A SCIENTIFIC RECONSIDERATION OF GEOCENTRICITY

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Perhaps one of the grandest schemes that obfuscate our conception of modern science is the universal substitution of philosophical speculation for absolute truth. For example, when inquiring into the source for the origin of life upon this earth, as we have thus perceived, one is constantly battered with the assertion that the ancient theory of evolution (perpetuated by Darwin in the *Origin of Species*) is the undeniable source of life on our present planet. However, with that consideration in mind, we find as a rudimentary factor, even in our own treasured college texts, the claim that certain positions on universal centricity are the result of a philosophical base. One of the authors of the textbook, "Earth Science" states emphatically, "The early Greeks have been criticized, *and rightly so*, for using philosophical arguments to explain natural phenomena."[1] Naturally, if the criticism is "rightly so," then the entire theory of evolution should be labeled as being criticized as "rightly so," for it has an ancient Grecian philosophical background as well. Therefore, it would be intellectually defunct to dismiss a scientific possibility on the premise that the possibility itself is circumspect with philosophical proclivities.

It seems to be pretty much common knowledge these days that the two major competing arguments on the perspective of universal centricity are a geocentric (earth-centered) universe, and a heliocentric (sun-centered) universe. The former has the weight of history behind it, being the primary view of the center of the universe, while the latter operates under the auspice of the scientific community as being the view that has been demonstrated with observation, and is thereby correct and superior to the former. Nevertheless, as with any basic system of hypothesis, the criteria for separating fact from fiction is centered on the interpretation of the evidence. In the geocentric/heliocentric debate, the geocentric is dismissed without an after-thought on the consideration that the observable evidence catapults the heliocentric model, while leaving the geocentric model buried in the sands of abysmal ignorance. Hence, reasons for rejecting a geocentric universe in exchange for a heliocentric universe will be examined to determine if heliocentric observations can render a geocentric interpretation.

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[1] Tarbuck and Lutgens, 2003. *Earth Science*, (Pearson Education Inc.), p. 550; emphasis added.

The first objection to a geocentric universe to be examined is that of "Foucault's Experiment." Essentially, in 1851, the French physicist Jean Bernard Leon Foucault (1819-1868), attempted to substantiate the proposition that the earth rotates on its axis by staging a free-swinging pendulum to illustrate the motion. The idea is that once the pendulum is staged and set in motion, it will continue in the same path unless some outside mechanism imposes itself up the free-moving pendulum. In order to prove that the pendulum is certainly changing its position, a hard writing instrument would be placed on the bottom of the pendulum while it is in motion to demonstrate the variations in position. This is precisely the experiment that Foucault performed when he suspended an elongated pendulum from Paris' Pantheon dome. The outcome was that the pendulum was slowly but surely making positional changes, and subsequently returning to its point of origination in more than twenty-four hours. Therefore, because the pendulum was freestanding with no outside force acting upon it, it must mean that the earth was rotating upon its own axis thereby moving the pendulum.

An answer to vindicate a geocentric model of the universe against a critical objection such as Foucault's Pendulum is found within the advent of modern geocentric models. The first one, by the German physicist Paul Gerber,[2] showed that if the universe rotates around the earth once per day instead of the earth rotating on its axis once per day, then the usual evidences for heliocentrism, such as the Foucault pendulum would appear precisely as we see them. To demonstrate this model, Gerber assumed an "advanced gravitational potential." This gravitational system essentially reverses "cause and effect," such as an earthquake being due to stresses and strains within the rotating universe (which would effectively cause a strain build-up on earth), instead of the regular explanations of these stresses being built up along the cracks in the earth. Such ideas can be explained mathematically, like the mathematics describing the emission of radio waves. These field emissions would prescribe that a radio signal comes from infinity essentially, prior to the self-same signal being transmitted into the universe. Radio waves sent out by a radio transmitter can be mathematically explained with trigonometric sines and cosines. The catch is that this signal wave cannot just have its beginning in the middle. In order for the mathematics to perpetuate itself with the radio transmitter, there has to be a wave of some sort coming in from infinity to create the signal. An "advanced signal" of this nature is normally dismissed as being "unphysical," and mathematically nugatory. However, Gerber's advanced gravitational potential operates in a very similar fashion. The gravitational potential behaves as if the universe anticipates the position of the heavenly bod-

[2] Gerber, P., 1898. *Zeitschr. f. Math. u. Physik*, **43**:93.

ies and changes in each and every aspect in the universe. Be that as it may, in the earthquake example, the earthquake is thereby caused by the advanced potential. Hence, the earthquake registers the earth's response, which changes the shape of the earth, with that change being submitted back into space. At this point the universe would alter its rotation rate, beginning with the earth's surface and radiating out into the universe at the speed of light.

In 1918, two German physicists, Lense and Thirring,[3] considered the actions of elements inside of a rotating shell. Very similar to Gerber's work above, Lense and Thirring sought to demonstrate what the behavior of things like pendulums, winds, satellites, etc. would be like if the universe were a rotating shell. They concluded that the behavior of these entities would be as we observe them behaving, although not exactly. Lense and Thirring discovered a new effect, a twisting of an orbit which is commonly called "frame dragging" or the "Lense-Thirring effect." Furthermore, they were able to erect the postulation that the gravitational field inside of the rotating shell was not zero, as would be the expected outcome in the Newtonian gravitational model. They discovered that there were forces acting away from the center in the shell that were analogous to centrifugal and Coriolis forces. Hence, in this particular geocentric model, centrifugal and Coriolis forces are no longer "fictitious forces" or "effects," but identifiable and viable gravitational forces. Consequently, heliocentric proofs such as the earth's equatorial bulge, the stationary satellite, and the Foucault pendulum are equally justifiable to prove geocentricity.

A surprising source of objection to the geocentric system is the argumentation of the seventeenth century Italian scientist, Galileo Galilei (1564-1642). Galileo made many contributions to modern science, including perhaps his greatest contribution, namely, his descriptions of the behavior of moving objects. Nonetheless, Galileo was a major proponent of the heliocentric system, most likely converting to that point of view somewhere between 1593 and 1597 (although the exact dates are unknown). Galileo proffered the following evidences, which are verbosely executed as refutations for a geocentric universe:

1) "The discovery of four satellites, or moons, orbiting Jupiter. Galileo accurately determined their periods of revolution, which range from two to 17 days. This find dispelled the old idea that Earth was the only center of motion in the universe; for here, plainly visible, was another center of motion—Jupiter. It also countered the argument, frequently used by those opposed to the Sun-

[3] Lense, J. & Thirring, H., 1918. *Physikalische Zeitschirf.* **19**:156.

centered system, that the Moon would be left behind if Earth really revolved around the Sun." (*Earth Science*, pg. 558)

2) "The discovery that Venus has phases just like the Moon, demonstrating that Venus orbits its source of light—the Sun. Galileo saw that Venus appears smallest when it is full phase and thus is farthest from Earth. In the Ptolemaic system…the orbit of Venus lies between Earth and the Sun, which means that only the crescent phase of Venus could be seen from Earth." (*Earth Science*, pg. 558-559)

Considering these refutations gleaned from Galileo's material, several things should be noticed. One, a strikingly interesting detail that Galileo offered as proof for a heliocentric universe was his supposed discovery that the Sun rotated on its own axis about once per month. Howbeit this intricate detail isn't discussed in the very same text (Earth Science) that lists the other supposed evidences for Galileo's rejection of geocentrism. Notwithstanding, it should be noted that this piece of evidence was based upon metaphysical reasoning on Galileo's part and had no real physical principle on which to be based. Therefore, during Galileo's day, it was dismissed. Secondly, Galileo's argument concerning the moons of Jupiter is only a partial fact. While it is a fact that he discovered four moons (satellites) that indeed orbit Jupiter, basing this discovery as a sure proof for the authenticity of heliocentrism is an argument by analogy at best. The truth of the matter is that this argument only countered one argument purported by the Aristotelians that the earth could not be in motion around sun because it couldn't drag the moon with it around the sun. Acknowledging that Galileo's discovery of orbiting satellites around Jupiter that subsequently orbited the Sun only refutes that particular aspect of the Aristotelian theory. It most certainly was not proof for the motion of the earth. As stated before, it would only set up a proposition for an analogous hypothesis. Thirdly, Galileo's discovery of Venus' exhibition of phases similar to that of our own moon is not a proof for the motion of the earth. It was an error on the part of Galileo to assert that the Ptolemaic model could not give a sufficient explanation. The reason for this is that Galileo's discovery could not hold any weight under criticism if one allows epicycles centered on the sun. The only way that Galileo's discovery could be correct is if one insisted on earth-centered orbits. Finally, another observation that isn't too commonly discussed in academic circles is a confession by Galileo in the latter part of his life. In a letter written to Rinuccini concerning Pieroni's material about the yearly motion of certain stars, he stated:

> The *falsity of the Copernican system* must not on any account be doubted, especially by us Catholics, who have the irrefragable authority of the Holy Scriptures interpreted by the greatest masters in theology, whose agreement renders us certain of the stability of the earth and the mobility of the sun around it. The conjectures of Copernicus and his followers offered to the contrary are all removed by that most sound argument, taken from the omnipotence of God, He being able to do in many, or rather infinite ways, that which to our view and observation seems to be done in one particular way, we must not pretend to hamper God's hand and tenaciously maintain that in which we may be mistaken. And just as I deem inadequate the Copernican observations and conjectures, so I judge equally, and more, fallacious and erroneous those of Ptolemy, Aristotle, and their followers, when, without going beyond the bounds of human reasoning, their inconclusiveness can be very easily discovered.[4]

According to Isaac Newton (1642-1727), the centrifugal force of the rotation of the earth caused the earth to bulge at the equator. This bulge is called, "the oblateness of the earth." Hence, as a result of the earth's equatorial bulge, the equator is further away from the earth's center than at the poles. Therefore, the force of gravity is less at the equator than at the poles. This can be illustrated by taking a cup of water and observing it, as the surface of the water appears to be flat. However, once you begin to stir the water and the water circles more speedily within the cup, the surface becomes more and more concave. Notice that the water in the cup is rotating in conjunction with its surrounding area, which in the case of this example would be the universe. Isaac Newton came to the conclusion that the surrounding area represented an absolute, immovable space, which today is known as "an initial frame of reference." However, if this appears to be concrete proof for the motion of the earth, hence a Sun-centered universe, Dr. Bouw offers the following commentary to the contrary:

> "Hood discovered that by rephrasing Newton's laws using variables measured relative to interacting particles, 'the law of inertia is no long required.' Also, use of the change in variables allows time and space invariance to include accelerated observers. In short, the use of relative variables means it does not matter which is turning, the earth or the universe: the results are the same. Hood's approach re-

[4] Drake, S., 1978. *Galileo at Work—His Scientific Biography*, (Chicago: Univ. of Chicago Press), p. 225; emphasis added.

duces Newton's three laws to one law. In particular, this means that the law of inertia need never be appealed to."[5]

A treatise of this caliber could never permit the time and space it would need to endeavor into a discussion of the many other aspects of the geocentric/heliocentric debate such as, other geocentric models and their explanations, the aether, the origin of gravity, stationary satellites, geocentric explanations of the seasons, geocentric explanations of retrograde motion, a modified Tychonic system, parallax, aberration, etc. However, it was needful to cite examples of heliocentric objections to a geocentric universe which do not necessarily hold absolute weight under criticism. Under investigation, it seems that the proofs offered as conclusive evidence for the heliocentric perspective of the universe, can just as easily be applied to a geocentric perspective of the universe yielding the same results. As has been pointed out, with certain modern, geocentric models, the Foucault pendulum argument would be just as viable to prove an Earth-centered universe. Galileo's arguments prove certain aspects of the old geocentrism view to be in error, but none of his heliocentric evidences prove anything about the motion of the earth. Hence, it is becoming more and more clear that the only way to know for absolute certain as to whether the universe is Earth-centered or Sun-centered, would be for the inquiring individual to be on the outside looking in. Therefore, this debate is ultimately left not only to initial philosophical speculations, but also to the undeniable fact that the proposed "observations" are indeed relative to the observer.

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[5] Gerardus D. Bouw, 1992. *Geocentricity*, (Cleveland: Association for Biblical Astronomy), p. 226.