motion, as opposed to relative motion, he gives the example of two globes opposite each other and tied together by a cord. They are spinning along the same circular path in a vacuum. Though the two globes remain still, relative to each other, we can know that they move by the tension on the cord that results from a centripetal force pulling the globes apart as they spin. So, according to Newton, from this we know there is such a thing as absolute motion, as the tension on the rope provides empirical access to non-relative motion. Having discovered absolute motion, argues Newton, we then also need to concede absolute space *and* absolute time (time and space being the two vital ingredients to motion). However, there are three points I would like to make about this claim from Newton.

Firstly, it turns out that despite Newton's desire to assert the existence of absolute space (which he connected to the existence of an absolute God), his own laws have the very much contrary consequence of declaring that absolute space *does not* exist. Hawking (1996) points out that Newton's laws denied the possibility of absolute rest, which also denies the possibility of an absolute point in space. So his spinning globe test here goes quite against his other key hypotheses.

Secondly, and very importantly, the motion that Newton presents with his spinning globes, is not one of velocity but of acceleration. For the concept of acceleration includes not only changes in velocity but also changes in direction. A globe spinning along the circumference of a circle is obviously accelerating in its motion, so it is not the motion of the globes that the string is detecting but their acceleration. So there is no absolute motion detected.

Finally, even with absolute motion denied, the reductionist can level another complaint against Newton's attempt to demonstrate absolute time through the spinning globes experiment. The main contention between the two schools of thought about time is that it cannot be separated from change (of which motion is a type). So what the reductionist is waiting for is a demonstration of changeless time and the example Newton gives clearly does not meet this criterion, as it involves the *change* in tension of the cord between the two globes. So, we can safely conclude that Newton's spinning globe thought experiment adds nothing to our discussion about the potential existence of both absolute space and absolute time.

Another common way that philosophers in Newton's era (including Newton) appealed to an absolute notion of time was via theology. This theological appeal, very simply, is the idea that necessarily God could have created the world at a different time if He so desired. For example, Gassendi (translated in Capek, 1987, p. 600) writes, "We comprehend that even before there were any things time flowed; and from this we acknowledge that they could have been created by God earlier than they were created—that is, either a short time or a long time or even an eternal time earlier." In such a case one might understand the absoluteness of time to be a reference to, or consequence of, the absolute character of God and his omnipotence (if he can make the world at one time then surely he can make it at another).

This poses an interesting hurdle for our present discussion for we began it by assuming that God does indeed exist. So, because of the assumptions we have already made, it seems an appeal to theology could carry some weight. For if we were entering the debate about time in pure isolation we could just leave this appeal to theology to one side, as a proof of God's existence would be beyond the scope of most direct investigations into the nature of time. Having said this, however, we can easily side step this theological appeal by acknowledging that our present discussion into the nature of time is in fact distinct from and prior to our assumption that God exists. And, although I do not rule out the possibility that we might discover the true nature of time within the characteristics of God (once those characteristics and his very existence are proven), we have at our finger tips several far more direct and accessible arguments on both sides of the time debate. These arguments are the focus of this discussion.

So what then is left of Newton and Barrow's appeal to absolutism after we have dealt with both Newton's appeal to absolute motion and any appeal to theology? Well, the common

thread running through both Newton and Barrow is the fact that although events can be slower or faster or even that objects often remain unchanged over time, time itself keeps moving “in its equal tenor” (Barrow, *Lectiones geometricae*, lec. I, quoted in Burtt, 2003, p. 156). Aristotle, almost two millennia earlier, came to a very similar conclusion:

“... time is present in the same way everywhere and to all things. And further, change is faster or slower, but time is not.” (Aristotle, *Physics*, translated in Sachs, 2004, p. 120)

Essentially, the thought goes that there must be something absolute that enables us to notice that events happen either slowly or fast. If there were not, all changes and movements would only be noticed at the same speed. Again Aristotle says, “... the slow and the fast are defined by means of time, the fast as what is moved much in a little time, the slow as what is moved little in much time” (in Sachs, 2004, p. 120).

The major flaw in this absolutist position, however, is that whenever Aristotle, Barrow or Newton are noticing either fast or slow change (or no change at all) there is always, for them, some sort of other change occurring from which they can use as a reference (either consciously or subconsciously) to measure the rate of change. For example, in watching a leaf fall slowly from a tree, Newton’s heart continues to beat, his pocket watch to tick and the earth to revolve. These all help to provide him with a reference from which to decide whether the leaf falls quickly or slowly. In light of this, the real question that needs to be asked of the absolutist is the following: If you were to remove all other potential references for change (other regular changes) could time still be detected? And this is precisely the challenge of the relativist against absolutism.

3.2.2 Relativism

Although Aristotle, in saying “that ... time is not motion is clear”, kept to the idea of absolute time, he was also the first to confess along relativistic lines that “it makes no difference to us in the present inquiry to speak of motion or of change” (Aristotle, *Physics*, translated in Sachs, 2004, p. 120). For Aristotle, time and change (or motion or movement, as he sometimes called it) were different entities yet one could not exist without the other.

“... time [does not] exist without change; for when the state of our own minds does not change at all, or we have not noticed its changing, we do not realize that time has elapsed, any more than those who are fabled to sleep among the heroes in Sardinia do when they are awakened; for they connect the earlier ‘now’ with the

later and make them one, cutting out the interval because of their failure to notice it.” (Aristotle, 1930, p. 11)

In this example, Aristotle was the first to point out that even if time is absolute, where there is no noticeable change there will be no noticeable time—time aside from change cannot be detected.

Gottfried Leibniz is one of the most prominent relativists in history and had an ongoing debate on time (as well as many other related topics) with one of Newton’s absolutist advocates, Samuel Clarke. In this correspondence, Leibniz, like Aristotle before him, believed that our experience of time was limited to our experience of change: “...if there were a vacuum in time, i.e. a duration without changes, it would be impossible to determine its length” (Leibniz in *New essays concerning human understanding*, quoted in Newton-Smith, 1980, p. 17). However, to classify himself a true relativist, Leibniz went further exclaiming in the Leibniz-Clarke correspondence, “I hold space to be something merely relative, as time is, ... [and] an order of coexistences, as time is an order of successions” (quoted in Mates, 1986, p. 228) and again, “... instants, consider’d without the things, are nothing at all ... they consist only in the successive order of things” (quoted in Alexander, 1956, p. 27).

Having thus reduced time to change, we also find that Leibniz provides a helpful positive construction of time (if still only reduced to a mental entity). As opposed to Newton’s infinite container analogy, McDonough (2007) describes Leibniz as adopting the analogy of a family tree, which, Leibniz says, resembles time in that it is non-real and simply an abstract system of relations. In the case of a family tree, relations are those between brothers and sisters, parents and children, and so on. And in the case of time, the system of relations is between events, and, to use Leibniz’s language, their succession. McDonough also points out that as a metaphysical idealist, Leibniz posits time (and space) as being two steps removed from his ontological list of things. In this ontology we find only what he called monads (mind-like things with appetites and perception). One step removed from monads are the physical objects we usually assume to make up our world: cats, automobiles, clocks and so on. And still a further step removed from physical objects is the relations we observe between objects—time and space. For example, the temporal relations of succession between different positions of a clock’s hour hand or the spatial relations of an automobile to a cat.

Now that we have grasped Leibniz's reductionist position we need to understand how he defends it. His approach can be summed up in three distinct ways (McDonough, 2007). The first is a counter argument to Newton's appeal to theology, in essence saying that it would be contradictory to God's nature to have created absolute time and space.¹ Leibniz's second approach similarly involves God but this time also carries some non-theological weight. He argues that for time to be absolute requires that creation could have been made at any particular time along the pre-existing absolute time-scale, but surely, says Leibniz, God would need a sufficient reason for preferring to create it at one time over another. Obviously the theological component of this argument is a stumbling block for today's reader but it can be posited in a secular way. Forbes reworks the argument to ask from a scientific perspective what sufficient reasons there would be for the world we live in to occur when it did as opposed to another time: "... if an event occurs now, it must be explicable why *now*" (1993, p. 81). Using this premise the revised argument still works. For example, in the creation of the world if we were to look to the first movement (whether this was caused by God or a big bang-type phenomena or something else) and ask why this happened when it did, we would be left with very little explanatory force (for indeed science would have a very hard time explaining why something came from nothing exactly *when* it did). And this simple lack of explanation stems from Leibniz's third argument that two worlds that differ only in the time in which they occupy (a temporal shift) would be indiscernible from each other.

This third argument requires that we accept the Principle of the Identity of Indiscernibles (PII), which is, in Leibniz's own words, "to suppose two things indiscernible, is to suppose the same thing under two names" (in McDonough, 2007). The argument also requires that we agree with Leibniz that two temporally shifted worlds (that are otherwise identical) are indiscernible. It is here—with these two question marks over Leibniz's third argument—that we discover again (after Aristotle had earlier alluded to it and we encountered it when discussing Newton's idea of absolute motion) the crux of the tension between reductionism and absolutism: can we detect any difference between two temporally shifted, but otherwise identical, worlds? Or, in other words, can time without change be detected?

This is an epistemological question, but the other question raised by Leibniz's third argument and his PII rule is a metaphysical one: namely, that if empty time cannot be

¹ As explained earlier, we will leave to rest any arguments from theology, because they demand a further enquiry into the existence and nature of God, thus, going well beyond the scope of the present discussion.

detected or temporally shifted worlds distinguished, must we therefore accept that absolute time does not exist? Does a thing's inability to be detected, or discerned from another thing, mean that it does not exist?

However, before we dive in and tackle these two critical questions, there still remains much ground for the relativist to argue his or her case. We have heard why absolutism has somewhat of an intuitive pre-philosophic appeal, but, as I will argue, the same can be said (and in fact more so) for relativism. On top of this intuitive appeal there is also much support for relativism from both science and a pragmatic philosophical point of view. So I ask the reader to tuck the above two questions of metaphysics and epistemology away in his or her mind while I lay out some more detail about the relativist/absolutist debate.

3.3 RELATIVISM: THE INTUITIVE APPEAL

I noted earlier that absolutism has the following type of intuitive appeal: it doesn't seem too far fetched to assume (in a pre-philosophical sense) that time exists and is something absolute and independent from the events that occur within it. However, it is also possible to posit relativism as being similarly intuitive, and perhaps even more so. I consider relativism's intuitive appeal to fall into three categories: (A) our coinciding intuitive preference for simplicity; (B) the language we use about time; and (C) our very much relative sense of time.

3.3.1 Our Intuitive Belief in Simplicity

“We are to admit no more causes of natural things than such as are both true and sufficient to explain their appearances ... To this purpose the philosophers say that Nature does nothing in vain, and more is in vain when less will serve; for Nature is pleased with simplicity, and affects not the pomp of superfluous causes.” (Newton, 1934, p. 398)

I'm sure the reader will note the irony of Sir Isaac Newton's declaration in the above quote, especially as he titled it his “first rule of reasoning within philosophy” and that it is to be found in the same piece of writing (his *Principia*) as his three-fold assertion that space, motion and time are all absolute. This all means that he somewhat transgressed his own rule of simplicity (or reduction) by adding absolute time to his ontology (his list of

things that exist). Whether he did this by mistake or had a valid reason for relaxing the rule on this occasion is irrelevant to our present discussion. However, what is important is the fact that he had this intuitive idea that the world we live in is primarily simple. This simplicity can be defined as follows: other things being equal, where one thing or hypothesis has the same explanatory power as two things or two hypotheses, we can assume the former (the simpler) situation to be the correct one. This definition of course follows very closely with the rule often employed (and less often justified) by philosophers called Ockham's Razor², which states, "Entities are not to be multiplied beyond necessity" (Baker, 2010, 2).

It is also interesting to note that Sydney Shoemaker, one of the 20th century's foremost proponents for absolute time, holds a similar view in favouring the simpler hypothesis:

"Now it seems to be generally agreed that if two hypotheses are compatible with the same observed data, we should prefer the simpler of the hypotheses in the absence of a good reason for preferring the other." (1969, p. 373)

I will go into more detail about how he employs this principle of simplicity later, but what is important again is the intuitive manner in which Shoemaker, like Newton, accepts it. In fact he provides us with absolutely no reason why we should accept the principle apart from that sweeping statement "it seems to be generally agreed".

Additionally, in our everyday lives we see this same principle dominating our commonplace reasoning. For example, when we enquire into why the washing on the clothesline is still wet after a day in the warm sun, we can safely conclude that it is because of the sudden burst of rain we could hear on the roof just moments earlier. This simple explanation suffices and we don't generally need to go looking for any other complicating explanations—like the neighbour spraying his hose over the fence or a day-long break in the laws of evaporation—to make sense of the situation. Opting for the simpler hypothesis, in daily situations like this, is something we do very frequently and naturally.

Although the everyday application of the simplicity principle may not always be scientifically concrete (and is certainly not deductively concrete, without a defence of the simplicity principle itself), what is important is that pre-philosophically we typically have an intuitive tendency toward simplifying, and assuming simplicity, in our world. However,

² Although this rule takes its name from William of Ockham (1288 – 1348AD) and although he did employ comparable techniques, he did not specifically advocate the use of the Razor as we now know it today.

does this everyday intuition toward simplicity apply when people think about time? On the whole, I believe, yes.

Think about a farmer who rises at dawn to milk his herd of cows. Is his concept of time a simplified relative one involving just the motion of the earth's rotation (which causes the "sun to rise") or is it a more complicated one involving both the rising of the sun and also some sort of gauge on absolute time? Of course, it is only the simpler concept of time (the rising of the sun) that the farmer is concerned about—the addition of the complicating hypothesis of absolute time is unnecessary to the farmer's everyday, pre-philosophical thinking. What about the employee who wants to make sure she is not late to work? Arriving on time for her is only a concern relative to her workplace clock having moved through a certain number of ticks, clicks or spins. And beyond this, her only other concern is that the workplace clock is relatively in-sync with her boss's watch. Even if her workplace clock and her boss's watch were out of sync with some perfectly accurate clock that measured absolute time (if one should exist) this would not be much of a problem for the employee: her primary concerns are of the relativity (to each other) of several time-keeping devices and she does not need to take heed of any absolute notion of time. So, it is clear that simplified time, as found in the relative notion of time, sits well with our intuitive, everyday beliefs.

3.3.2 Our Language about Time

Another example of the way we possess an intuitively relative notion of time can be found in our everyday language. We often say things like "time just went so slow this afternoon" or "since having kids the years have just whizzed by" or "time flies when you're having fun". These comments are rarely meant literally; rather we say them with a reference to the events that take place within them. For example, the husband and wife in their fifties or sixties whose children are grown up do not look back on their parenting years and say that time mysteriously sped up, rather because of the many events and changes that occurred during that time their notice of other relative changes (ticking clocks, the earth rotating around the sun and so on) was lessened. Also, when time is said to have moved slowly we are typically referring to a feeling of boredom or lack of mental stimulation—it is the slowness of the events that is the main concern for the person making such a statement and not the slowness of actual time (if there is such a thing).

In regards to the everyday language we employ when talking about time, it is this implied focus on the events and changes which constitute our daily lives that once again demonstrates the intuitive notion of relative time. For although we employ figurative language that can suggest that we have some sort of sixth sense that enables us to actually be aware of time moving either slower or faster, our motivations for making such statements are almost always connected to the quantity and intensity of the changes and events we have experienced. This is the meaning we intend when we make these statements and is the meaning we derive when we hear them.

3.3.3 Our Relative Sense of Time

Upon similar lines, studies and our own personal experiences also suggest that we do not have direct access to an absolute measure of time. In lacking a “sixth sense” in this way we need to rely on witnessing other *relative* changes to gain our sense of time. Aristotle pointed this out (as mentioned earlier) when talking about the heroes of Sardinia who slept and when they woke had no concept of how long they had slept for. For indeed the only way you would be able to gauge the length of your sleep is by observing the position of the sun or stars in the sky and/or by being aware of how hungry or thirsty you are or finding some other temporal measure that demonstrates some sort of relative regularity.

The BBC recently ran a controversial study on a television programme called *Total Isolation*. This real life experiment involved volunteers being locked away alone in a pitch black and sound proof disused bomb shelter for 48 hours. Some volunteers were also given giant mitts that prevented them from touching anything with their hands (reducing yet another sensation). The testimonies of the volunteers during the experiment (the rooms were equipped with audio and see-in-the-dark video surveillance) confirmed our inability to sense time.

“Narrator: As part of the research the scientists want to find out how long it takes the subjects to lose track of time in the absence of watches or sunlight. And as the morning progresses it is clear some of them are already becoming disorientated.

“Adam [a volunteer part-way through the experiment]: ‘Well, this is weird, now I have no idea how long I have slept for. Now, I have slept twice in the night so let me have a little guess now what time it is. I can’t really know could I? It could be six in the morning; it could be one in the afternoon.’” (BBC, 2008)

This small study certainly demonstrates our inability to accurately measure time when we have been sleeping; however, can the same be said for our waking lives? Studies have shown that when all other factors are equal, humans (and animals) can produce fairly accurate estimates of time duration up to several hours long (Droit-Volet & Meck, 2007). However, what studies also show is that all manner of complicating factors can easily disrupt the accuracy of our awareness of duration. Droit-Volet & Meck explain that:

“... the subjective experience of time is lengthened (durations seem longer than normal) by increases in arousal. According to the internal-clock models, increased arousal accelerates the pacemaker, thus causing more pulses to accumulate within the same physical unit of time. This sensitivity of clock speed to arousal has been documented in studies that have presented a repetitive series of auditory clicks or visual flickers designed to increase arousal before the timed event, ... altered body temperature to manipulate arousal through metabolic processes, or administered drugs that modulate arousal by altering the effective levels of dopamine (DA) in the brain. For example, the administration of psychostimulants, such as cocaine and methamphetamine, increases arousal and produces an overestimation of durations, which is characteristic of an increase in clock speed, whereas the administration of antipsychotics, such as haloperidol and pimozide, decreases arousal and produces an underestimation of durations, as if the internal clock was running slower.” (2007, p. 505-506)

Along such lines of reasoning we can understand the “internal clock” to be, or be controlled by, the subject’s own physical pulse, so that when that pulse changes, so does the subject’s internal measure of time. In this sense our sensation of time, as determined by our pulse, remains relative.

Furthermore, Tipples (2010) found a similar result when studying respondents’ estimates of time intervals while reading taboo words. The findings showed that subjects consistently under estimate the length of time spent while reading risqué text, confirming the idea that “time flies when you’re having fun” (or when doing something exciting, new or naughty, as was the case in this study!). These results also confirm what I raised earlier in regards to the quantity and/or intensity of the events we experience creating a feeling either of boredom (and the seeming slowness of time) or excitement (and the seeming fastness of time).

According to the above mentioned studies it is clear that even in waking life our sensations of time are relative not only to the external events that we experience (of ticking clocks and rising and setting suns) but also to our own internal emotions and physiological processes. When we lose access to these regularities, or if these regularities have indeed become *irregular* (as is the case of an increased or decreased heart-rate), we all tend to lose track of time. So, we can conclude that our everyday experience of time is primarily of the relative change of the various events and internal physiological changes that we experience—our sense of time is relative.

3.3.4 Concluding Remarks about the Intuitive Appeal of Relativism

In this section I have attempted to demonstrate that:

- We have an intuitive belief of simplicity that is present in our pre-philosophical view of time;
- The meanings we intend when we talk about time are primarily referring to the relative changes and events we experience;
- Without access to an event that displays regularity (whether an external clock or an internal heartbeat) we easily lose track of time.

With these findings from everyday life it is easy to grant relativism a very strong intuitive appeal. So much so that it cause one to question the intuitive appeal of absolutism as initially stated. So can we then still maintain that the absolute notion of time has some claim over our intuitive beliefs? Yes, I believe so and I also believe that the two potentially competing intuitions can coexist. However, I also argue that one is fundamentally more intuitive than the other.

As we have already discussed (and will discuss further in the following discussions about time) we do not have direct access to absolute time. So without such access, where might our intuitive notion of it come from? The obvious answer is that it stems from the various mental constructs that we build in our own minds (and teach to others) in order to make sense of the world around us. Let me explain. Consider the regularity of various common measures of time: the rotation of the earth around the sun, the earth's rotation upon its own axis, atomic clocks, the tides, expensive wrist watches—they all share a remarkable regularity with each other and because of this are said to, apart from minor deviations, conform to an (immeasurable) absolute time. This assumption helps us to make sense of the relative regularity we see around us and is, in this sense, intuitive. However, the first thing that we notice about the world around us when making this assumption toward an

absolute time is that the world is indeed relative. So, without this primary intuition about the relativity of events toward one another we would not produce any ideas about the possibility of absolute time. For it is difficult to imagine in a world where there was virtually no relative regularity of events (for example, everything operating chaotically) that we would be able to arrive at the idea of an overarching absolute notion of time. For in producing the mental construct of absolute time one must go through the following mental process:

- 1) Witness events that are temporally relative to each other;
- 2) Witness a certain level of regularity between those events;
- 3) Infer from that relative regularity that there is some sort of metronome-like measure of time upon which all other temporal measures conform to or stray from.

Without witnessing these first two steps I see no other way that one could intuitively arrive at the notion of absolute time. Therefore, it seems clear that our intuitive awareness of relativity (and with it, of relative time) precedes our intuitive idea of absolute time—hence, why I believe that relativism is fundamentally more intuitive than absolutism.

So having reached a point where it might be satisfactory to say that relativism has a greater intuitive appeal than absolutism it would help to be reminded why I have ventured down this somewhat laborious tangent. It has been to demonstrate that relativism is very much a live option to us pre-philosophically. We do not need to think of relativism as being a philosophical attempt at ridding us of an idea that is commonly accepted in everyday life, but rather is itself an idea that conforms to many of our everyday beliefs and habits.

Leaving behind this discussion about intuitions I move on to discuss two other reasons (one scientific and the other philosophic) why we might wish to adopt relativism.

3.4 RELATIVISM: THE SUGGESTIONS FROM SCIENCE

Scientifically speaking there are two key findings that very much support the relativist's thesis: firstly, the findings of Einstein's relativity theories, and secondly, the nature of constant movement between, and within, atomic particles. Although these two areas of science can recommend relativism to us as the more likely hypothesis, it does need to be noted that such scientific findings are inductive hypotheses themselves, and, therefore,

do not provide us with a perfectly solid philosophical foundation from which to infer conclusions about the metaphysics of time. Lowe describes the need to keep an open mind in this way very well:

“... an empirical scientific theory such as Einstein’s, no matter how strongly it may be confirmed by observation and experiment, does not necessarily have the last word on such fundamental metaphysical issues as the nature of space and time and their interrelationship. It is perfectly conceivable that a philosopher should devise a metaphysical argument which so compellingly demonstrates that simultaneity, properly conceived, must be absolute, that we would be obliged to prefer the new theory to Einstein’s. I do not claim to have such an argument myself, but I do urge that we retain an open mind about its possibility.” (2002, p. 269-270)

So, just as it was discovered that our intuitions promote the relativist position, I now attempt to demonstrate that modern science provides further pre-philosophical support.

3.4.1 Einstein’s Relativity

In the early 20th century Albert Einstein published two theories—his special theory of relativity and his general theory of relativity—that finally corrected many of the unexplained variations between Newtonian predictions (based upon Newton’s laws of physics) and the real observations in nature. In doing so, Einstein refuted (again, in a scientific sense) Newton’s idea of absolute space and motion. Rovelli explains Einstein’s views:

“Einstein was convinced that the idea of such an absolute space was wrong. There can be no absolute space, no ‘true motion.’ Only relative motion, and therefore relative acceleration, must be physically meaningful. Absolute acceleration should not enter physical equations. ... In Einstein’s terms, ‘the laws of motion should be the same in all reference frames, not just in the inertial frames.’ Things move with respect to one another, not with respect to an absolute space; there cannot be any physical effect of absolute motion.” (2004, p. 56)

However, it was Einstein’s special theory of relativity that dealt the cruel blow, from a scientific perspective, toward absolute time. This was achieved through the principle of the relativity of simultaneity. One of the prerequisites of an absolute notion of time is the idea that events, regardless of where you are observing them, can be said to occur at exactly the same time and be simultaneous in this way according to any other observer. Einstein’s special relativity did away with this idea of absolute simultaneity, asserting that

simultaneity is fundamentally relative and the analysis of events, and therefore time, should always be treated with this relative simultaneity in mind.

Einstein says that, “It might appear possible to overcome all the difficulties attending the definition of ‘time’ by substituting ‘the position of the small hand of my watch’ for ‘time’” (1905, p.2). In this way he is demonstrating that time can be understood in very much a relative sense (as we have already discussed), however, he continues explaining that even this relative sense needs a further element of relativity in that events occurring at different locations and velocities (includes speed *and* direction) will have a different type of simultaneity: “... in fact such a definition is satisfactory when we are concerned with defining a time exclusively for the place where the watch is located; but it is no longer satisfactory when we have to connect in time series of events occurring at different places, or—what comes to the same thing—to evaluate the times of events occurring at places remote from the watch” (1905, p. 2).

So under Einstein’s theory it is possible that two events might occur in the same instant from one frame of reference (from the point of view of one observer), however, from another frame of reference the two events will likely occur in vastly different instants. The consequence of this is that for all scientific purposes it becomes far more accurate and efficient to talk about time in a relative sense and, thus, not entertain ideas about an absolute notion of time.

The special theory of relativity (and with it, the principle of the relativity of simultaneity) rests on the idea that the velocity of light is constant. Lowe (2002) points out that although many experiments and observations have confirmed that the speed of light is indeed constant, this confirmation is still based on an inference from the available data. “The postulate of the constancy of the velocity of light,” says Lowe, “is just that—a postulate—and not itself capable of direct empirical verification. What *can* be directly confirmed empirically is the constancy of the *average* speed of light for a round trip from A to B and back to A again—which, of course, is entailed by, but does not entail, the constancy of the velocity of light” (2002, p. 268-269). So, again, we need to remind ourselves that the suggestions we can take from Einstein are only scientific and do not carry the same weight as a pure philosophical discussion, of which I shall present shortly.

However, before we move on from Einstein’s findings in relativity one related finding has particular application to our present task. A prediction of general relativity is that mass

(and its related gravitational force) of a very large body will affect the frequency of light, making time to appear to move slower the closer you are to that large body. Hawking explains this interesting phenomenon:

“To someone high up [further away from the large mass of Earth], it would appear that everything down below was taking longer to happen. This prediction was tested in 1962, using a pair of very accurate clocks mounted at the top and bottom of a water tower. The clock at the bottom, which was nearer the earth, was found to run slower, in exact agreement with general relativity.” (1998, p.33)

This represents a further suggestion from science that the idea of absolute time is somewhat redundant; that for all practical and scientific purposes a relativist notion of time, not only suffices, but is explanatorily more effective.

3.4.2 Movement at Atomic and Sub-Atomic Levels

Before discussing the findings of modern science in relation to the movement of atomic particles, let me provide a philosophical backdrop to the discussion that will frame the importance of the scientific findings.

One of the entailments of absolute time is the following statement: It is possible that there have been, or are now or could be, periods of time where nothing happens—where no changes occur. Putting aside questions of how this period of time might be detected and whether any inability to be detected is a problem (this will be discussed later), this entailment initially looks unproblematic. Most people would have no problem assuming that at some point in history or in the future, for even the slightest duration of time, no changes might occur. We can refer to such occurrences as temporal vacua.

The above entailment of temporal vacua also relies on the possibility of the following statement being true at least during one period of time: It is possible that every existing thing can remain changeless for a certain length of time. Again this statement initially appears unproblematic for we see chairs and tables and all sorts of physical objects at rest all the time in everyday life. So of course (or so it seems) it is possible that everything could have this property of being in perfect rest for some duration of time.

Here are these two (initially uncontroversial) statements in simpler forms:

R1: It is possible that everything might be at rest at once.

R2: It is possible that every existing thing might individually be at rest for some duration of time.

The absolutist must always maintain the truth of R1 except for in one situation. This one situation is during the state of affairs where nothing exists. For when there is something in existence and when we are maintaining that time is absolute, we should always allow for the possibility of temporal vacua where time ticks by without the reliance upon change and events. However, if there was nothing in existence, then R1 suddenly becomes redundant and as strange as it sounds to say that time carries on while nothing exists, this option might still be available to the absolutist.

On the other hand, relativism is in the opposite position of, by definition, needing to reject R1. For if the relativist is to allow that it is possible that everything at some point in history or in the future might come to be at perfect rest then he or she is left with the task of explaining how time can carry on while all change has ceased. The relativist would need to appeal finally to something like absolute time to make sense of this virtual vacuum in time. As we shall now discuss, this need to reject R1 has some issues given that R2 seems especially unproblematic. For if we are to accept R2, what is there stopping us from also accepting R1? However, before we talk about this inference between R2 and R1 (which appears to be something of a slippery slope), is R2 really as unproblematic as it initially appears? Once again, let us turn to science for a suggested answer.

The question we are here attempting to answer is whether it is possible that existing things might individually come to be at rest for any length of time (whether very short or very long). Most people's initial response would most certainly be in the affirmative, for we observe tables, chairs, mountains, and all sorts of objects that appear to be perfectly still. In fact, we can leave these objects for days, weeks and even years and come to find them exactly as we left them: unchanged and unmoved. However, for our purposes changes to the naked are not satisfactory. Anyone who has completed any level of high school science knows that these objects that *appear* still actually have much microscopic movement going on within them—levels of movement that actually contribute to the objects' ability to appear stationary and fixed.

This movement of course is at atomic and sub atomic levels. We know that a body of water, even if it appears perfectly still, has millions and millions of hydrogen and oxygen atoms constantly colliding with one another. Richard Feynman describes it like this:

“... all things are made of atoms—little particles that move around in perpetual motion, attracting each other when they are a little distance apart, but repelling upon being squeezed into one another.” (Quoted in Fraser, 2006, p.87)

Quigg identifies another type of similarly microscopic physical change that occurs in everything that comes into contact with the sun’s rays:

“Each second, about a hundred million million neutrinos made in the Sun pass through you. In one tick of the clock, about a thousand neutrinos made by cosmic-ray interactions in Earth’s atmosphere traverse your body.” (Quoted in Fraser, 2006, p.88)

As you can see all this is not good news for R2, and with it, R1. If “all things are made” of constantly moving particles then it now seems very problematic to ask that all these things should at some point come to be at rest³. However, science does also teach us about the concept of absolute zero: the point at which an object becomes so cold that the energy within it, between atomic particles, diminishes, leaving the particles that constitute the object perfectly stationary. Does absolute zero provide the absolutist with the escape route for R2 to be true?

The practicalities of reaching absolute zero provide the first hurdle to the affirmation of this question. Consider a laboratory set up to reduce a piece of matter or gas or liquid to absolute zero. Various techniques of refrigeration might be employed for this purpose, including, in the case of lowering the temperature of a gas or liquid, creating a vacuum whereby the pressure in that substance is sufficiently reduced as to enable the energy and with it the temperature to dramatically fall within the substance. However, as the experiment records temperatures that approach the absolute zero value of -273.15c (or zero degrees Kelvin), for every degree closer towards absolute zero it becomes more and more difficult to continue reducing the temperature. Such experiments have shown absolute zero to be a condition that continuously eludes both our creation and our observation, like an exponential curve that refuses to reach a certain point even though it becomes very close to it. Here are some examples of this interesting finding:

“It is impossible by any procedure no matter how idealised to reduce the temperature of any system to absolute zero in a finite number of operations.” (Fowler and Guggenheim, 1940, p.224)

³ At this point the reader should be reminded that in this section I am investigating the direction by which science might suggest the philosophical approach to proceed. As has already been stated, these scientific suggestions obviously do not provide us with the concrete philosophical answers we are after, but they can help guide us nonetheless.

“In order to reach a temperature of absolute zero, a ‘heat engine’ would have to be built that is 100% efficient. This is not possible. We will never build such a device.” (Barbier, 2010)

This discovery is now known as the third law of thermodynamics. However, to say that it is impossible for us to build a cooling engine that is 100 per cent efficient in this way is simply to say that it is impossible for us to build such an engine, and this does not entail the proposition that it is impossible for such an engine to miraculously exist. So even though science would suggest that all existing things are indeed moving at all times, there still seems to be the logical possibility that the absolutist can appeal to that such a state of absolute zero might mysteriously (through a process unknown to science) occur.

However, this may still not be enough for the absolutist to claim that R2 can be true, for again science has detected movement in all objects (including solids, gases and liquids) that is unaffected by the variations in physical temperature—this is the second, and most demanding, hurdle to the absolutist. Phillips and Williams point out that “electrons keep whizzing rapidly around the nucleus in the same way, no matter whether the atoms in the gas are hot or cold” (quoted in Fraser, 2006, p. 182). Christian also affirms this conclusion: “absolute zero (0 Kelvin) is defined as where all molecular motion stops. The electrons still orbit the nucleus, the nucleons still spin, etc” (Christian, 2010).

So now it is clear that we have a situation resembling a Russian doll where just when you think that an object is stationary, as determined by the naked eye, science tells us that the particles that constitute that object are actually constantly moving. Then when you allow for the logical possibility that the object, and with it the particles that constitute that object, is cooled to absolute zero, we find that those particles are also brought to a standstill. However, science also tells us that within those particles, the sub-atomic particles are moving just as constantly as ever regardless of the temperature. And perhaps if a mechanism were discovered whereby sub-atomic particles could be slowed down in their movements, thus allowing for the possibility that they might be perfectly stationary, we may then discover another more minute layer of movement, and so on and so on. Regardless, the current discoveries of science suggest that our proposition in R2 is actually quite problematic and controversial.

However, we have already mentioned that science cannot provide us with a concrete defence of a philosophical position. For its discoveries may be true in all observed cases

but these observations do not preclude the possibility that another situation might be observed that demonstrates an exception to the scientific rule. In our present discussion this is important because when we closely observe the two statements, R1 and R2, we can know that for R1 to be true, R2 only needs to be true at *some* period of time; it does not need to be the case that all existing things should *always* be able to enter a state of rest. It only needs to be the case that all existing things should in at least one period of time be able to enter a state of rest (the one period of time where *everything* could possibly be at rest—as in R1).

This puts the absolutist in the stronger position of having a ready response if science or any other empirical findings were to demonstrate that R1 and R2 both appear false (as has already been shown to be the case). So long as the propositions of R1 and R2 are conceptually possible then the absolutist has a defence. Shoemaker, an absolutist whose work we shall explore shortly, writes, “what is in question here is not whether it is physically possible for there to be time without change but whether this is logically or conceptually possible” (1969, p.368).

This is where I need to remind the reader that the purpose of this present discussion has been to paint a picture of the type of metaphysical reality science would suggest to us as being the most likely. It has been about building the pre-philosophical groundwork from which we can undertake the pure philosophical discussion. And so far, this task as it relates to science has led us to the conclusion that relativism is certainly the most favourable thesis. Einstein’s theories of relativity undermined Newton’s physical arguments for absolute time and the constant movement of atomic and sub-atomic particles undermines our assumption that objects can be in a state of rest. This is important because when I began the discussion about time and absolutism versus relativism I mentioned that absolutism could be seen to have the advantage of appealing to pre-philosophical ideas, but what our scientific discussion has demonstrated is that an informed pre-philosophical position certainly tends towards favouring relativism over its competitor.

Before moving on to our final pre-philosophical discussion point, I should also mention a further problem for the absolutist in his or her attempt to infer from the conceptual possibility of R2 (the ability of all things to at some time be individually stationary) to R1 (the ability for all things to be stationary at once). The complication of this inference from R2 to R1 is the problem of causation. For if we were to maintain, as many scientists and

philosophers might, that our physical world is causally closed (that every effect has a predictable physical cause and every cause has a predictable physical effect) and that such causes cannot be temporally separated from their effects (thus, assuming the impossibility of causation at a temporal distance, for example, a green ball turning blue simply because an hour has passed and no other causal factors or physical processes are involved) we could not allow two crucial conditions of R1. These are: firstly, that the world would not be able to enter R1, for every action would have an equal and opposite reaction (as Newton might suggest); and, secondly, that the world would not be able to escape from the state of rest in R1, as there would be no cause to set in motion once again the self-perpetuating cycle of cause and effect.

Obviously this discussion rests upon whether or not we are going to accept the necessity of a causally closed world. We shall return to this discussion once we delve into Shoemaker's (1969) argument for absolutism, but I feel it is necessary to mention the issue here as to point out a further scientific problem of absolutism.

3.5 RELATIVISM: THE PRAGMATIC AND EXPLANATORY VALUE

We have seen that from a scientific perspective it is far more advantageous (being more accurate, simpler and, therefore, more efficient) to talk about time in a relative sense. I also propose that a similar advantage exists when talking about time from within a philosophical framework. That is to say that the acceptance of the relative notion of time over its absolute competitor is a much more useful tool in the hand of the philosopher. This does not, in itself, promote the relative hypothesis to be the most successful, for what use is increased practical benefits if in fact those benefits are pointed in the wrong direction to begin with? Instead, what the following discussion attempts to illustrate regarding the pragmatic value of relativism, is that if relativism and absolutism are found to be otherwise equal (for example, that the non-pragmatic philosophical arguments both for and against show no or little preference either way) then we can look to relativism's extra pragmatic benefits as a way of deciding between the two theories.

This idea of favouring the hypothesis with greater practical advantages when other factors are equal can be attributed primarily to the work of 19th century philosophers William James and Charles Peirce. Hookway (2008) describes James' pragmatist approach:

“William James thus presented pragmatism as a ‘method for settling metaphysical disputes that might otherwise be interminable.’ (1907: 28) Unless some ‘practical difference’ would follow from one or the other side's being correct, the dispute is idle.”

So the important point to make from the outset is that we are first required to discover whether the available hypotheses are indeed “otherwise interminable”. James himself explains this importance of analysing each hypothesis on its pre-pragmatic philosophical merits (which he calls “older truths”) before we consider the pragmatic differences:

“The point I now urge you to observe particularly is the part played by the older truths. Failure to take account of it is the source of much of the unjust criticism levelled against pragmatism. Their [the older truths’] influence is absolutely controlling. Loyalty to them is the first principle—in most cases it is the only principle; for by far the most usual way of handling phenomena so novel that would make for a serious rearrangement of our preconceptions is to ignore them altogether, or to abuse those who bear witness for them.” (1975, p.35)

Although I am somewhat going against James’ advice by looking into the pragmatic values of relativism and absolutism before fully investigating the “older truths”, I am doing this in order to paint the broader picture of the landscape in which the purely philosophical discussion lies. And to conform to James’ principle, I will certainly be maintaining that the pre-pragmatic philosophical discussion will be my first and primary guiding principle.

So how do we go about making a pragmatic analysis of our two theories? Well, James explains,

“The pragmatic method ... is to try to interpret each notion by tracing its respective practical consequences. What difference would it practically make to anyone if this notion rather than that notion were true?” (1975, p. 28)

James offers the example of radium which was at some point in history discovered to emit heat that defied the laws of the conservation of energy. However, it was the assertion of another hypothesis, the discovery of helium, which allowed these laws of the conservation of energy to be saved. As a result, says James, this hypothesis “is generally held to be true, because, although it extends our old ideas of energy, it causes a minimum of alteration in their nature” (1975, p. 36). So rather than completely alter all of our accepted principles of the conservation of energy the hypothesis of helium was chosen to explain the strange heat being emitted from radium in such a way that kept our other

principles intact. The negative practical consequences of accepting the helium hypothesis were far less than those associated with accepting some sort of law-breaking hypothesis.

So let us apply a similar test to our notions of time, beginning with absolutism. It can be easily seen that if a philosopher were to accept absolutism he or she must deal with the following consequences:

- a. **Ontology** | An increased ontology—that time becomes something, a new kind of *something*, which actually does exist. Along the lines of our discussion about simplicity, an increased ontology can complicate matters practically as the following points further illustrate.
- b. **Measurement** | An inability to detect and directly measure time itself. Aside from measures of change, we have no idea how much time has passed in a certain interval. For if time is absolute then it is conceivable for hours, days or even years to have passed in what seems like a single moment to us. For it is possible that we could all have been frozen in place during that period and became unfrozen immediately in such a way that we were unaware of any freeze taking place.
- c. **Little or No Detail** | With no ability to detect or measure time, we would not be able to make any educated decisions about its length, its beginning and end, its direction, whether it is circular or linear, whether it is accelerating or decelerating nor any other potentially useful information about time.
- d. **Beginnings** | We also would have no ability to explain how or why it came to be.
- e. **Connected Discussions** | With so little that is able to be discovered about absolute time, all of our discussions that hinge on us having a grasp of the nature of time would also be severely hampered. For example, in seeking to discover the hows and whens of the universe coming into being our concept of time would be a practically useless theory.

As can be seen, the absolute notion of time has some serious pragmatic weaknesses. In fact it, as a theory, offers us very little (if any) assistance in any other related philosophical discussion that we might encounter and certainly complicates our ontology. However, does relativism fair any better? Let us look at each of the weaknesses that beset absolutism and see how they affect the relativist hypothesis:

- a. **Ontology** | Ontologically, relativism commits ourselves to no additional types of existence beyond that which its relative changes occur within. So ontology is not a practical problem for relativism.

- b. **Measurement** | Having reduced time simply to change, the ability to detect and measure 'time' now rests purely on our ability to detect and understand change. With changes being so readily detected and measured this is a huge practical advantage.
- c. **Little or No Detail** | All the various characteristics that could be attributed to time can simply be discovered through our observations and analysis of change. So, for example, the question of whether time can be reversed simply becomes a question of whether all the changes that have occurred over a certain interval can be reversed in the opposite order in which they occurred.
- d. **Beginnings** | Reducing time to change means that instead of needing to explain the birth of absolute time we must simply explain how all existing things moved from a state of no change to a state of constant, ongoing change.
- e. **Connected Discussions** | A relative notion of time that is based upon change gives us a very useful tool going forward as we investigate other matters such as the beginning and ongoing existence of the universe, the characteristics of a supreme being (if such a being exists), and many other philosophical questions.

Clearly, as far as I can see, relativism stands head and shoulders above absolutism in its pragmatic value. However, I do concede that by focusing on time purely in a relative sense we leave ourselves open for error. For if it happened that, after accepting the relativist hypothesis upon pragmatic grounds, absolute time was actually the correct hypothesis, we are allowing ourselves the real possibility that we might miss various periods of time. And in doing so miss much of what can be known about time. This is obviously a potentially practical weakness of accepting relativism over absolutism.

However, I do not believe this problem carries with it much weight. Firstly, it is difficult to imagine a situation where, from a practical perspective, we are required to detect or measure time without change. In fact the only occasion that I can imagine is if we indeed wanted to prove the existence of absolute time itself. For all other deliberations, both practical and philosophical, time purely referenced by change (relative time) perfectly suffices. Secondly, this small opportunity for error is not so great if the two theories have been found to be otherwise equal but with one significantly practically superior in every other area. For as Hookway (2008) explains, "Both Peirce and James combined their pragmatism with a distinctive epistemological outlook, one which rejected the Cartesian focus upon the importance of defeating skepticism while endorsing the fallibilist view that any of our beliefs and methods could, in principle, turn out to be flawed." So we are not

here saying that relativism, if accepted because of its pragmatic superiority, will be infallibly correct, just that it fits best with many other hypotheses that we have accepted (for example, a minimised ontology and various scientific findings) and also best enables us to make significant steps forward in other philosophical and practical arenas.

So, excepting its potential for error, relativism is the practically superior theory. And although, as has already been discussed, this does not immediately present relativism as the preferred theory, it does signify that if our two competing theories should be non-pragmatically equivalent we now know which theory we would have grounds for accepting.

I have now presented the intuitive appeal of relativism (as found in our intuitive belief in simplicity, the language we use about time, and our relative sense of time), the suggestion from science that relativism is to be favoured (as a result of Einstein's relativity theories and modern discoveries of atomic and sub-atomic particles) and the pragmatic superiority of relativism. All this has been done to paint the picture that, despite any early intuitions that we might have that absolutism is the correct hypothesis about time, relativism is very much a live option to us (and often the preferred one) both pre-philosophically and (in the case of its pragmatic value) post-philosophically. So, all that remains to be discussed is the pure philosophical discussion, whereby we must return to those two questions we tucked away earlier:

- **The Epistemological Question:** Can time without change be detected?
- **The Metaphysical Question:** If empty time cannot be detected or temporally shifted worlds distinguished in such a way that absolute time might be discerned as being different from relative time, must we therefore accept that absolute time does not exist?

3.6 THE EPISTEMOLOGICAL QUESTION: CAN EMPTY TIME BE DETECTED?

As we have already discussed and as confirmed by the likes of Aristotle, the detection of time apart from change seems to always evade our detection. Our experience of time is annoyingly and constantly accompanied by some sort of change whether it is large-scale physical movements like the earth spinning around the sun or whether it be the minute pulses of blood pumping through our bodies. And as I will soon discuss, even the act of thinking that time is passing itself involves change: the change from the mental state of

experiencing time to the following mental state of being aware of your experiencing time. However, in contrast to all this, perhaps the most significant move to show that the detection of temporal vacua is at least *conceptually* possible occurred in 1969 with Shoemaker's paper "Time without Change". The following discussion is centred on this paper and ultimately argues that Shoemaker's thought experiment fails for the following reasons:

- Shoemaker's argument is circular: he assumes the possibility of freezes (local periods of time without change) in the argument *for* the possibility of freezes (global periods of time without change).
- The conceptual impossibility of detecting absolute space determines that even relative motion should be included as a type of "real" change. This means that adequate detection of Shoemaker's local freeze (and of absolute rest in general) is conceptually impossible.
- As Shoemaker admits, his thought experiment requires that we allow for the possibility of a world with vastly different rules of causation where the conjoint instances of cause and effect can be extended temporally. However, this idea relies on absolute time existing in the first place and, because we have reasons to prefer relativism, we should also prefer to deny temporally separated causation (and therefore, deny the possibility of Shoemaker's world).

Before explaining these criticisms we must first explore Shoemaker's method.

3.6.1 Shoemaker's Freezing World

By far the most compelling argument for the detection of time without change (or empty time) comes relatively recently from Sydney Shoemaker (1969). He presents an intriguing thought experiment where there is a world divided into three distinct geographical sections (A, B and C). Every three years the entirety of section A undergoes a freeze where there is no change or movement for a year. At the close of the year the entire section carries on as usual as though no freeze had occurred. So, if a bird was flying in this section during the freeze it would stop mid-air for a year and then carry on flying from the point at which it froze. A pot of boiling water would freeze (in motion not, necessarily, in temperature) but carry on boiling with no temperature change a year later. Members of each section will not have any direct experience of the freeze but from reports of others outside their section like "Where have you been this past year?" and "Everything in your section of the world is exactly as it was a year ago!" the members of the frozen section will be able to understand that a freeze has taken place. This same freeze phenomenon

also occurs in sections B and C, each also lasting exactly one year—with the only difference being that in section B the freezes occur every four years and in section C every five years (remember section A is every three years). As a consequence of this regularity there are certain years of multiple freezes: A and B together every 12 years, A and C every 15, B and C every 20, and all three in unison every 60 years. Here we find the important conclusion of Shoemaker’s thought experiment: every 60 years, although the inhabitants of the world would have no direct experience of the changeless year, by a system of reasonable assumption (via induction of the observed pattern of local freezes) empty time could be detected.

On the surface this clever thought experiment can look quite compelling; however, Shoemaker himself identified two major weaknesses that need to be dealt with immediately. Firstly, the objection can be raised that the inhabitants of the world may never actually know for sure that a region was totally frozen. Secondly, one could argue that even with the regularity of local freezes in the world, inhabitants still would not be given sufficient grounds for accepting that a global freeze does in fact occur every 60 years. I will deal with Shoemaker’s responses to each of these objections one by one.

3.6.2 Shoemaker’s First Hurdle

The first objection Shoemaker raises against his own thought experiment proposes that something similar to the following situation might occur:

The inhabitants of the possible world realise that each region has what appears to be a local freeze and so they develop instruments to gauge the activity levels (if any) within these frozen regions. These instruments go on to confirm what was before only witnessed by the human eye, for example, it could be said the instruments are capable of measuring to a cellular level. However, the objection states that just because instruments cannot detect any changes in a frozen region up to a certain level, what is to suppose that new technology may one day be developed that is even more accurate, able to measure even smaller changes than in individual cells (at the sub-atomic level, for example)?

Shoemaker points out that there could be many other variants of the same type of objection and responds to them by “supposing that the scientific investigations of these people support a ‘quantum’ theory of change which rules out the possibility of changes so slight that they are undetectable by certain instruments” (1969, p. 371, footnote).

However, this response does not solve the whole problem.

3.6.2.1 Do local freezes need to be verified?

There is of course the issue that if a region of space is ‘frozen’ in the way that Shoemaker is proposing, it will emit no light, no sound, no smell, no gravitational force (for surely we must include gravity as a process which itself involves some changes)—indeed we could not allow for any physical process to be given out from the frozen region. So, as we might have expected, any instruments the inhabitants of the world set up along the borders of the frozen regions, in order to detect any changes within those regions, should all read zero during freeze periods. However, we all know that a scientific reading of zero does not always mean that nothing is occurring. In this case, there is the certain possibility that although the borders of the region are frozen, as confirmed by Shoemaker’s ‘quantum’ capable measuring instruments, there may well be internal changes occurring that are veiled by the non-changes of the region’s borders. Such change could be a self-perpetuating, self-enclosed system of atomic-level rotation that has no effect on its surrounding space. So, the question is, how can a quantum-level measuring device placed on the outside of the region detect this sort of enclosed and veiled change? I say it cannot. For even after the freeze has ended, it would be near impossible to measure *every* atom within the now-thawed out region to see if there had been any such cases of change.⁴ So this demonstrates that the inhabitants of Shoemaker’s world would still have some room to doubt whether complete local freezes do actually occur, thus, questioning the conclusion that a global freeze occurs every 60 years.

The other consideration that can be raised in support of Shoemaker’s first confessed objection is that a device that measures to a quantum, most-minute level of existence may not actually be possible. This thought goes that for any new technology able to measure movements and changes as small as 1×10^{-09} millimetres, for example, there will likely be further changes and events occurring at a 1×10^{-10} level that therefore are not being detected by the current level of technology. So as technology develops there should always be further possible events occurring at a yet smaller level.

⁴ It could be argued that the measuring device is not actually housed within an unfrozen region on the boarder of a frozen region looking in, but is rather within the frozen region itself. As no messages can be sent from within a frozen region to another part of the world the inhabitants are only able to go off recorded readings that are stored in the device’s internal memory. This, however, is obviously not an option because a mechanical device that measures and then stores those measurements would be seen as a clear example of change—which would thereby refute any beliefs that the region was indeed frozen.

These two arguments share the same sentiment. Both demand that for the inhabitants of the world to “have good reason to believe in periods of changeless time” they must have those reasons absolutely verified. However, I will side with Shoemaker on this point and accept that this is an unmerited criticism. Shoemaker’s response to these sorts of verificationist arguments is that they are “no more plausible than the argument from the fact (if it is one) that it is impossible to verify that two things are exactly equal in length to the conclusion that any two things necessarily differ in length” (1969, p. 372). I believe at some point you need to allow the inhabitants of the world that their observations and levels of observational technology are sufficient to allow them to have “good reasons” for accepting local freezes. And remember, we are also working in a *possible* world, whereby the rules of observation and verification can be manipulated to suit the intended goal so long as they can still be shown to be possible.

3.6.2.2 The weak vs. strong relativistic claim

The other response that Shoemaker makes to this first type of counter-argument is that critics who would try to argue against the occurrence of local freezes seem to be committing themselves to the very bold position that “*everything* must change during every interval of time” (1969, p. 372). According to Shoemaker this position is much stronger and is “intuitively less plausible” (p. 372) than what we might have thought the original relativist position to be, that “*something or other* must change during every interval of time” (p. 372). However, it is clear, given my preceding comprehensive discussion on the numerous intuitive appeals of relativism (particularly those confirmed by modern science) that the belief that things might come to absolute rest for periods of time could actually have less intuitive appeal than the idea that all things remain moving always. As such, the inhabitants of Shoemaker’s world could be well justified in assuming this strong relativist idea that all things are moving always, and therefore, could reasonably demand the need for *stronger* evidence of the existence of local frozen regions before they deny their intuitions. This puts a significant stumbling block in the way of Shoemaker’s inhabitants gaining a “good reason” to accept local freezes. For although I am not demanding a verificationist level of evidence to go against the inhabitants’ intuitions, I do believe these intuitions and pre-evidence beliefs put the ball back in Shoemaker’s court to provide *enough* evidence of local freezes.

3.6.2.3 The Alternative Hypothesis

The final point I wish to raise—and the one that demands the most discussion—in connection to the first objection that Shoemaker raised to his own argument is the idea of a competing hypothesis. Shoemaker assumes that the inhabitants of his world would hypothesise that local freezes occur, but going on the evidence the inhabitants are receiving there is another very plausible hypothesis (over and above the hypotheses of accepting local freezes or of denying local freezes because of insufficient evidence).

Place yourself in the shoes of the inhabitants of Shoemaker's imaginary world. During the first occurrence of a local freeze, what do the inhabitants of the other two regions immediately make of it? First of all, all contact with that region becomes suddenly shut off: all sound waves, photons, radio waves, radiation, and even electrical currents will no longer travel from the frozen to the non-frozen regions. Secondly, the freezing of one region will have drastic flow-on effects in both the weather patterns and the gravitational states of the non-frozen regions. Both these observations would hugely affect the conclusions that the inhabitants reach, therefore, let us discuss each issue one-by-one.

An inhabitant is standing on the border of one region admiring the beauty and fragrance of a flower in another region when suddenly a local freeze occurs in the flower's region. No longer can the inhabitant see the flower, the fragrance is no longer emitted, and even the sound of the bees hovering over the flower has ceased—it is almost as though the flower and the entire region in which it exists have simply disappeared. So the inhabitant is justifiably astonished, and being a physicist he quickly goes to his laboratory and retrieves his quantum-capable measuring device to see if he can pick up any other signs of movement from within the flower's region that may be undetectable by his five senses. Returning with his device, he finds his initial suspicions confirmed: there is no sign of any movement, whatsoever, from within the region *and*, more importantly, no sign even of anything existing (because of the lack of light, radiation, sound or of anything coming from the region). His immediate thought would of course not be that the region has simply frozen, but that it has ceased to exist altogether. This is the alternative hypothesis that I believe the inhabitants of the world could reach.

Carrying on in Shoemaker's world, now a year later, and now with our physicist's scientific colleagues also performing tests on the so-called 'frozen' region (all of which produce the same result: nothing), the region suddenly appears again. The flower, once more, is right

there before the physicist; he can see it, touch it, smell it, hear the bees again and even taste the flower if he so desired. The measuring devices spring back to life showing all the signs of normal existence within the other region. Again, what do the scientists assume happened to the ‘frozen’ region? It seems a stretch to suggest that they might say that it simply froze and suddenly thawed out, for their recorded data suggests something much more dramatic than a mere ‘freeze’. When we talk about water freezing we can still see it, touch it, and detect it in numerous other ways, but with the case of an entire ‘frozen’ region *all* contact with that region has been entirely lost. As such, their first hypothesis, and seemingly most simple (to use Shoemaker’s own term), would be that the region just ceased to exist and then came back into existence again. I will return to the ramifications of this conclusion shortly.

The other major type of observation that Shoemaker failed to discuss is the flow on effects within unfrozen regions when another region ‘freezes’ (or ceases to exist). The most obvious effect would occur in weather patterns. For example, assuming the regions of the imaginary world are like the geographical regions of Earth divided by the longitudinal lines of 30 degrees north and south (so you have three regions: North—above 30 degrees north; Tropics—between 30 degrees north and south; and South—below 30 degrees south), if the Tropics were to freeze⁵, the weather patterns in both the North and South regions would be hugely affected as they come up against a ‘brick wall’ of a frozen region.⁶ What would happen to an unfrozen weather system in such a case? Do they simply ‘bounce’ off the frozen region? And if so, we are met with this very difficult problem of how exactly such a ‘bounce’ might occur—for can a frozen region apply the force of opposition upon a non-frozen region? On the other hand, perhaps the wind will just keep flowing in the same direction as it encounters no resistance from the frozen region. This would be a very strange situation in deed, as you would have air and water and even solids ‘spilling’ out the sides of non-frozen regions as they are no longer supported by the now-frozen region. On top of this, what if the weather patterns (or wind direction) at the time of freezing were moving away from the frozen region? Would this create a vacuum of space, where there once was air, on the border of the un-frozen region and, if so, how does the frozen region avoid being ‘sucked’ into this vacuum? Or is the frozen region literally blown about by the wind? Surely not the latter, because this would certainly mean that change (in the form of movement) is occurring to objects within that region and,

⁵ In Shoemaker’s sense of the word ‘freeze’, not a temperature freeze.

⁶ The same could be said for ocean currents that cross over regional boundaries.

again, with the former option, how can an unchanging body of matter create the force of opposition in order to remain still?

As you can see, the single question about a local freeze's effect upon weather patterns poses many problems for Shoemaker. Essentially the core dilemma here is for Shoemaker to explain the behaviour of a frozen region when exposed to various atmospheric forces. Such an explanation is not easily forthcoming because science is unable to suggest what might happen to an object when it is completely frozen or motionless. To understand this we need to remind ourselves again that we are not here talking about a 'freeze' in the way that we talk about water freezing into a block of ice, for even within ice there is movement at atomic and cellular levels (as we discussed earlier). A frozen region, for it to operate like Shoemaker requires it, must be *absolutely* frozen, as has already been considered, to a quantum level. So, effectively, we are asking that the entire contents of a frozen region be instantaneously frozen to a temperature of absolute zero, where there is no movement of any atomic particles. However, my earlier discussion on science revealed that we have failed to observe such a state; it is a condition that continuously eludes our observation like an exponential curve that refuses to reach a certain point even though it becomes impossibly close to it. Further still, my earlier scientific discussion also revealed that despite the temperature sub-atomic particles appear to remain moving constantly. This is a problem for Shoemaker because as far as science is concerned it appears practically impossible (or at least for humans to initiate) that any object, or rather the atoms that constitute that object, can be at absolute rest—*for in our world the evidence suggests that all things are moving at all times*. So it becomes an immense challenge to explain the way a 'frozen' region might interact or behave (for want of better words) in relation to non-frozen regions.

However, perhaps there is another way of avoiding this weather problem. Suppose there is a dividing border—an immensely dense wall—that separates each of the regions. This wall, although it is not part of any region's freeze (for if it were to freeze, it too would suffer the same problems), provides the physical boundary line between regions so that weather patterns are prevented from interfering with another region's air space. However, there is a very obvious and fatal problem to this solution: if these boundaries are not allowed to freeze, then clearly we have no grounds for accepting a global freeze every 60 years.

Accepting that the boundary solution therefore fails, perhaps as opposed to a physical, solid dividing wall, there could just be empty space between the three regions of

Shoemaker's world. So instead of the world resembling our own Earth, it would be divided into three separate planets. They are close enough to each other for the inhabitants of each planet to carry out meaningful tests and observations on other regions, but not too close as to have weather patterns, and other similar physical process affecting each other. However, the one physical process we know they would not be able to avoid (assuming roughly similar physical laws to our own world) is gravity. With only three planets in Shoemaker's world⁷ they would undoubtedly exert considerable gravitational force⁸ upon each other. For example, two planets may be orbiting the other or they may all be moving toward each other or somehow all caught in a suspended state of rest where all gravitational forces simply cancel each other out. Either way, if they are to have mass—which is the determining factor for the presence and strength of a gravitational force—each planet (or region) must be exerting force at all times upon the other two planets (or regions). The only way to get around this is to say that the regions of the imaginary world have no mass. And surely, if you are demanding that the regions of the world can 'freeze', then you must also demand that the regions also have physical mass.

So, if there is mass within a region then there is also a gravitational force. If there is a gravitational force then there is a process operating within that region. And if there is a process going on then some meaningful and real change is also occurring within that region. So while a region is unfrozen there will be gravitational readings being taken, and gravitational effects upon, the other two unfrozen regions. And while one region is 'frozen' (in the way that Shoemaker proposes—that it is entirely motionless and still existing) the gravitational readings and effects will continue to be observed in the other two regions. If this is so, then it is clear that change is still occurring within the so-called frozen region (because of the process of gravity), and Shoemaker's claim is defeated. This, of course, does rely on Shoemaker's world possessing similar laws of gravity to our own world (perhaps Shoemaker might be able to explain how it is possible that physical objects could exist but exert no gravitational force on any other object).

The other alternative in this situation of taking gravitational readings between regions is that when a freeze occurs in one region, the devices show that all processes and

⁷ Shoemaker is obviously talking about 'possible worlds' rather than individual planets in a greater universe or solar system. As such, he assumes the three regions of that world (whether they be all in one planet or spread across three planets) together comprise the entire mass of objects in that imaginary universe.

⁸ Although Einstein and other more recent discussions use other terminology, I have chosen to use the Newtonian terminology of gravitational 'force' as a simplification. I have no doubt that talking about gravity as a wave or a particle or even a warping of space-time would produce a similar outcome in the present discussion.

movements (including gravity) have indeed ceased—this obviously being the requirement in Shoemaker’s test—and hence the ‘frozen’ planet has actually disappeared from existence. What happens next is obviously very similar to the weather situation I raised earlier. When a planet stops emitting a gravitational force upon other planets, the balance or orbit of those planets will be immediately affected. So at the end of the year in which one planet has been ‘frozen’, the inhabitants will discover that the planets have changed position relative to each other. Now, is this relative change in position an example of change for the ‘frozen’ region? And what do we make of the region also being non-existent during this period?

To answer these questions, let us consider the situation again from an inhabitant’s point of view. In this case a scientist is on planet (or region) A observing planet B which he knows is about to enter its scheduled local period of non-existence. At the beginning of the year planet B disappears according to all the scientist’s readings and observations and planet A, and C, consequently experience new gravitational forces. So perhaps A and C, before the period of B’s non-existence, were orbiting B, but now with B not existing they are released from their circular motion and begin to move into space in a Euclidean straight line, spin out into space chaotically or even that A and C begin to orbit each other. Either way, the positions of the planets change hugely during the period of B’s non-existence, such that when our scientist on A begins to pick up readings from B (at the end of the year) it is now in a very different relative position and is now under, and giving, vastly different gravitational forces from the other two planets (due to the change in distances). In the intervening period during B’s non-existence planet B has actually changed a lot: tides would be different, weather systems would be changed (if such exist on these planets), and the relative position of the planet to the other planets would have drastically changed. Suffice it to say that the scientist would struggle to deny the following conclusion:

The ‘new’ planet B, though with many similarities to the old planet B, has changed so much that it no longer seems right to call it planet B, but rather something like B’, or another name altogether.

Having said this, it is conceivable that the scientists in all three worlds may together develop sophisticated models that predict the changes that occur to a non-existing object during the period of its non-existence. In this way, they would be able maintain the same sense of identity for each of the planets—in a similar way to how we might explain the continuing identity of a Cartesian piece of wax as it melts and moves from a solid into a

liquid and so on. However, the important point here is that if identity is to be maintained toward B during its changes then we cannot deny that the planet does actually undergo change during its non-existence period.

So the inhabitants of our three worlds have direct experience of localised periods of non-existence where, while each planet is non-existing, it still undergoes change. This obviously stands in contrast to Shoemaker's model of having local regions still existing but just frozen. But what happens when we take this non-existing but still changing model across to the global period of non-existence, if such a period should occur? Well, the major problem here is that although we would not expect any changes to occur (as every planet is equally non-existent) we can hardly say that the world still exists with all its regions in non-existence. To argue otherwise would be to already assume that absolute time (as something over and above the things and events that populate our world) actually exists and as I have spent much of this paper discussing there seems to be a vast array of pre-philosophical and also philosophically pragmatic reasons by which we should prefer a relativistic notion of time over an absolute one, particularly when the two theories present themselves as being otherwise equal.

So I conclude this section saying that the frozen world hypothesis carries with it many crucial problems and that a 'non-existing' hypothesis would be more likely to be accepted by the inhabitants of Shoemaker's world. Furthermore, this 'non-existing' hypothesis will only lead to the conclusion that periods of empty time occur if you have already accepted that absolute time exists. This circularity is evident through much of Shoemaker's argument and I will return to it below. It should also be noted here that I have not mentioned yet the further complicating question of how exactly a region of Shoemaker's world could move in and out of periods of non-existence. This problem of causation will be discussed shortly as I discuss further weaknesses of Shoemaker's argument.

3.6.2.4 Additional Alternative Hypotheses

Before moving on, I should point out that on top of the one alternative hypothesis I have raised, Michael Scott (1995) also presents two other hypotheses that the inhabitants of Shoemaker's world may choose to accept given the contents of the observational data available. These are that:

1. They do not assume that the regions are frozen but rather that access to these regions becomes blocked and that each zone has its own corresponding time zone.

2. They could assume that when any section is frozen there is actually a situation of change *without* time; so that the inhabitants keep a universal calendar that runs much slower than Shoemaker's (for example, only ticking over a year when there is no freeze across the entire world).

While I believe these alternative hypotheses are interesting and potentially compelling, I argue they are vulnerable to Shoemaker's system of choosing the hypothesis that is most simple. And as they introduce multiple systems of time and an entirely new concept of 'change without time' I believe Shoemaker could quite easily write them off as being too complicated to be considered equally alongside his original hypothesis—a threat I believe my non-existing regions hypothesis does not suffer from.

3.6.3 Shoemaker's Second Hurdle

I now return to Shoemaker's original argument and, for the purposes of testing his second hurdle, will assume that Shoemaker can successfully defeat the first hurdle—thus, supposing that local freezes do actually occur and that the inhabitants of the world are able to become aware of them through sufficiently accurate and reliable measuring systems. Having made these assumptions, is it acceptable for Shoemaker's inhabitants to infer that global freezes (and periods of empty time) do occur every 60 years?

Shoemaker concedes that the following answer may be open to the inhabitants of his world: They conclude that the regularity of local freezes is simply broken every 60 years and the cycle is started again after the 59th year. Of course, this hypothesis *and* the original hypothesis (of a global freeze every 60 years) are both unverifiable, for as we have already discussed, a world where there is absolutely no change is impossible to measure. However, Shoemaker says that, although both hypotheses are unverifiable, when we are faced with two hypotheses that are “compatible with the same observed data, we should prefer the simpler of the hypotheses” (1969, p. 373). Shoemaker concludes that because the second hypothesis requires a breaking, every 60 years, of an otherwise accepted pattern of freezes, it is therefore the least simple of the two hypotheses. Thus, concludes Shoemaker, the global freeze hypothesis should be preferred and, with it, empty time detected.

Shoemaker notes that, for some people, declaring the global freeze hypothesis as the simpler of the two may not be acceptable, so to add force to his argument he provides several modifications to the imaginary world. These include allowing that: the length of freezes vary in duration (although they are shown to be over six months long, but less than a year), they occasionally overlap, and, finally, their variation in duration is shown to correlate with the length of a period of “sluggishness” that proceeds each freeze (during which the inhabitants find movement noticeably more difficult than normal). So in the 60th year, for example, there will be times when not all the regions of the world will be frozen and there will also be measurable times of sluggishness. Both of these factors will promote the frozen world hypothesis as the more probable (or *simpler*) of the two.

I concede to Shoemaker that the global freeze hypothesis does seem to be the simpler of the two, especially with the above modifications. However, as I have already begun to allude to, the weaknesses in Shoemaker’s argument occur before this point and I would here like to delve into three objections of my own that I believe to be fatal to Shoemaker’s cause.⁹ These are of the circularity of his reasoning, the definitions of change, and the problem of causation.

3.6.4 Objections to Shoemaker: Circularity

My objection here follows closely to my conclusion above that if the inhabitants of Shoemaker’s world were to prefer the “non-existing but still changing” local hypothesis the only way that they could believe that absolute time exists is if they had already assumed it. There is a similar circularity throughout Shoemaker’s project. By now the reader will be clear that the intention of Shoemaker is to present the *conceptual* possibility that people might have good reason to accept the existence of periods of time without change. However, his project begins by allowing that this very fact can occur on a localised scale. Now as has already been discussed, Shoemaker says that to deny this localised freezing is to appeal to the strong (and intuitively unlikely) claim that all things are moving (or changing) always. It is the supposed lack of intuitive support for this claim that Shoemaker would argue prevents his own argument from becoming circular. However, what if we were to show that this claim (that all things are changing always) was shown to have very much intuitive support? What then? Surely then, Shoemaker’s argument would be seen to be including the conclusion in the premises.

⁹ I have already raised some of these objections in the section on Shoemaker’s first hurdle, but will now develop them further.

I ask the reader to again think back to the discussion on the intuitive support for relativism and in particular the immense scientific backing for this claim that all things *are* moving always. Although this does not entirely rule out the possibility that an object could go through a period of existence and have no change, it does directly counter Shoemaker's own approach of basing his argument on the intuitive appeal that all things are not moving always.

Corish (2009) reaches the same conclusion in stating that "Shoemaker does not prove the possibility of changeless time; he assumes it. But another assumption is entirely possible: time is not absolute but relative to things happening, to change—and if no change occurs, there is no time" (p. 222). Corish develops this conclusion further by explaining that in Shoemaker's world it could equally be argued that time stops in each of the frozen regions. This phenomenon of time moving at different speeds in different frames, argues Cornish, is not strange given the suggestions of Einstein's relativity theory. Along these lines he says that something can appear simultaneous in one frame and not from another. In such a world, even 'instantaneous' events would be relative so that we would have a situation of "the non-existence of simultaneity" (Corish, 2009, p. 222).

Even more recently, Benovsky (2010) has reached the same conclusion of the circularity of Shoemaker's work: "The Shoemaker argument actually does not *show* that it is possible that there can be time without change, since local freezes are simply presupposed without argument" (p. 4). He later recommends an almost pragmatic method of deciding between the two hypotheses of absolutism (which he calls substantivalism) and relativism (relationism).

"The choice between substantivalism and relationism ... is thus a choice between alternate ways of formulating the same thing, where nothing really depends on the formulation, except that of course one formulation can be better than another in order to express in a more understandable way what one wants to say." (2010, p. 15)

However, I argue that there are legitimate reasons why we might prefer relativism over absolutism.

3.6.5 Objections to Shoemaker: What is change?

A question that I have thus far given scarce attention is what exactly constitutes change and, consequently, what qualifies as being labelled empty time. Aristotle (1930) clearly noted that he considered change could only be *real* change, that relational changes do not count, for example, a snooker ball is not changed because it is now closer to another snooker ball as a result of the latter's movement. However, as Hawking (1996) points out, Aristotle also believed in the concept of absolute rest, whereby if an object appears still then it *is* still, thus, giving him grounds for discounting relative movement from being an instance of change. Hawking demonstrates this mistake: "One could equally well say that body *A* was at rest and body *B* was moving at constant speed with respect to body *A*, or that body *B* was at rest and body *A* was moving" (1996, p. 17). I will explore this idea of relative motion further, but first, let us consider other borderline examples of change.

Obviously normal physical movement (as opposed to relative movement) counts as change but what about thoughts? The detection of time obviously relies on there being a mind that can do the detecting and obviously a mind is constituted (even if of nothing else) of thoughts. Can we allow that thoughts or even the experiencing of just one thought does not constitute change? Assuming the answer is yes, let us suppose that the one allowed thought is "I am experiencing time" and in the interval of time when that is experienced there is no other change. Does this constitute our illusive experience of changeless time? I argue that it does not, for the experiencing of time and the thought of "I am experiencing time" are two different mental states, one of which follows the other, and between them there exists a real change in the observer's mind. Aristotle appears to have pre-empted this by saying, "when some time is thought to have passed, some movement also along with it seems to have taken place" (1930, p. 12). Therefore, we cannot allow even thoughts to occur during empty time, thus, further limiting our ability to detect it.

One type of change that I will however rule out as not constituting real change is Goodman's (1983) 'grue' and 'bleen' changes. In Goodman's paradox of induction he called an object grue if it was green up until time t and then blue from then onwards. So if an object remained green after time t then it would change from being grue to being non-grue. It is clear that such changes place an enormous weight on the concept of time, particularly of there being something significant about time t . However, this type of consideration is obviously not available to us who are still attempting to define exactly what time is. This means that we should not include changes in temporal position (if such changes are even possible—as depending upon the existence of absolute time) as

constituting real change. So, for the purposes of the present discussion, if all other factors are equal, we will consider object *O* at time *t* to be unchanged at time *t+1*. Shoemaker also discounts these types of purely-temporal changes for the purposes of his thought experiment.

Having included thoughts in our list of changes and discounted grue-like changes we can now return to our discussion on relative motion. This all hinges on the idea of absolute space. To explain why, consider a simplified world where there are just two objects, A and B. In an instance of change, B moves away from A (a fact that we infer from the increased distance between A and B). However, what is there to say, given the observable facts that we have at our disposal from this world, that rather than B moving from A, A is in fact the one moving and B is standing still? Further still, what is to deny the idea that indeed both objects are actually moving? Without a third object (of which, we could somehow know that *it* is not moving) to provide an absolute reference point, it is impossible to answer such questions.

The same is true when we populate our imaginary world with a similar number of objects that exist in the real world. Take the snooker ball example. A ball is hit and rolls across the surface of the snooker table. But what is to suppose that the snooker ball actually remains still and the rest of the entire universe rolls across the surface of the snooker ball? Or even that a combination of the two occurs. And indeed, as ridiculous as this sounds, the laws of physics, such as “For every action there is an equal and opposite reaction”, all tend to suggest that a combination of movements (where all objects move) is the reality. This idea can be seen in the classic example of an astronaut in space. To move, he or she only needs to throw an object, such as a spanner, in the opposite direction that they intend to travel.

A possible counter to this way of thinking could be to point out the trail left behind a shooting comet or behind a moving boat. Surely, one might argue, if it were the universe moving and not the comet or the boat, all the objects in the universe would exhibit this trail instead of the comet or the boat. However, in the case of the boat, if the ocean that it is sailing upon were the thing actually moving and the boat was standing still (absolutely, not relatively to the ocean) it would still require force from the boat to resist the movement of the water and as the boat is resisting the water’s movement it will be leaving a trail in its wake. A similar thought can be applied to the comet whereby, instead of the friction of moving water creating the trail, it is the ‘friction’ of surrounding

gravitational forces (given out from an entire universe full of planets and stars and so on, which are moving in the opposite direction to the comet) that are able to capture fragments of the comet away from the comet's motion-resisting force, thus, creating a trail effect exactly mirroring the effect that would be created if the comet were moving.

Therefore, the only way I can see that one might demonstrate the movement of an object through absolute space is if they were somehow able to demonstrate the existence of some sort of absolute fixed grid in space. And although we seem to lack such a possible grid in our own universe, perhaps it is conceptually possible that such a grid might exist. Such a fixed grid certainly seems to be conceptually possible, however to be relevant in Shoemaker's case, it needs to be conceptually possible that this absolute grid might be detected by the inhabitants of the world, and this is where the problem really lies. For the challenge facing the inhabitants is to understand when changes are occurring in their world. However, if they are unable to prove absolute space, they will be up against the problems I have just now raised of showing what exactly is moving at any one moment and what exactly is at rest. And sure, there may be absolute space in Shoemaker's possible world but how will inhabitants know it exists? For even if there is a visible three dimensional grid laid out in space, how is anyone to know that even this grid itself is fixed? Indeed you would need another fixed grid from which to gauge the former grid by. And to measure that fixed grid you would require another grid, and so on *ad infinitum*.

The consequence of this for Shoemaker's world is that the inhabitants would not have adequate grounds for saying that so and so object was at rest and so and so object was moving; for all they know, *everything* could be moving. With this in mind, Shoemaker's inhabitants are now disqualified from excluding relative change from their list of real changes, meaning that their belief in local freezes (and therefore, global freezes) would be severely (and arguably, fatally) hampered.

3.6.6 Objections to Shoemaker: Causation

Shoemaker concludes his paper "Time without change" with the problem of how exactly a frozen region or world might extract itself from a freeze. He concludes that, despite the way causation works in our own world (with the cause and effect being temporally adjacent to each other), it is a conceptual possibility of causation where the cause and effect are separated by time alone (and there are no intermediary and connecting causes and effects). In Shoemaker's words:

“I am unable to see any conceptual reason why it could not be reasonable for the inhabitants of a world very different from ours to believe that such causality does occur in their world ... then in such a world there could, I think, be strong reasons for believing in the existence of changeless intervals.” (1969, p. 378)

In getting to this point, Shoemaker rules out the possibility of something in an adjacent region sparking the frozen region out of its freeze, for if this were the case how could the fully frozen world become extracted from a freeze? So his alteration to the laws of causation is the only course left open to Shoemaker.

However, Shoemaker’s appeal to temporally separated causation relies on the combined assumptions that a) there is such a thing as absolute time (upon which temporally separated causation gains its separateness), and b) localised absolute rest is possible (in other words, that localised freezes are possible). As I have attempted to argue, localised rest is conceptually impossible to detect, however, this does not mean that localised rest is therefore conceptually impossible. So, assumption (b) is okay. However, once again, we encounter the circularity that dogs Shoemaker’s scheme, for we can only accept (a) if Shoemaker’s scheme succeeds, but this scheme relies on temporally separated causation being possible, which of course relies on there being absolute time. True, it may be that absolute time does exist (after all this) but what I have attempted to argue is that absolute time cannot be detected. So in a situation that appears otherwise equal (between absolutism and relativism), with no other way forward, we should prefer the theory that most confirms to our pre-philosophical intuitions, the suggestions from science and that which has the greatest philosophical pragmatic value. This theory, as I have argued, is relativism. And if we are to prefer it over absolutism in this way then it makes sense to be wary of allowing Shoemaker the assumption needed to satisfy his solution of temporally separated causation.

With such doubt thrown onto the idea of causation over a temporal distance, I must say that it counts as another factor against the inhabitants of Shoemaker’s world believing that they have adequate grounds for accepting the local and global freeze hypotheses (and with them the temporal vacua hypothesis).

3.6.7 Summary of Objections to Shoemaker:

To recap my objections to Shoemaker, I have argued that although he successfully navigates his own second hurdle, Shoemaker's reply to his first hurdle is insufficient. He underestimated the level of evidence the inhabitants would require to accept local freezes (as it can be argued that they do not have much intuitive appeal) and also did not consider alternative hypotheses. In particular, the 'non-existing but changing' hypothesis suggests itself as the most probable, but it suffers from the problem of begging the question of absolute time when it comes to a global period of non-existence (let alone the problem of explaining how a non-existing thing can change while it is non-existent).

Beyond these thoughts, I have summarised the key weaknesses in Shoemaker's project as follows:

- a) There is circularity in Shoemaker's work. He assumes the possibility of local freezes in order to prove global freezes (and essentially, there is no real difference between the two ideas—if we accept that one occurs it is no big step to accept that the other occurs also). Additionally, we also arguably have much more intuitive support for the thesis opposing the idea of local freezes; this is the thesis that all things are moving always.
- b) It is not possible to have adequate grounds for detecting absolute rest (because of our inability to detect absolute space), and therefore, for detecting a freeze.
- c) The acceptance of the idea of temporally separated causation relies on having already accepted absolute time. So, again, because we have pre-philosophical reasons for preferring relativism we can reject such causation.

As I noted earlier, point (a) does not rule out the possibility of local freezes, but it does suggest that the inhabitants of Shoemaker's world would have good reason to think that they do not occur. This would obviously weaken Shoemaker's scheme. And although point (b) does not rule out the possibility of absolute rest and of local and global freezes, it does provide further support for the inhabitant's acceptance of the hypothesis that local freezes do not occur. Finally, point (c) reveals another area of circularity that will further weaken any attempts for Shoemaker's inhabitants to have good reasons for believing in temporal vacua. So, from these points, I conclude that Shoemaker's scheme, of demonstrating the possibility that people might have good reasons to believe in time without change, ultimately fails—the good reasons for accepting relative time would outweigh any appeals of absolutism.

This answers our epistemological question of whether empty time can be detected. And of course the answer that I propose is that it cannot, even in an elaborately constructed possible world with all the tweaks that Shoemaker and I have considered. So now I turn to the metaphysical question of whether or not absolute time's inability to be detected is defeating to the absolutist's cause.

3.7 THE METAPHYSICAL QUESTION

Leibniz's Principle of the Identity of Indiscernibles (PII) states that "to suppose two things indiscernible, is to suppose the same thing under two names" (in McDonough, 2007). If we are unable to detect time without change, as I have just now argued, then we have no way of telling two temporally shifted worlds apart. So, for example, there might world W1 which is exactly similar to W2 except that W1 exists at time T whereas W2 exists at a later time T+1. Leibniz's principle would say that, because we are unable to discern the difference of the two times T and T+1 (as a result of our inability to detect time without change), these two worlds (W1 and W2) are therefore "the same thing under two names". Is this a fair assumption to make? Are we willing to accept Leibniz's PII rule?

This discussion of identity is a very vast area of study and I therefore here am unable to do give it the space it deserves. However, I will offer several recent arguments that are particularly relevant to our own branch of the identity discussion. Black (1952) offers the example of a universe in which only two perfectly identical globes exist. He asks us to, firstly, discern between the two globes and, secondly, decide whether there are indeed two globes there.

If we were to accept that absolute space exists we could assume an absolute north, south, east and west and an absolute up and down, and from here discern the two globes by saying one is further to the east or to the north or upwards from the other (which ever direction they might be apart). However, as I have already dismissed the idea of absolute space we must look elsewhere for an answer to this question.

Hacking (1975) suggests that in such a seeming two-globed universe there could be a system of mirrors placed in such a way as to create the impression of two indiscernibly identical globes when there is really just one. He also mentions that in this universe there

could simply be either one globe and an observer that sees double or two globes and an observer that sees normally. Hacking explains:

“... there is nothing true in one description and false in the other, except question-begging statements ... There is no clear way to decide which of the two worlds has the simplest laws of perception.” (1975, p. 253)

According to Hacking, in the case of indiscernible objects, there is always the hypothesis that there is only one object and this hypothesis, and its competitor, are both equally valid. Thus, Hacking gives support to PII or, more accurately, attempts to demonstrate that PII is not false, as Black’s universe might have done.

However, Adams (1979) offers another argument in support of the two-globed universe argument. He says, “No one doubts that there could be a universe like the universe of our example in other respects, if one of the two globes had a small chemical impurity that the other lacked. Surely, we may think, the absence of the impurity would not make such a universe impossible” (p. 17). There are, of course, problems with this idea, for what caused the small chemical imbalance in the first place? Surely, in a causally closed world¹⁰ for one globe to be different from the other it must have always been different and will always be so in the future, no matter how small the impurity.

Adams pre-empted this counter by offering another situation—which avoids these “spatiotemporal” causal problems—of two almost identical twins existing in a possible world. The twins are otherwise identical except that when they both had a dream on the same night when aged 27 one dreamt of a seven-horned monster and the other of a ten-horned monster. In such a case there seems to be no reason to demand that such differences are evidence of differing causal factors. So, here is a case of two *almost* identical things that could have very possibly been *perfectly* identical. However, Adams does point out that we should usually think that identity is determined not just at one time but at all moments of an objects existence. In the twin’s existence, their identity is only determined from age 27 onwards, up until then the PII rule might still hold. As such, Adams concludes that although the separate identity of two indiscernible objects might not be entirely determined, it is “at least logically possible” (p. 19).

I am willing to side with Adams here and agree that although differences between objects may be indiscernible it is not necessary that those two objects are actually only one. It

¹⁰ A causally closed world is an idea that most people would have no problem with.

may be all sorts of degrees of probability likely to be only one object but the logical possibility, as Adams points out, of there being two identical objects cannot be discounted. So, in relation to our question of whether two temporally-shifted worlds should just be called one world, I argue that: a) we have already discovered that we cannot discern them apart; b) we have numerous intuitive, scientific and other pre-philosophical reasons to suppose them to be one and the same; but c) despite this evidence we cannot hold to PII necessarily and must admit the logical possibility of the two temporally-shifted worlds being in fact two worlds—and, hence, admit the logical possibility of empty time.

3.8 CONCLUSIONS ABOUT TIME

We are now in the position of needing to make a call between the two theories of absolutism and relativism. I have denied that time without change can be detected and have also argued that this does not necessarily mean the denial of absolute time. So, this puts us in something of a stalemate where, although absolutism cannot be proven using the typical tools of philosophy, by the same token, it also cannot be categorically denied using those same tools. Thus, we are required to recall the discussions on our intuitive beliefs, on the suggestions of science and the philosophical pragmatism. On the basis of these three areas, as has already been argued, relativism is clearly the preferred theory. As such, I conclude that going forward we can define time simply as change and do not need to concern ourselves with an undetectable, impractical, intuitively-inferior absolute notion of time.

At this point the reader may say that this is all very well for me to say that time is just change but doesn't change presuppose time? For example, if change happens all in sequence, what is it that allows this sequence and where is this sequence housed? This is a thought that I have not considered up until now, and I have purposefully avoided it until we could reach a conclusion about the nature of time, because it is a discussion we may not have needed to venture upon. However, I also believe this criticism to be unfounded.

Ultimately, the idea that change presupposes time stems from a misplaced view of change. This view of change lays out each instance of change as distinct from other instances of change, and can therefore lay them out one-by-one in a sequence of changes resembling a timeline—hence, where the idea comes from that change presupposes time.

However, as I have argued throughout, change is occurring always in all things, so with this in mind it does not make sense to talk about instants of change (clearly divisible and quantised) but rather to talk about an ongoing process of constant change. Change does not stop and start; it is always present, in all things. Sure, we can point to noticeable, identifiably-different changes at macro levels (for example, the noticeable change of a tick of a clock, the movement of the earth or a mind entertaining a new thought), but we also know that beneath these 'quantised' changes are other smaller changes that appear to be ongoing and indivisible (for example, the movement of sub-atomic particles and also the processing and electrical firings of a brain). This type of change promotes itself more as an ever-present 'now' that is just simply constantly changing, rather than a sequence of instances of different changes.¹¹

¹¹ My discussion here could very nicely segue into the related topic of McTaggart's (1908) different series of time. However, with restricted space and a desire to return to the theological consequences of my findings about time, I will leave this discussion for another occasion.

4 THEOLOGICAL CONSEQUENCES

If time is just change, then what is God's relation to it? Well, we are told that God is unchanging (immutable), so if this is true it also seems logical to say that God exists outside of that which we know time to be. So God exists outside time.

However, many questions arise with this conclusion. From what I can see, they fall into two categories. The first category concerns the question of whether we really want to say that God is unchanging. We need to ask what scripture has to say on the matter and also how the idea of an unchanging being sits alongside my discussions about time up to this point. The second category of questions is concerned with how the idea of an unchanging God can stand alongside the other ideas we have of God: of being creator and sustainer of a changing world, being triune, being all-knowing (omniscient) and being infinitely alive.

4.1 IS GOD REALLY UNCHANGING?

4.1.1 Suggestions from Scripture

At the beginning of this paper I focused on several passages of scripture that, while not being definitive, certainly gave some direction as to whether God exists within time or not. My summary of these scriptural references was that God:

- Is, temporally speaking and from our point of view, eternal both into the past *and* the future;
- Also exists now;
- Existed before (not necessarily in a temporal meaning of “before”) the world began in a characteristically different type of existence from the present;
- Acted before (again, not necessarily in a temporal meaning of “before”) this present existence, or age, began;
- These actions, even if it included nothing else, involved the creating of “the heavens and the earth”;
- Despite existing in another age (potentially “before” time), God is no less alive than we are, in fact he is infinitely alive (including having ongoing interactions with our world), and;

- Our usual measures of time (years and so on) are useless in calculating and searching God’s eternity—again suggesting God has a different type of existence. This definition obviously leaves many questions about the nature of time and of God’s relation to time unanswered. Up until this point I have attempted demonstrate a philosophical definition of time as change, but before we can say what God’s relation to this time is, we must explore what scripture has to say about God and change.

Again I should stress that scripture does not provide us with solid and philosophically-ready definitions and explanations, but it can guide our steps somewhat. So here are several key scriptures relating to God’s immutability:

“But you are the same, and your years have no end.” (Psalms 102:27)

“I the Lord do not change.” (Malachi 3:6)

“God is not a human being, that he should lie, or a mortal, that he should change his mind.” (Numbers 23:19)

“... he is the living God, enduring for ever.” (Daniel 6:26)

“... the Father of lights, with whom there is no variation or shadow due to change.” (James 1:17)

“But you are the same, and your years will never end.” (Hebrews 1:12)

“Jesus Christ is the same yesterday and today and for ever.” (Hebrews 13:8)

“...God desired to show even more clearly to the heirs of the promise the unchangeable character of his purpose ...” (Hebrews 6:17)

Here we have examples of God not changing in his thoughts (Numbers 23:19), his purpose or character (Hebrews 6:17), his enduring (Daniel 6:26) and most of all in his entire person (Malachi 3:6, Psalms 102:27, Hebrews 1:12 & 13:8). So, according to scripture, God is not just immutable in his character (in that his morals do not go changing), but there is something inherently immutable about his entire being and existence, having “no variation or shadow due to change”. This all certainly suggests that God might be unchanging in a way that posits his existence outside of what I have defined time to be.

However, we also find in scripture many instances of God relating to humans, of performing miracles, of listening and talking, of changing emotions and even of his mind being changed. So somehow a biblically-aligned description of God’s nature needs to take into account both the idea that he is unchanging and the idea that he can change enough in order to perform actions and relate to a changing world.

4.1.2 Does relative change affect God’s immutability?

In my discussion about time above I argued that even relative change could not be distinguished from examples of real change. So if God is himself immutable, what does it mean to him that there exists a world, relative to him, that is very much changing? Does my moving my arms and hands to type this sentence change God?

Well, firstly, I need to point out that my discussion above in relation to Shoemaker’s argument was very much tied to a spatial existence, whereby the lack of support for absolute space meant that relative movement could not be discounted as an example of real movement. However, when we talk about God, we also understand that he is non-spatial: “God is spirit” John 4:24. This idea aligns well with the other thought elucidated from scripture above that God exists ‘before’ (not necessarily in a temporal meaning of ‘before’) the world began *in a characteristically different type of existence from our own*. In fact John 4:24 takes this description of God having a different existence so far as to say that “those who worship him must worship *in spirit*” (emphasis added). To understand how this different type of existence, as spirit, can avoid relative spatial change we can compare God to numbers. Numbers exist in a non-spatial sense and are also unchanged by any spatial changes and, although we would not wish to resign God’s existence merely to that of a number, it does provide an appropriate illustration what non-spatial existence may resemble.

This response to the criticism of relative change—to say that God simply enjoys a very different existence from our own—is fine until you introduce the other concepts of God that a fully developed theology of God requires. I explore these below.

4.2 THE COMPATIBILITY OF AN UNCHANGING GOD

So how exactly does an unchanging God that is spirit correspond to the ideas that we would usually apply to God? These include: God being creator and sustainer of a changing world, being triune (for the Christian idea of God anyway), being all-knowing (omniscient) and being infinitely alive.

4.2.1 Unchanging God as Creator and Sustainer

The key question here is not how an unchanging God created a changing world, but how an unchanging God *created*. Is not the creation of something an instance of change whereby not only the thing being created is changing but also the creator itself undergoes a change?

To answer this question, and also to provide a ready answer to the questions that follow, I would like to introduce a new concept of God's nature. From the above, we understand that God is spirit and exists in a realm very different from our own, however, we also understand God to be omnipotent, being able to do all things. One of those things that we should allow God to do is to change: because we can change, it would seem as a failing on God's behalf if he were not able to do likewise. Furthermore, as many of God's characteristics are his by necessity (being eternal and omnipotent and so on) it of course makes sense to say that God cannot change these things (for omnipotence can be defined as being able to do all that is logically possible to do), however, in regards to changes outside of himself he should certainly be allowed the privilege of bringing these about. And, as a consequence, when he brings about these things outside of himself, it inevitably changes something about himself, for example, when God *creates* heaven and earth, he changes into the creator. When he punishes one of his creations, he becomes a punisher. When he forgives, he becomes a forgiver.

The important point here is that these changes all occur apart from God, and, although these instances of non-God changes coincide with God's changing, we still know that, in the state of affairs where God hasn't created anything, God remains unchanged. For God, there is a possible world where he is unchanging and a possible world where he is changing (via creating and loving and forgiving). So to create the universe, and indeed anything other than himself, it was simply a matter of actualising the possible world where things change (and where God also relatively changes as a result).

However, does this go against all the work I have done above to show that God is changeless? And if not, how can something be both unchanging and changing at the same time? Well, firstly, I would argue that both the concepts of God as unchanging and changing are true. In a world where nothing else is in existence God is necessarily changeless, however, as he actualises a changing creation he too, in that world, becomes changing. Secondly, to understand how it can be true that God is both changing and unchanging we need to identify the area of contention in the words I have just used above

of being “unchanging and changing at the *same time*”. As I have already attempted to show, we no longer need to be concerned with being at the “same time” or at a “different time”, because we can substitute these terms with being in a world of change and being in a world of no change. And when God actualises the possible world of change (where there is creation and God is creator), it is no contradiction to maintain that the ‘already’¹² actualised possible world of no change (where it is just God in existence) still obtains alongside the changing world. To understand this it is necessary to remember that I am not saying that these worlds are actualised at the same time, but are simply both actualised one adjacent to the other (for talk of time is now irrelevant). This adjacentness can be compared to what we read in 2 Timothy 1:9 that God was “... before the ages began ...”, where “before” is not necessarily meant temporally but could be interpreted spatially, for example “in front of” (see Section 2.1). This thought also mirrors what Leftow (1991) argued, in that a ‘moment’ (to use his words, I would prefer an ‘existence’) is not necessarily a ‘when’, it can also be a ‘place’.

So I argue that there might be two types of existence (something that certainly conforms to the biblical idea stated above that God exists in an existence critically different from our own), one of which contains only God (and is therefore unchanging) and the other actualised by God to be changing.

4.2.2 Unchanging God as Triune

The specifically Christian concept of God as three persons fits well with this idea that God could exist both in a changing world and in an unchanging world. For in the possible world where it is just God that exists, and because we understand the trinity to still be perfectly one and united, there is no change. However, when God actualises changing worlds he is able to actualise different persons of himself that interact with those changing worlds. For example, the Holy Spirit might interact, and change as it does so, with a *spiritually*-changing possible world (or type of existence). And Jesus, as fully God and fully man (Hebrews 4:15, John 1:14, 1 Timothy 2:5), is the actualisation of God in a *physically*-changing world.

I must add here that these thoughts on the trinity obviously only apply to the Christian concept of God and, as such, are simply an attempt to look for a philosophically plausible way in which biblical ideas might be explained.

¹² For want of an equally appropriate word that does not have these temporal connotations.

4.2.3 Unchanging God as Omniscient

In Section 2.3 I identified areas of conflict between the two concepts of a timelessly eternal God and of an omniscient God (all-knowing)—a characteristic of God that most theists would want to promote. The problem is that if God is outside of time then he will not know what something is like “now” and we want to be able to claim that he knows all things. Additionally, if he is inside of time then he will not know what is going to happen in the future, particularly if we maintain the existence of human freewill.

However, with my scheme of reducing time to change and positing that God exists both unchanging and changing, we can allow that God has a perfect and constant view of the coming changes because he exists unchangingly. Also we can allow that he knows what it is like to be changing and amongst a changing world. This later idea of being amongst a changing world is my equivalent of knowing what it is like “now”, for we can replace this temporal wording of “now” with the non-temporal idea of “changing”. In this way, God can be seen to maintain his omniscience.

The final point I would like to make surrounding God’s omniscience is how a being who is unchanging could possibly think, particularly when earlier in this paper I argued that thinking was a type of changing. However, a response to this potential criticism is easily forthcoming, for an unchanging God who is also omniscient does not need to process information in the way that we do, where one thought leads to another and so on. God already *knows* all things, so instead of performing the process that we refer to as thinking, God simply *knows*. Knowing is not a process, but a state of being. So no change is taking place.

4.2.4 Unchanging God Eternally Alive

From our perspective, perhaps because we have no idea what an unchanging existence might look like (except of course for the existence of numbers, which appears quite dull!), it is difficult to see that God could actually enjoy infinite life. For in Jeremiah 10:10 we read that God is the “living God” and in 1 John 5:20 that “he is the true God and eternal life”.

Again, because it is possible to posit God as both changing and unchanging, we can easily understand that all the life we enjoy in this changing world God would certainly have the potential to enjoy as well. Then in regards to having infinite life in the non-changing world, there is not much we can say sensibly about it except that it must have at least the unity and simplicity inherent in unchanging numbers and mathematics, for this is the only unchanging thing we have to compare it to. As such, in each area of existence that we know about, it could easily be argued that God enjoys a greater level of life than any other being existing within that realm.

5 Conclusion

In this paper I have considered the ancient question of whether God exists within time or outside of time. In doing so I have spent much of my discussion on the related, and even older, question of what exactly time is. As such I have argued that time can simply be reduced to change. I arrived at this conclusion by showing that although absolute time cannot be detected, on metaphysical grounds, it cannot be categorically denied. Having reached this stalemate between absolutism and relativism I then appealed to intuitions, scientific suggestions and philosophical pragmatism to show that the relativist notion of time is the superior of the two theories.

So with time defined as change, I successfully searched for a scriptural basis that God is unchanging, and therefore, exists outside of 'time'. However, this needed to be balanced with the equally biblical principle that that same God creates, interacts and is even changed by our changing world. To overcome this hurdle I attempted to demonstrate that it is no contradiction to hold that God might enjoy a dual existence of unchanging in his own unique realm of existence and changing (in relative ways that do not affect his character) in our own realm of existence. And to be philosophically more accurate, by realm of existence, here I mean an 'actualised possible world'.

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