

Geocentrism: An Astrophysicist's Comments

Gary North

In November, 1992, I published a position paper, *Geocentricity-Geostationism: The Flat-Earth Temptation*. It was a critique of the geostationary hypothesis. I argued that this position is not taught in the Bible. I cited James Jordan's 1981 essay to this effect, "The Geocentricity Question," which ICE had published in *The Biblical Educator*.

I made a number of layman's observations on the logic of geostationism, but the one I regard as clearest to those not initiated into the arcane realm of astrophysics is one that was raised in a question-and-answer session by an attendee of one of Dr. James Hansen's seminars on geocentricity. Dr. Hansen did not give what I regard as a straight answer. The question is this:

If the earth is stationary, why don't the communications satellites fall down?

This is a very simple, very obvious question. It deserves an equally simple and obvious answer. These satellites are said by modern astrophysics to be in geosynchronous orbit with the rotation of the earth. The gravity of the earth does not pull them back to the earth because the centrifugal force of their orbits exactly counteract the force of gravity. They hang above the earth - not motionless, but seemingly motionless. They whirl around the axis of the earth, but synchronized with the whirling of the earth around its axis.

If the earth is stationary, then there are no orbital centrifugal forces counteracting the force of gravity. Yet the satellites do not fall to the earth. Something is holding them up there. I asked a very simple question: What?

Needless to say, I received letters from Hansen's disciples giving me the usual geostationist apologetic: "The mathematics of geostationism is the same as the mathematics of heliocentrism." They buried me in equations. This is an apologetic methodology with them. They refuse to say how the satellites stay up there. Apparently, the satellites are held up there by the force of equations.

U.S. satellites and U.S. space shuttles are launched from Cape Kennedy in Florida. Florida hangs down lower than the other U.S. states, closer to the equator. The rotation of the earth serves as a "slingshot" into outer space. They are not launched by any nation from

northern or southern latitudes. They are launched from latitudes close to the equator. If the earth does not rotate, why can't they be launched equally inexpensively from anywhere on earth? The satellites are all in a close-packed orbit area that is now filling up with debris. There will eventually be an economically cataclysmic chain reaction from pieces of shattered satellites smashing into other satellites, creating more shattered satellites, etc. So, why isn't the U.S. launching satellites from, say, North Dakota? (In summer, of course.)

The Challenge

I was challenged by one geocentrist to find an astronomer who would defend the heliocentric worldview from the criticisms of the geocentrists. I have found such a man. While most astrophysicists are uninterested in engaging in such an odd activity, this one is an old classmate from college: M. M. Nieto. I paid him to write an essay on the topic; the laborer is worthy of his hire.

I agreed not to tamper with what he wrote. He is not writing from a biblical standpoint. The challenge offered to me was that I find any astronomer - not just a theonornic one - to write a response. I have accepted this challenge. So has Dr. Nieto. I leave it to him to present the evidence from the realm of science. He will now get to respond to any critics from the world of geocentrism. His address is M. M. Nieto, c/o Los Alamos National Laboratories, Box 1663, Mail Stop B285, Los Alamos, NM 87545.

I had hoped that he would keep it simple, but the tendency of scientists is to write like scientists for other scientists. I had hoped that he would put his equations in an appendix. He didn't. But he did do his best to be clear. He lays down a challenge to the geocentrists: show how their theory would have led to recent observations. Maybe this could have been done, but it wasn't done. Einstein's model did predict these observations.

Until geocentrist scientists can offer a comprehensive alternative to the modern view, and make better predictions than the modern view, they will not gain many converts. But if geostationism is true, there are fortunes to be made from satellites launched from North Dakota.

Testing Ideas on Geostationary Satellites

Michael Martin Nieto¹

ABSTRACT

This newsletter has asked me to review the ideas of papers [1]-[5] which propose a geocentric solar system with non-moving geostationary satellites. These ideas are in contradiction to standard scientific opinion, which has a Copernican solar system with satellites orbiting around the Earth, geostationary satellites having orbital periods of 24 hours.

I The Nature of Scientific Dialogue

For there to be any meaningful discussion of the disagreement between the scientific and interpretist camps, there has to be a set of ground rules. For example, from Hanson's point of view [5], any disagreement between his literal interpretation of the Bible and scientific prediction must, as a question of faith, be decided a priori in favor of his literal interpretation. If that is true, then there is no discussion. All that people can do is to state their views, try to make their views understood if not believed, and to peacefully agree to disagree.

However, if one chooses to venture into the other camp to try to convert, then one must agree to play by the other camp's rules or else, once again, there is no meaningful discussion.

For example, if a member of the scientific community wishes to argue with the geocentrists on the basis of Biblical interpretation, it does no good for him to argue on the basis of the philosophical musings of a 19th century agnostic. As I would put it, that would be like the Pope and the Ayatollah arguing about the nature of the Godhead on the basis of the Bible vs. the Koran.

Here we have the opposite situation. We have literal interpreters making "scientific arguments" for a geocentric system. They can believe geocentricity as they will, but if they choose to make the arguments scientifically then they must stand up to the values of scientific discussion. (Similarly, in the alternative arena, the arguments of the agnostic would have to stand up to Biblical writings.)

What, then, would I state is the nature of scientific understanding from both theory and experiment? (Please note that here I mean "theory," not in the sense of an untested speculation but, in the sense of an explicit, testable, mathematical formulation which is predictive, Stick with me!)

The first thing a correct theory must have is agreement with experiment; not just so-so approximate agreement, but agreement to the best of experiment. Also, the reader must understand

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what is meant by physicists when they “overthrow” an established theory. To physicists it is like, “The Theory is dead, long live the Theory!”

An accepted theory will have been found to make correct predictions in a wide area of physics. Even so, we keep testing it in newer and newer areas. Finally, we find a place where the theory fails. Then we construct a new theory which predicts not only all the correct results of the old theory, but also predicts correctly where the old theory fails. From our point of view it is not that Newton was wrong, but that Einstein is “righter.” Einstein stands on the shoulders of Newton. Now we (including myself [6]) are looking for places where Einstein’s theory fails so that we can find a new theory which is “righter” than Einstein’s.

II The Historical Basis of Modern Science and Newton

I claim the first great scientist, vs. medieval natural philosopher, who understood the above was Kepler. He was trying to explain the shapes of the orbits of the planets. He started from a preconceived harmony of the spheres, where the orbits were based on spheres within which were inscribed regular polygons. But the observations did not agree with his theoretical predictions. However, contrary to most natural philosophers who would have been tempted to force the data to agree with their theories, Kepler abandoned his theory. This allowed him to find that ellipses, whose special cases are circles, are the orbits of the planets.

Kepler and Galileo were the two giants upon whose shoulders Newton stood. In the end, with what are very simple equations. Newton could explain the orbits of the planets, gravity on Earth, and the tides. This was truly amazing. With simple equations, not wheels within wheels and a new wheel for every new observation, there was agreement with experiment.

III Newton and the New Planets

But furthermore, there was contained within Newton’s equations predictions of things which had not been seen. In the 1830’s there was a tremendous problem. The orbit of Uranus was behaving incorrectly. Either a) Newtonian gravitation was breaking down, or else b) there was another planet out there which was causing perturbations of the orbit of Uranus. Two gentlemen, John Couch Adams and Urbain Jean Joseph Leverrier independently and correctly calculated the existence and location of the new planet. On the very first night of looking for it, Neptune was discovered [6]. That is theory. No new wheels within wheels.

This emphasizes again that a scientific theory must be predictive. The theory must be able to predict new things without having to add a new wheel every time a different phenomenon occurs.

IV Newtonian Gravity “Breaks Down”

It is also instructive to look at the breakdown of Newtonian gravity. 45 years later, another funny orbit was confirmed. that of Mercury. It took 35 more years to find the solution. There was no new planet close to the Sun, the mythical Vulcan. Rather, there was a new theory, general

relativity, which predicted [8] the funny new effect in the orbit of Mercury, the anomalous shift of its perihelion. In particular, the prediction is

$$\Delta\phi \text{ per revolution} = \frac{6\pi GM}{(1 - e^2)ac^2}, \quad (1)$$

where G is Newton's constant, c is the velocity of light, M is the mass of the Sun, and e and a are the eccentricity and semimajor axis of Mercury's orbit. The prediction is 43 arc seconds per century, which is what is measured. This observation is very difficult. But general relativity can also be used to calculate the shifts in the perihelion of asteroids and, even better, satellites which can be given highly eccentric orbits. These comparisons between theory and experiment are even more precise [8]. Contrariwise, even if there were a widely known geocentrist prediction, how would the anomalous shifts of the perihelion of asteroids and solar satellites work out?

✓ Verified Predictions of Gravity Theory

I now want to discuss other effects that were predicted from general relativity and then measured.

A Time delay

General relativity predicts that if you reflect a radar beam back and forth from a planet just on the other side of the Sun, the radar beam will be time-delayed. That is, it will take longer for the radar beam to reach us than the straight-line velocity of light would say. For Mercury, for example, the prediction is

$$\Delta t = \frac{4MG}{c^3} \left[1 + \ln \left(\frac{d_m d_e}{R^2} \right) \right] = 240 \mu sec, \quad (2)$$

where M and R are the mass and radii of the Sun and the d 's are the distances from the Sun to Mercury and to the Earth, respectively. This value is verified experimentally. Indeed, a more precise experiment, to 0.1 %, was done by sending a transponded beam from the Voyager lander on Mars. Geocentrism does not predict this effect.

B The Apollo corner reflectors

In fact, this brings us to the next effect. Do you remember how the Apollo astronauts left corner reflectors on the Moon? (Corner reflectors are mirrors shaped like the corner of two walls and the ceiling which reflect light back from whence it came.) Well, with the aid of these reflectors, we now know the position of the Earth with respect to the Moon to within about 2 centimeters. The precise, relative locations of the Earth, Moon, and the Sun are not those predicted by even Newtonian theory, but by general relativity. In particular, the positions are those which include the effect of the Moon falling about the Earth while the Earth falls about the Sun [8]. Of course, geocentrism has never predicted this.

C This year's Nobel Prize

Perhaps most appropriately, this year's Nobel Prize is about an effect which would have destroyed the universe long ago if geocentrism were correct. First I must digress to explain what the effect is.

Consider a race car going around an oval. You all know how it is much easier to maintain speed on the straight-aways. When you go around a corner, even if it is banked, you lose power and energy from friction. The same type of thing is true of particles in an accelerator. Remember how big the SSC was going to be? That is because, as particles go around in a circle, they lose energy in the form of light, X-rays, etc. In fact, the name, "Bremsstrahlung", is German for "braking rays." The tighter the circle the more braking energy is lost... Therefore, to reduce that energy loss, the SSC was going to be very very big.

Now we can come back to gravity. There is a binary pulsar system called PSR 1913+16. The two stars, rotating about each other, are very dense and very close and orbit very quickly about each other. There is also a braking energy in gravity. It is called "gravitational radiation." Usually it is so small you cannot hope to see it. But for a system like this double star, you can see its effect. The prediction, which comes from a precise mathematical formula, is that the two stars rotate faster and faster, and get closer and closer in towards each other with a precise value. The rate of change of the period of the orbit is predicted to be

$$\frac{dP}{dt} = -\frac{192\pi}{5c^5} \left(\frac{2\pi G}{P} \right)^{5/3} \frac{(m_1 m_2)}{(m_1 + m_2)^{1/3}} \left(1 + \frac{73}{24}e^2 + \frac{37}{96}e^4 \right) \left(1 - e^2 \right)^{7/2}, \quad (3)$$

where the m_i are the masses of the two stars. e is the eccentricity of the orbit, and P is the period. The prediction is $-2.4022 \pm 0.0002 \times 10^{-12}$, and the observation is $-2.422 \pm 0.026 \times 10^{-12}$ [9]. That was why Taylor and Hulse got this year's Nobel Prize.

If geocentrism were to predict this effect, which it does not, then it would have to predict something else. It would have to say that all the stars in the sky, which geocentrism says are rotating about us, should be gravitationally radiating themselves down to us, leading to our eventual destruction (depending on how large one says is the age of the universe). But that last point aside, if geocentrism were correct, we should be seeing the universe decaying towards us right now. We don't. (This leaves aside the problem that even the near-by stars would have to be traveling faster than the speed of light.)

D Other effects

There are many other predictions that come from the same sets of equations: the gravitational bending of light, the gravitational red-shift of light, the Doppler shift of light from moving objects, gravitational lensing, and on and on. There is no need here for me to repeat the entire literature. Please consult reviews on the topic [8]. All the examples work, with amazing precision. A scientist is impressed the way a basketball fan is impressed with the skills of Michael Jordan. Geocentrism cannot predict these things from a set of given equations . . . or to be exact, has not predicted these things.

411 the above again reminds us of how scientists find new and better theories. They test the predictions of the old theory in as many places as possible, searching for the theory to break

down. When that happens, it is a breakthrough. As stated above, the way to look at it is not that the old theory was wrong, but that the old theory has limits and the new theory describes more things. The new theory must get everything right that the old theory did and then get other things right that the old theory did not. Thus, general relativity improves upon Newtonian gravitation in the large, and quantum mechanics improves upon classical physics in the small.

VI Geocentric Ideas

Now we return to the geocentric ideas on geosynchronous satellites. Upon careful reading of Refs. [1]-[5], one sees that there is no explicit mathematical theory as to why the satellite would stay up there if the universe were geocentric. The authors postulate that maybe there is a sphere of matter (no good, they realize, there is no force inside a sphere of matter), or then maybe there is a ring and maybe this could account for it. They speculate. But they do not show. They do not calculate any matter distribution that would cause the satellite to stay up there. It is *ad hoc*.

What they are saying is, "I believe there is another answer because I believe there is another answer." That is fine, but until one finds an answer that predicts this and all the other effects we have discussed or alluded to, geocentrism remains outside the framework of scientific discussion. One has to have a mathematical formalism that explains this oddball phenomenon precisely, with numerical values [10]. Contrariwise, the standard Newtonian physics predicts very precisely how the satellite will behave. (Amusingly enough, the USA needed to include the effects of general relativity to locate its satellites to cm-scale precision [11].)

As a last point, which is perhaps most transparent to the general audience, I want to discuss parallax of near-by stars, which would not occur in geocentrism. Look at Figure 1. It shows the Earth in its orbit on one date (position a) and on a date 6 months later (position b). There is a bright distant star, A . (The distances are foreshortened in the figure.) There is also a close-by star, B , situated as shown. (Even van der Kamp concedes the distance to nearby stars can be measured [12].) On the first date, the angle subtended by A and B is the positive angle α . But six months later it is the negative angle β . This change of angle is observed and is totally understandable in the Copernican system. In the geocentric system the star must move back and forth a different amount for every close star, even though the stars are supposed to remain fixed on an orbiting sphere.

The geocentrist can believe what he will. That is his right. But the members of the Flat Earth Society also have the right to believe in a flat Earth-and they do!

VII Conclusion

Therefore, although one certainly has the right to believe in geocentrism if one will, it is not a scientific belief. Science does not operate with theories which cannot 1) predict experimental observations that are seen now [8], or 2) cannot predict things which are found later [13].

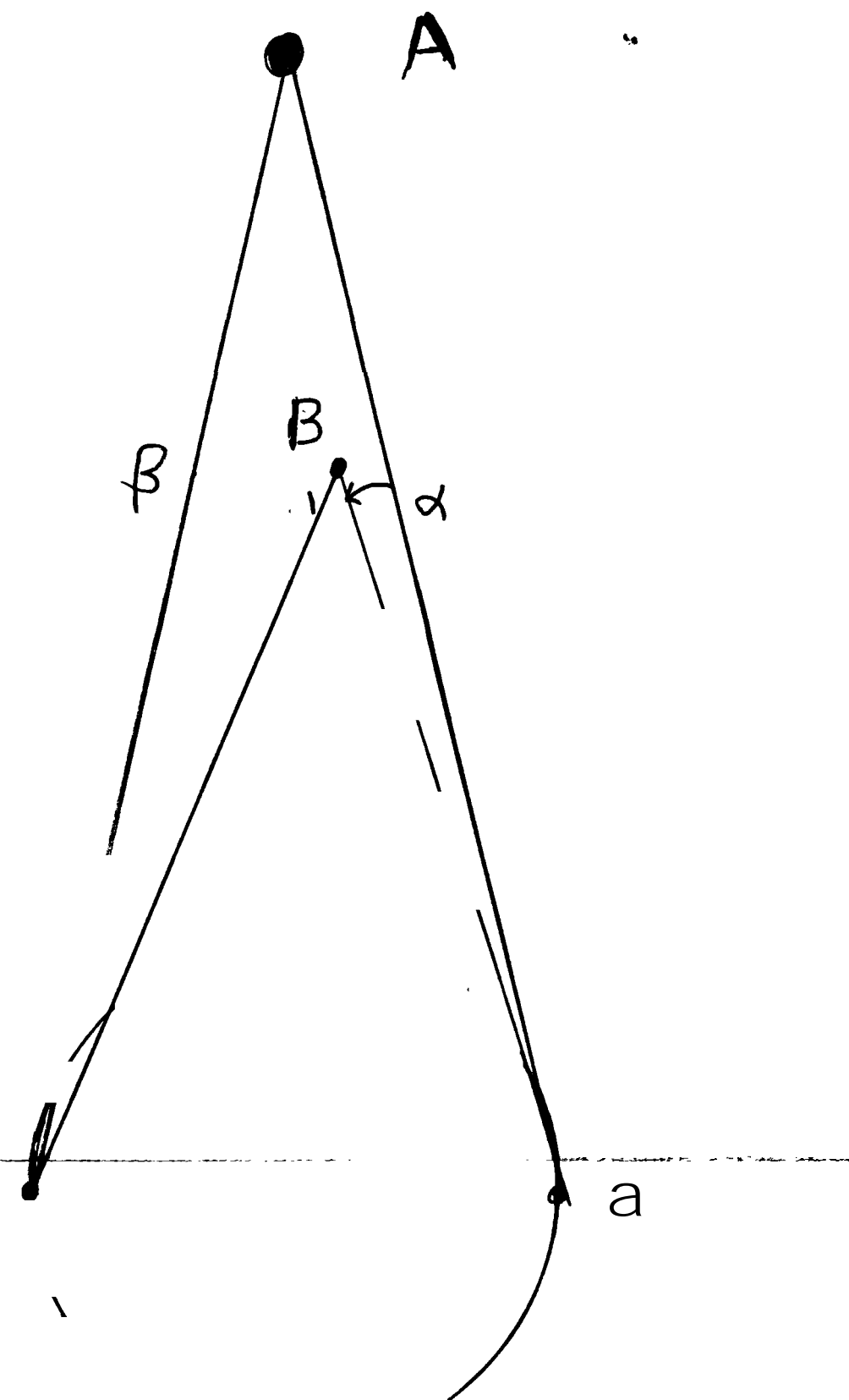


Figure 1.

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- [I must also point out that the discussions in the papers under consideration of things like errors in understanding of 1977 satellite positions have long since become moot. You may have heard of the Global Positioning Satellite Systems (both civilian and military). With lasers reflecting off of orbiting satellites, one can now tell one's position with respect to the satellites and to the center of the Earth from any place on Earth to within a few centimeters.
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- [Walter van der Kamp, "Einstein - Right or Wrong?", Chalcedon Report, 23 (May, 1994).
- [There is a gravimagneto effect related to the Earth's rotation, which amusingly draws upon the work by Thirring cited by Byl [3]. Attempts will be made to measure this effect with a gyroscope orbiting about a rotating earth (Schiff gyroscope experiment) and by two satellites (LAGEOS I and III) orbiting about a rotating Earth in complementary orbits. This is a prediction, whose test will hopefully come about this decade.