

PRECESSION PARADOX

Was Newton Wrong?

The Author of a Startling New Book Rexamines the Evidence

• BY WALTER CRUTTENDEN

Stories about the Precession of the Equinox abound in the myth and folklore of ancient civilizations throughout the world. In the groundbreaking book, *Hamlet's Mill*, authors Giorgio di Santillana, former professor of history and science at MIT and Hertha von Dechend, of Wolfgang Goethe University in Frankfurt, detail the ancient fascination with the precession of the equinox. It is an exhaustive study that shows that pre-history peoples not only seemed to track the movement of the stars across the sky but relate it to the rise and fall of the ages. Even Sir Isaac Newton wrote a little-known book, *The Chronology of Ancient Kingdoms*, wherein he attempted to match the world ages of the precession calendar with historical events. But why were our ancestors so obsessed with such an obscure astronomical motion? Today only a small number of astrophysicists try to understand the theoretical motions and dynamics of precession mechanics and they have completely disassociated its explanation with any myth or folklore.

Precession of the Equinox Defined

The age-old phenomenon whereby the equinox moves backwards through the constellations of the Zodiac at the rate of approximately 50 arc seconds annually (one degree per 72 years). This means, an observer standing at the point of the equinox (the day when darkness and light are of equal length) looking at the sky very closely will notice that exactly one year later (on the like equinox) the stars will not be in their exact same position as the year before. Because the exact timing of the point of equinox is so tricky and the movement is so small it is quite difficult to detect in just one year but over long periods of time you can't miss it.

In 1543 Copernicus tried to explain this mystery and two others when he told us that the earth had three motions. First, he said the Sun appeared to move overhead from east to west not because the sun actually moved but because the earth spins on

its axis. Second, he explained the seasons by showing us the earth went around the sun on a tilted axis (in a heliocentric system) thereby changing the length of the day and the amount of sunlight received. But he needed a third motion to explain the precession of the equinox. Here he postulated that the earth "liberated" or wobbled. He assumed it was this wobble that changed the angle of the axis enough to cause the equinox to move or precess relative to the fixed stars. But he never said why it wobbled.

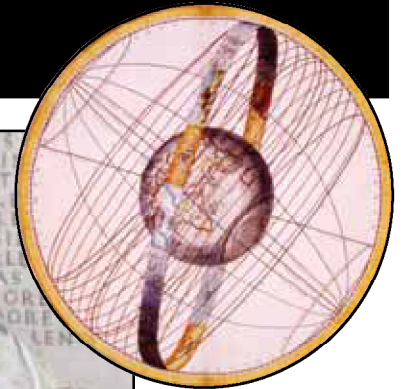
It was Newton, over one hundred years later, who had just codified his laws of gravity, that determined that the only bodies close enough or large enough to actually wobble the earth were the moon and the sun. Thus began the theory of "lunisolar precession" to explain the observable of the precession of the equinox.

Problems with Lunisolar Theory

The "lunisolar" theory states that the earth's changing orientation to the fixed stars (primarily seen as the Precession of the Equinox) is principally due to the gravitational forces of the moon (luni) and the Sun (solar) acting on the earth's equatorial bulge (the fat part around the middle). These objects are thought to produce enough opposing force or torque to slowly twist the Earth's spin axis in a clockwise motion, so that after a period of approximately 25,770 years (at the current rate) the earth would



Newton statue by Roubiliac at Trinity College, Cambridge



have completed one retrograde motion on its own axis—and one retrograde orbit.

In this theory the Earth is thought to behave like a wobbling top.

It is an observable fact that the earth's spin axis, and therefore the point of equinox, does change relative to the fixed stars. People have noticed this for thousands of years and this is why it is said that we are now at the "dawning of the age of Aquarius." The Vernal equinox is now leaving Pisces moving into Aquarius, as seen on the first day of spring.

The precession of the equinox is real when viewed against the backdrop of the fixed stars.

But here is the catch: there is no evi-

dence that this observable is due to any change in the spin axis relative to the sun, or moon or venus or anything "within" the solar system! Studies of the position of the axis relative to these bodies, just recently completed, confirm this. So how can the earth appear to precess relative to objects outside the solar system but not relative to objects within the solar system? This is the precession paradox.

Remember that Copernicus guessed the spin axis must wobble but he never gave us a cause. It was Newton, who assumed the

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earth wobbled relative to all objects, within and without the solar system, but he had no way to check if this were true.

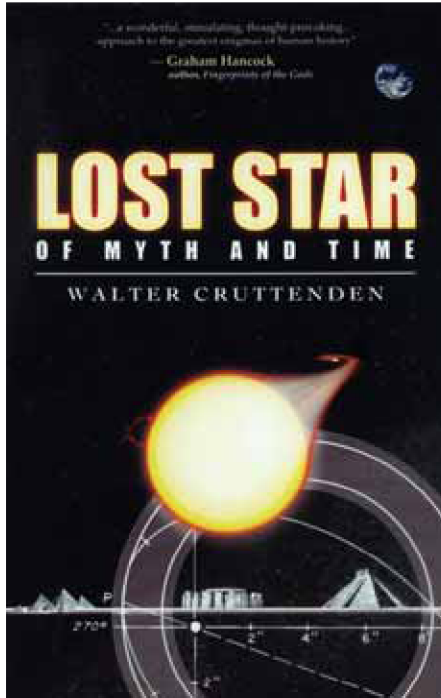
As we now know, Newton's equations never did match observed precession rates, so along came Jean le Rond d'Alembert (1717-1783), followed by many others who have continually tweaked the formula to match observation. Ironically, none questioned the underlying assumptions (in science you usually don't question Newton). And so no one stood back to ask if this "wobble" might just be an apparent motion (one not occurring within our local reference frame of the solar system). To this day astrophysicists continue to modify the calculations for precession, which now include many factors beyond the original "lunisolar forces" (including other planets, asteroids, a possible elliptical movement of the earth's soft

core, etc.) all in an effort to better predict the precession rate. To me, this all looks suspiciously like a "plug," the act of coming up with new or different data to fit the predetermined answer. In the precession equation the current answer is about 50.29 arc seconds per year of change in the earth's orientation to inertial space—it can be measured. So, a lot of different inputs have been invented to get close to this answer. But all the "plugs" will never quite fit if the answer has a different cause.

The big thing wrong with the dynamicist approach (the process of looking strictly at the local gravitational dynamics) is the assumption that the earth's axis wobbles relative to all objects inside or outside the solar system. This is a blunder of historical proportions that has obfuscated not only our understanding of precession, but also the very motions of the earth. Fortunately, new studies involving the timing of the venus transits, lunar rotation equations and the earth's motion relative to other objects in the solar system (such as the Perseids meteor shower) all show that the earth does not precess relative to local objects.

In spite of this, the current paradigm is

so widespread and well accepted that when I mention the idea that the earth does not precess or wobble relative to local objects, astronomers are completely baffled, or they look at me as if I am insane. It is like telling people in Ptolemy's time that the sun does not go around the earth: They look up, see that it does, then conclude you're crazy. But the truth is, the so-called "wobble" is primarily the geometric effect of an unknown motion. There is an unaccounted-for reference frame—the solar system curving through space—producing the observable phenomenon we call precession.



Looking with New Eyes

Here at the Binary Research Institute we have found that lunar rotation equations do not support lunisolar theory, nor does the earth's motion relative to nearby objects support the theory. Consider our largest meteor shower as a case in point.

As you may know, the Perseids is one of the most reliable meteor showers of the year.

Caused by the Swift-Tuttle comet debris slicing

through the Earth's orbit path it peaks on August 11-12 each year (depending on recent leap year adjustments). Hence, it effectively acts like a marker that intersects the earth's path around the Sun and has been plotted for aeons. The very best records go back to at least the Gregorian calendar reform of 1582—a time from which we know we have a highly reliable calendar system (less than one day of error per 3200 years).

But here is the issue: According to lunisolar theory, the earth does not go around the sun, 360 degrees in a tropical or equinoctial year—it has to come up 50 arc seconds short because that is the amount of precession we can measure relative to the distant stars. Because the tropical year is so close to the average calendar year, objects in space appear to slip through the calendar at the rate of about one day per 72 years. Now if precession is caused by local forces you would expect the observation date of the Perseids to change at the same rate that the earth precesses relative to the fixed stars outside the solar system. This means that just as the constellations have changed position relative to the equinox at the rate of about one degree or one day every 72 years,

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Ask Solomon

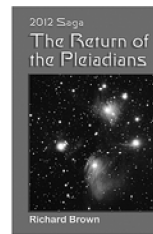
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or almost a full week since the Gregorian calendar reform, the Perseids (debris within the solar system) should have done the same (relative to a wobbling earth). This means that the shower should now be peaking around August 5 or earlier. But the fact is the Perseids have moved very little if at all in those 423 years. This meteor shower is even called “St. Lawrence’s Tears” because it happens regularly right after his feast day. Why hasn’t it precessed through the calendar like everything else outside the solar system?

It is possible that this comet debris just happens to drift in an opposite direction about the same rate as precession and that our lunar calculations and Venus transit calculations are also somehow precisely incorrect but I don’t think so. A more logical conclusion is that we can’t measure precession relative to objects within the solar system because it (the precession observable—the Earth’s changing orientation to inertial space), is not principally caused by local forces. Yes, there are some local forces and they produce the minor motions of nutation, Chandler movement and the like, but the major

change in orientation that we experience (at least relative to the fixed stars) is likely not due to any large local wobbling of the axis—but rather to the entire solar system (a moving reference frame in itself) gently curving through space. It produces the observable without the need for significant local force. That is the only way I know of solving the paradox of an earth that does not change orientation relative to local objects within the solar system while clearly changing orientation to objects outside the solar system in excess of $50''/y$.

In addition to the Perseids data we have also found that precession is actually accelerating and acts more like a body that follows Kepler’s laws (in an elliptical orbit) than a wobbling top that should be slowing down. Furthermore, there are at least half a dozen circumstantial arguments indicating that precession is a result of something other than local forces.

And we are not the only ones. A number of completely unconnected groups, including Karl Heinz and Uwe Homann, at the Sirius Research Group in Canada, have come to the same conclusion: the lunisolar theory of precession does not make sense.

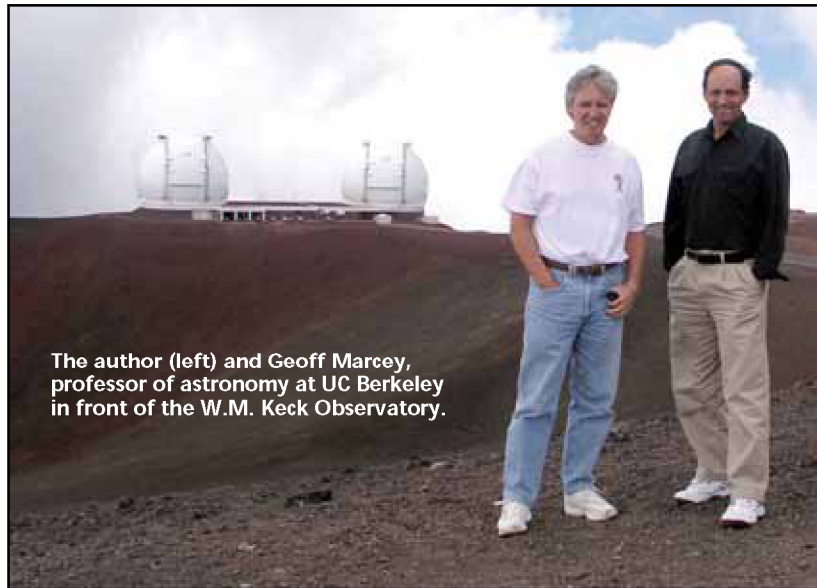
Their Venus transit studies show that either the nodes of Venus just happen to match the precession rate (a highly unlikely scenario) or the earth does not wobble relative to Venus. And studies of the motions of the moon relative to the earth show the same thing—there is no precession of the earth relative to the moon.

If this were any easy problem to understand I am sure it would have been corrected by now. But it is an extremely tricky thing to try and measure any change in the earth’s orientation relative to objects within the solar system because everything nearby has such a high relative motion—everything is moving! This is why astronomers use very distant objects, quasars in

rate with the motion of the binary. Thus if the binary motion caused the sun to circle the center of mass in 24,000 years, then the spin axis would appear to reorient itself to inertial space in this same period (plus or minus any purely local effects). This principle works because the local motion occurs within the confines of the binary movement allowing the binary movement to distort whatever local motions are actually occurring. In this case, the observable of precession would be due principally to the geometric effect of a solar system that itself curves through space (around the binary center of gravity). The solar system here acts as a distinct reference frame that contains all the motions of the planets and their

moons, which in turn maintain all their respective gravitational relationships, as the system as a unit moves in a spiral motion relative to inertial space, similar to the way a galaxy appears to move as a unit relative to inertial space.

In simple terms this means that the earth doesn’t really wobble very much, at least within the reference frame of the solar system. It just looks like it is wobbling relative to the fixed stars because the whole solar system is moving—another reference frame is at work.



The author (left) and Geoff Marcey, professor of astronomy at UC Berkeley in front of the W.M. Keck Observatory.

other galaxies, when measuring changes in the earth’s orientation (precession). But such measurements will never tell you how much the earth’s spin axis changes relative to local objects—it has just been assumed the change is the same. That is the problem: incorrect assumptions.

So if the observable of precession is the result of the solar system curving through space rather than a local wobbling of the axis the big question is what causes the sun or solar system to curve through space?

The Binary Hypothesis

If our sun is part of a binary (or multiple star) system it would be gravitationally bound to a companion star, resulting in the sun’s curved motion through space around a common center of gravity. This is the accepted motion pattern of binary star systems: two stars attracted to each other orbiting a common center of mass or gravity.

This motion, combined with an oblate earth that is subject to even minor local torque (gravitational effects like lunisolar forces on a very small scale), would cause a constant reorientation of the earth’s spin axis relative to inertial space, commensu-

Binaries Everywhere

It is important to note that there was little or no knowledge of the extent of binary star systems at the time the current lunisolar model was put forth in the West. Even when I was a boy in the 1950s and 60s dual star systems were thought to be the exception rather than the rule. However, it is now estimated that more than 80% of all stars may be part of a binary or multiple star relationship. Apparently, stars like companions as much as people do! Since we now know that numerous star types such as Black Holes or Neutron Stars and many Brown Dwarfs (or even Red Dwarfs against the galactic center) are almost impossible to see, and very often difficult to detect, the number of multiple star systems may be higher than a census of strictly visible stars would indicate. So, if most stars out there have companions, our lone sun and its solar system are looking more and more like an anomaly. That is, if indeed it is a single star system, and not a partner in a multiple star system.

Assuming that we are in a binary system, and that Newton’s laws work just as well outside the solar system as inside it, then the sun’s dual would most likely need to be

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a dark companion such as a Brown Dwarf, or theoretical old Neutron Star, or even some large planet-like mass that also has a very long orbit period (making any of its effects difficult to notice). It could even be a not-too-distant Black Hole that is not currently consuming matter and therefore is difficult to detect, though this is highly doubtful.

Another possibility is that MOND (Modified Newtonian Dynamics) or some variation of local gravitational dynamics might come into play at long distances outside the solar system. This of course would open the possibility that the sun may have a visible companion (and coincidentally would solve much of the dark matter problem). We can't expound on this particular possibility without significant further research, but we can't rule it out either, given the growing evidence that something is moving our solar system in an elliptical pattern far tighter than any galactic motion would produce. My gut feeling is that we have a lot to learn about the subject of gravity and gravitational tides. Right now there is a lot of extremely interesting new research going on that could greatly expand our companion star possibilities.

So Was Newton Wrong?

Copernicus and Newton were brilliant scientists and far ahead of their time. Given the fact that they were doing their work in a period when the acceptance of a heliocentric system was still in question, it is understandable that they could not figure out the third motion of the earth. For Copernicus to say the sun does not move in his first motion and then say it does to produce the third motion would be too much to ask for the time. Likewise, for Newton to deduce that the whole solar system was curving through space, meaning the sun was moving, before it had been accepted that any star could move, would also have been an overly ambitious thought. Besides, no one knew of the prevalence of binary stars or stellar dynamics of any type in that early period. So Newton is off the hook.

But for our modern astrophysicists to continue to assume that the earth does not change orientation relative to objects within the solar system any differently than it does relative to objects outside the solar system is unacceptable. We now have the tools to differentiate and it is time to more thoroughly study the earth's motion relative to all objects.

The ancients hinted in their myth and folklore of a lost star, and they implied it drove the rise and fall of the ages. If we discover we are in a binary system, with waxing and waning influences from another star, who knows, we might just prove the ancients right! ■

Walter Cruttenden's new book Lost Star of Myth and Time, (September 2005, St. Lynn's Press) investigates new astronomical evidence supporting the myth and folklore of a cycle of the ages.

Noah. In a few brief paragraphs in *The Original of Monarchies*—almost as an aside—Newton sets forth his theory of Atlantis.

His departure point is the well-known story of the journey of Solon, Plato's great-uncle, into Egypt where he obtained information about Atlantis, which was later used by Plato in his dialogues the *Timaeus* and the (unfinished) *Critias*. Newton writes:

"For Solon, having traveled into Egypt and conversed with the priests of (Sais) about their antiquities, wrote a poem of what he had learnt, but did not finish it. And this poem fell into the hands of Plato, who relates out of it that at the mouth of the straits near Hercules pillars there was an island called Atlantis, the people of which, nine thousand years before the days of Solon, reigned over Libya as far as Egypt and over Europe as far as the Tyrrhene sea, and all this force collected into one body invaded Egypt and Greece and what ever was contained within the pillars of Hercules, but was resisted and stopped by the Athenians and other Greeks, and thereby the rest of the nations not yet conquered, were preserved."

Newton continues his recapitulation of Plato's story by explaining that the gods, having completed their conquests, divided the entire earth up among themselves and "the island Atlantis fell to the lot of Neptune, who made his eldest son Atlas king of the whole island, a part of which was called Gadir."

Newton believed Atlantis was far smaller than most commentators have supposed, consisting mainly of the island of Gadir lying somewhat west of the country of Libya and probably west of the Pillars of Hercules. He explains that the Egyptian priests who talked to Solon thought this "lost continent" was huge because they remembered that Gadir had once had "dominions thereof over Libya as far as Egypt." Newton says the Egyptian priests had forgotten that in the great war in which the Athenians decisively defeated the Atlanteans, "Gadir" had been stripped of all its overseas possessions.

This island of Gadir—at least in Newton's conception of it—was called Gades in recorded history. It was synonymous with Ogygia, the island on which, according to myth, the nymph Calypso seduced Odysseus and kept him a prisoner of love for seven years (she couldn't overcome his longing for his home in Ithaca and Zeus eventually had to send Hermes to command her to release him).

Newton writes: "In that island Homer places Calypso, the daughter of Atlas, presently after the Trojan War when Ulysses' being shipwrecked, escaped thither. Homer

calls it the Ogygian Island and places it 18 or 20 days' sail westward from Phoenicia or Corcyra. And so many days' sail Gades is from Corcyra, reckoning with the ancients a thousand stadia to a day's sail. This island is by Homer described as a small one, destitute of shipping and cities and inhabited only by Calypso and her women who dwelt in a cave in the midst of a wood, there being no men in the island to assist Ulysses in building a new ship or to accompany him thence to Corcyra: which description of the island agrees to Gades."

Through a complex series of arguments, Newton next demonstrates that not only did the Egyptian priests greatly exaggerate the size of the ancient island of Atlantis, but they also exaggerated the period of time separating Solon from the time of Atlantis's heyday. That period of time was not 9,000 years, he says, but a mere 400 years.

"But the priests of Egypt in those 400 years, had magnified the stories and antiquity of their gods so exceedingly as to make them nine thousand years older than Solon, and the island Atlantis bigger then all Africa and Asia together, and full of people. And because in the days of Solon this great island did not appear, they pretended that it was sunk into the sea with all its people. Thus great

was the vanity of the priests of Egypt in magnifying their antiquities."

This is all Newton has to say about Atlantis in *The Original of Monarchies* when he identifies it with the island of Ogygia which is today called Gozo. But Newton's belief in the "succession of worlds" is also intriguing and, in the eyes of some, suggests Newton may somewhere else have more to say about the destruction of a place like Atlantis.

Late in life, the great scientist came to believe, through extrapolation from what he considered to be solid scientific evidence, that our solar system (and perhaps our entire universe) is periodically destroyed, then renewed, in a cycle resembling the Kalpa or "Great Year" described by the sages of ancient India. Even in his extreme youth Sir Isaac believed in something like the periodic destruction and renewal of the universe, but through reasoning based almost entirely on arguments from theology. Scholar Frank Manuel explains in *Newton as Historian* that,

"In turning to the problem of whether his was the only world that would ever be, Newton adopted an independent position in his interpretation of the Bible. He accepted outright neither the simple millenarian view that the eternal Sabbath would follow Judgment Day nor the Stoic vision of an infinite succession of worlds ended by conflagrations, but introduced once again the idea of likelihood, supported by subtle traditionalist proofs." ■



The Blind Poet Homer