The TYCHOS

Our Geoaxial Binary Solar System

The TYCHOS – our Geoaxial Binary System

Introduction for the Online Edition

The TYCHOS book is the result of almost half a decade of steady research into mostly non-Copernican astronomical literature, data and teachings. It all started as a personal quest to probe a number of issues and incongruities which, in my mind, afflicted Copernicus' famed (and almost universally-accepted) heliocentric theory.

As I gradually came to realize that the Copernican / Keplerian model presented truly insurmountable problems as to its proposed physics and geometry, I decided to put to the test, in methodical fashion, what was once its most formidable adversary, namely the geo-heliocentric Tychonic model devised by the great observational astronomer Tycho Brahe. In short, the essential soundness of Tycho's original model led me to envision and formulate the missing pieces of his ingenious (yet incomplete) configuration of our solar system.

The TYCHOS book expounds in simple narrative style – and with the visual support of more than 100 original illustrations – my revised design of Brahe's system which, in absence of any other working model, should be ideally implemented in all branches of astronomy and astrophysics. This, because the TYCHOS is today the only existing model of our solar system which agrees – by and large – with the vast body of empirical astronomical observations aquired and documented by humankind throughout the centuries. In any event, as clearly demonstrated in my book, the Copernican model is fundamentally flawed – and needs to be definitively discarded.

UPDATE [March 2020]: My TYCHOS book (all 36 chapters) is now freely accessible online – in the interest of maximum divulgation. However, I will warmly appreciate any financial support / donation towards my longstanding and ongoing research efforts (see donate button at the bottom of this page). Since 2013, I have independently pursued and developed the Tychos model without any sort of institutional funding – and am currently working on the 2nd edition of the book.

Here is where you may purchase the original 1st edition of my book, “The TYCHOS – Our Geoaxial Binary System”-(2018) in physical form.

As you read the book, make sure to visit and peruse the Tychosium 3-D, an interactive digital planetarium in constant development (with my research partner and computer programmer Patrik Holmqvist) which already simulates the Tychos Solar System to a high level of accuracy.

Thank you – and enjoy your newfound cosmic perspective. Consider it, if you will, as a boon empowering your intellectual awareness during your life on this planet. It may well take many years (or decades?) before the TYCHOS model will be acknowledged, discussed, let alone accepted by this world’s scientific community. However, I trust that the plain soundness of its principles will ultimately shine through.

May reason prevail.

— Simon Shack

Table of Contents

The TYCHOS

Our Geoaxial Binary Solar System

Preface

The TYCHOS is my proposed cosmic model. It is based on, inspired by and built around both modern and time-honored astronomical observations. In particular, my work has relied and expanded upon a number of lesser-known, overlooked and/or neglected teachings from the 1500's to the 1800's (as well as from antiquity). I dedicate this study to a few brilliant astronomers whose work has been passed over in favor of the so-called "Copernican Revolution". These early insightful architects who laid the groundwork for what should be our current model for the solar system include Nilakantha Somayaji (author of the *Tantrasangraha*, 1501), Samanta Candrasekhara Simha – (*a.k.a.* Pathani Samanta, 1835-1904), the ancient Maya/Aztec /Sumerian/Greek/Egyptian (et al) astronomers and, of course, Tycho Brahe (along with his trusty helper Longomontanus) whose impeccable observational data and tables still stand today as the most exacting ever made.

In spite of Brahe's rigorous and unchallenged documentation, his own model of the solar system was ultimately flipped on its head by his assistant, the famous Johannes Kepler. Kepler used his master's observations in his laborious attempts to validate his diametrically opposed Copernican model. As only a few people will know, Kepler was ultimately (in 1988) exposed for having falsified Brahe's all-important observational data (pertaining to Mars) so as to make them agree with his heliocentric thesis. His legacy is therefore eminently questionable; Brahe had specifically entrusted him with resolving the bewildering behavior of this particular celestial body, and Kepler's laws of planetary motion were almost exclusively (mathematically) derived from his relentless *"war on Mars"* (as he liked to call it). Just why the Mars data presented such exceptional difficulties should become self-evident in the following pages.

I trust that any earnest astronomer will concede that the currently-accepted Copernican model is by no means flawless. It is afflicted by a number of still unresolved anomalies and incongruities. The persistence of several longstanding enigmas are readily admitted throughout (the more honest and candid sort of) astronomy literature. It is thus a widely-diffused, popular misconception that the Copernican model has provided mankind with the most indisputable interpretation of the formidable wealth of astronomical observations gathered throughout human history: as we shall see, the Copernican model is not only disputable – it is outright impossible.

In short, the TYCHOS provides the "missing pieces" which prevented Tycho Brahe from completing the puzzle of his "geo-heliocentric" system, in spite of the basic soundness of its geometric design. The TYCHOS model, while stopping far short of proposing a TOE ("Theory of Everything"), submits nonetheless what may be the most exacting, logical and intuitively sound geometric configuration of our local cosmos ever devised. As I discovered, following the reason of the data itself resolves a series of cosmological paradoxes that falsify the currently-adopted Copernican theory of our universe. It is an unfortunate characteristic of their present proponents to be recalcitrant towards and dismissive of data that they've failed to incorporate into a holistic self-consistency.

To ease explanations, I have done my best to employ simple graphics. I have also strived to use the simplest possible maths at all times, so as to make this text accessible to the widest possible readership range, including myself: I have always found complex equations both tedious and laborious. Fortunately, the core principles of the TYCHOS model can be expressed and outlined with a bare minimum of computations — all in the good tradition of Tycho Brahe's very own philosophy.

> *So Mathematical Truth prefers simple words since the language of Truth is itself simple.*

— Tycho Brahe

The TYCHOS is built upon the unchallenged raw data collection of thousands of years of human study of the stars and planets. Hence, my model may simply be considered the natural evolution of Tycho's work, enabled at last by a number of modern astronomical discoveries. It is the result of a fresh re-interpretation of ancient and modern astronomical knowledge, as well as a few lucky hunches of my own. I will humbly ask this world's scientific community and all free-thinking people of integrity to carefully assess its principles with an open mind, devoid of prejudice and preconceptions.

I am aware that you will naturally ask yourself the following question: *"**Why** has no one seen or thought of all this before? And **who** is this impertinent fellow – without any academic credential to his name – having the gall to question the current, universally-accepted cosmic model?"* All I can say is: please read on. Let your own mind decide whether the Copernican or the TYCHOS model works best for you, that is to say, for your inborn faculties of intuition and logical thought. As I dived into this cosmic research odyssey in late 2012 (driven by sheer curiosity and an earnest passion for intellectual inquiry) I had no way to expect, even in my wildest imagination, that I would reach any solid conclusions worthy of your time. Yet, it now appears (to my pleasant surprise) that I was wrong about that. My best guess is that some lucky star has helped me along in what has certainly been the most enthralling discovery journey of my lifetime.

Rudolf Steiner once wrote:

> *"Now today we have a very remarkable fact, my dear friends. This Copernican system, when employed purely mathematically, supplies the necessary calculations concerning the observed phenomena as well as and no better than any of the earlier ones. The eclipses of the Sun and Moon can be calculated with the ancient Chaldean system, with the Egyptian, with the Tychonian and with the Copernican. The outer occurrences in the Heavens, in so far as they relate to mechanics or mathematics, can thus be foretold. One system is as well suited as another. It is only that the simplest thought-pictures arise with the Copernican system. But the strange thing is that in practical Astronomy, calculations are not made with the Copernican system. Curiously enough, in practical Astronomy, — to obtain what is needed for the calendar,- the system of Tycho Brahe is used! This shows how little that is really fundamental, how little of the essential nature of things, comes into question when the Universe is thus pictured in purely mathematical curves or in terms of mechanical forces."*

— *Third Scientific Lecture-Course: Astronomy* (Schmidt Number: S-4337 Lecture II — Stuttgart, January 2, 1921)

Evidently, Steiner's acumen, clairvoyance and intellectual honesty were admirable in this subject. This is more than can be said about many of our modern-day men and women of science (in particular those in the fields of astronomy & cosmology) who oft refuse to consider new ideas which may challenge their long-established beliefs. The process of discovery requires, of course, the very opposite intellectual attitude. I apologize to those entrenched in their application of principles they have only inherited from other minds — for any embarrassment (or even distress) that the TYCHOS might cause. However, I earnestly propose that it is now high time to think differently. Many important new discoveries have, in later decades, severely imperilled the very foundational precepts of the heliocentric theory of our cosmos as submitted by Copernicus, Kepler, Galileo, Newton, Einstein et al. The failure to act upon these new discoveries casts a shadow over the credibility of our world's scientific community — as a whole.

Table of Contents

Next Chapter

Foreword — Some basic intellectual problems with the Copernican model

It can hardly be denied that the Copernican model is marred by a number of problems which, objectively speaking, challenge the limits of our human senses and perceptions. To my mind, there is nothing "intuitive" about the Copernican theory. Even if you disagree, I think it is safe to say that the current, widespread acceptance of it relies on the faith that most people have conferred to those prominent scientists who, about four centuries ago, decided for everyone of us that it was not only a credible theory of our universe — but that it was, indeed, the definitive one. Paradoxically, the so-called "Copernican Revolution" was hailed as the *"triumph of the scientific method over religious dogma"*. Yet, when challenged by the likes of Tycho Brahe about the absurd distances and titanic sizes of the stars that the novel Copernican model's tenets implied, the proponents of the same invoked the "omnipotence of God".

> *"Tycho Brahe, the most prominent and accomplished astronomer of his era, made measurements of the apparent sizes of the Sun, Moon, stars, and planets. From these he showed that within a geocentric cosmos these bodies were of comparable sizes, with the Sun being the largest body and the Moon the smallest. He further showed that within a heliocentric cosmos, the stars had to be absurdly large — with the smallest star dwarfing even the Sun. [...] Various Copernicans responded to this issue of observation and geometry by appealing to the power of God: They argued that giant stars were not absurd because even such giant objects were nothing compared to an infinite God, and that in fact the Copernican stars pointed out the power of God to humankind. Tycho rejected this argument."*

— *Regarding how Tycho Brahe noted the Absurdity of the Copernican Theory regarding the Bigness of Stars, while the Copernicans appealed to God to answer that Absurdity* by Christopher M. Graney (December 2011)

It is commonly thought (and taught) that the "Copernican Revolution marked the end of religious bigotry". Well, nothing is further from the truth; if you had been questioning the Copernican model back then, you might have been called a person ***"of the vulgar sort"*** (since, according to Copernicans, you were therefore questioning God's divine omnipotence!).

> *"Rather than give up their theory in the face of seemingly incontrovertible physical evidence, Copernicans were forced to appeal to divine omnipotence. 'These things that vulgar sorts see as absurd at first glance are not easily charged with absurdity, for in fact divine Sapience and Majesty are far greater than they understand,' wrote Copernican Christoph Rothmann in a letter to Tycho Brahe. 'Grant the vastness of the Universe and the sizes of the stars to be as great as you like— these will still bear no proportion to the infinite Creator. It reckons that the greater the king, so much greater and larger the palace befitting his majesty. So how great a palace do you reckon is fitting to GOD?'"*

— *The Case Against Copernicus* by Dennis Danielson and Christopher M. Graney (March 2014)

Indeed, it is a widespread popular myth that Johannes Kepler was the man who brought on the era of "rational scientific determinism" to the detriment of dogmatic religious belief. Again, nothing is further from the truth. As J. R. Voelkel points out in his *The Composition of Kepler's Astronomia Nova* (2001) …

> *"He [Kepler] sought to redirect his religious aspirations into astronomy by arguing that the heliocentric system of the world made plain the glory of God in His creation of the world. Thus he made the establishment of the physical truth of heliocentrism a religious vocation."*

Now, it is a matter of fact that, today, our world's premier scientific institutions cannot even seem to agree upon the distance from Earth to Polaris — our all-important, current "North star".

> *"The North Star has been a guiding light for countless generations of navigators. But a new study reveals that its distance to Earth may have been grossly overestimated. […] The new discovery of a closer North Star is 'most unexpected for what is considered to be one of the Hipparcos satellite's most solid results,' said study leader David Turner, an astronomer at Saint Mary's University in Halifax, Nova Scotia."*

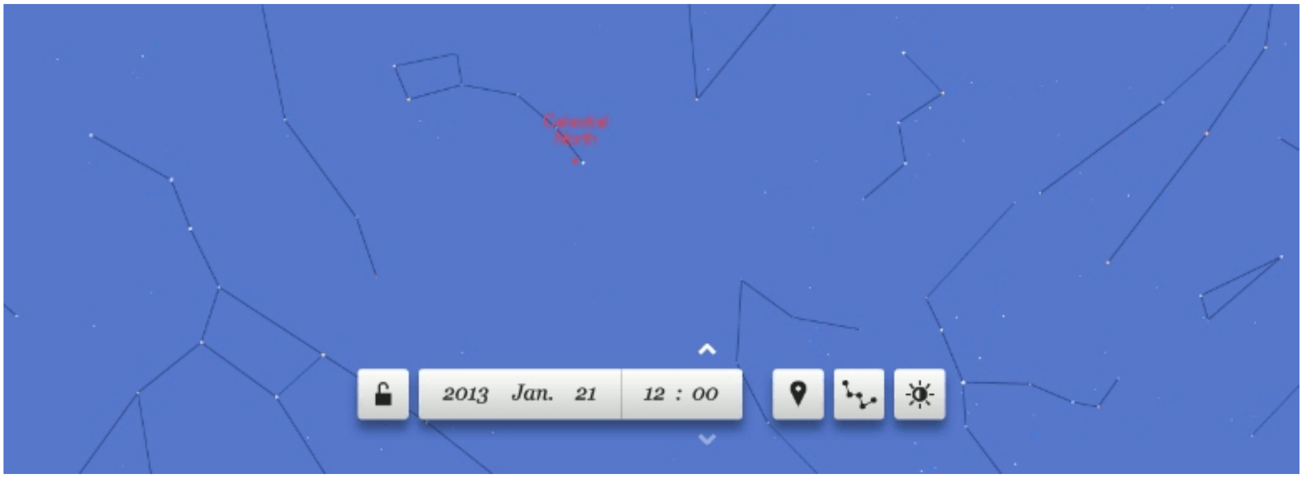
— *North Star Closer to Earth Than Thought* by Andrew Fazekas (December 5, 2012) for National Geographic News

As mentioned in the above-linked National Geographic article, this is no trivial matter since Polaris is a *"cosmological yardstick used by researchers to measure great cosmic distances out to billions of light-years"*. Well, the latest (2012) estimation of the Earth-to-Polaris distance ("323 light years") is a whopping **34%** shorter than the former estimate of "433 light years" (as listed in official ESA and NASA star catalogs). In light of this, it would hardly be unreasonable to question the much-vaunted pinpoint accuracy of modern astronomy.

If Polaris is now believed to be as much as 1/3 closer to us than previously thought, the very credibility of all currently-claimed star distances must be allowed to be questioned. Indeed, it would be a logical scientific enterprise to re-check all one's work — once it is discovered that one's yard stick is capable of expanding and contracting when we aren't paying attention.

To wit, how can our current North Star Polaris — which is actually a triple-star binary system — possibly seem to remain stationary above our North Pole, year after year, and for decades on end? And this, when we are meant to be sweeping around a 300-Million-kilometer-wide circle, covering an orbit with a circumference of almost one Billion kilometers? Today we are told that the Sun (and thus, our entire system) hurtles across our galaxy at the formidable speed of "800,000 km/hour" (or 222 km/second) and around a gigantic 240-Million-year-long orbit. Yet, Polaris appears to remain roughly in the same place year after year!

In the course of one year, as Earth supposedly revolves around the Sun around a 300-Million-km-wide orbit, our current "North star" Polaris (the white, central dot in the below animation) appears to be virtually stationary.



You may now justly ask, *"Is Polaris also said to be moving (along with Earth) at 800,000 km/h?"*

No, it is not. We are simply asked to accept the following surreal notion:

"Earth orbits around the Sun at about 107,000 km/h – while the Sun itself moves at 800,000 km/h. Yet we do ***not*** *see our current North star Polaris moving much at all – because it is unimaginably distant."*

Surely, the time has come to question such extraordinary claims which, objectively, challenge the limits of human intuition. When something is "unimaginable", there should be plenty of room for discourse, no matter how established any scientific theory may be.

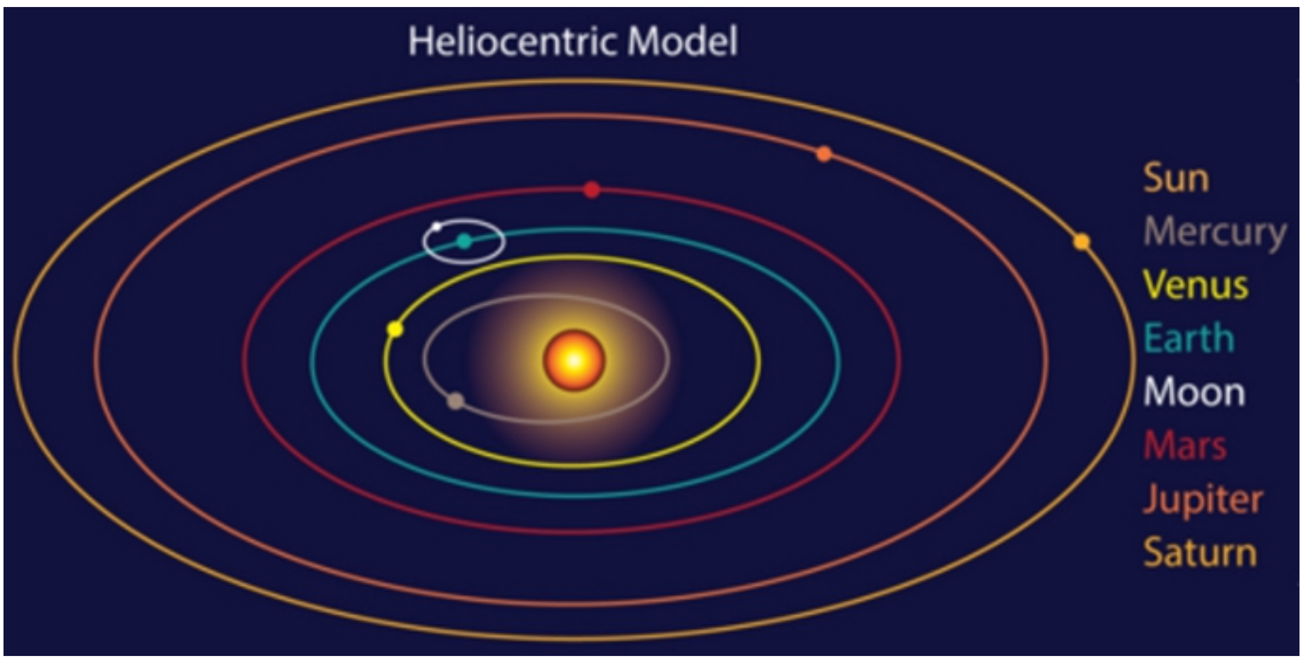
I will venture to say that the TYCHOS model may ideally satisfy both sides of the secular heliocentric vs. geocentric debate, since it proposes an ideal, "unifying" solution that may appeal to both parties (if they can first choose that agreeing on something would cause no harm). In the TYCHOS, our Earth is neither static or immobile; nor does it hurtle across space at hypersonic speeds. Nor is our planet located ("by the will of God") smack in the middle of the entire universe. Instead, it is just located at or near the barycenter of our very own binary system. Among other things, the TYCHOS model revives Plato's ideal concept of uniform circular motion: as we shall see, Kepler's elliptical (and accelerating/decelerating) orbital motions may well be a spatial illusion largely caused by Earth slowly moving around the center of our system.

> *"Kepler's Laws are wonderful as a description of the motions of the planets. However, they provide no explanation of why the planets move in this way."*

— *Kepler's Laws and Newton's Laws* from a course at Mount Holyoke College, Massachusetts

For now — and before we get on — let us remind ourselves of the Copernican model's "elegant" geometric configuration, "starring" the Sun which would be positioned in the middle of a multi-lane, planetary "merry-go-round" — *i.e.;* a carousel of planets revolving around the Sun in concentric, elliptical orbits. Here it is, as we are all familiar with – ever since our school days:

THE COPERNICAN / KEPLERIAN "CAROUSEL"



Above — a diagram originally from a Lumen Learning online coursework

The heliocentric Copernican model undeniably appeals to our natural senses, what with its plain and orderly layout. There is a clear "middle", and what's more, there is an object right there in it – the brightest and most obvious object in our skies. The problem is that its geometric layout conflicts with empirical observation and therefore, it cannot possibly represent reality. As will be amply demonstrated in the following chapters, it is outright unphysical – as it violates, among other things, the most elementary laws of perspective.

It bears reminding that, since their initial acceptance by our world's scientific community, the fundamental premises of the Copernican model have had to undergo a long series of profound critiques and revisions — all of which were somehow "patched up" with ad hoc arguments submitted by a clique of extremely influential fellows (*e.g.;* Newton, Galileo, Kepler, Einstein, Bradley, etc.). It is disconcerting that so much faith has been placed in those few individuals' convictions. It is also most disturbing that, over the years, numerous findings by independent researchers (invalidating the Copernican theory) have been completely ignored by the worldwide scientific community. If astronomy considers itself as a science, it ought to be taking a good hard look in the mirror today.

As you may remember (if you are old enough), the **old Copernican theory** went like this:

*"The sun is **immobile**, just like the stars – while all of our planets orbit around it in concentric circles."*

Whereas the **current Copernican theory** sounds a lot like this:

*"The Sun **travels at** 800,000 km/h across our galaxy – along with all of its companions – completing one orbit every 240 Million years."*

Both theories always were, and still remain, eminently questionable for a number of reasons:

The old Copernican theory contradicts the empirically-observable fact that *not one* of our visible stars are entirely immobile or motionless. The old notion implied that our Sun would be the only immobile star of our entire visible cosmos, an absurd proposition that I trust can safely be put to rest.

The current Copernican theory (which claims that our Sun needs circa 240 Million years to complete only an orbit) conflicts with the observable fact that the overwhelming majority of our visible stars appear to have much smaller local orbits of their own with relatively short periods. For instance, the orbital period of the Sirius A and B binary system is only 50.1 (solar) years; the binary system of Alpha Centauri A and B revolve around each other in only 79.9 years, while the Polaris A and B binary pair do so in just 29.6 years. Other recently-discovered binary systems exhibit even shorter "mutual orbital periods" of only a couple of years, months, weeks, days, or less. No stars (other than our own Sun) are said to be observed to be moving around orbits in the range of hundreds of millions of years.

And yes, it is indeed officially claimed that the Sun employs 240 or 250 Million years to complete just one of its orbits! I am certainly not making this up:

How long does it take the Sun to orbit the galaxy? by Robert Matthews (July 22, 2009 at ScienceFocus.com)

Moreover, our visible stars exhibit far slower apparent orbital velocities than **222** km/s (*i.e.;* 800,000 km/h – the alarming orbital speed at which our system is claimed to move across our galaxy).

For instance, our nearmost binary stars, Alpha Centauri A and Alpha Centauri B, exhibit orbital speeds (*a.k.a.* "proper motions") of 21.4 km/s and 18.6 km/s. As it happens, such speeds compare well with the orbital speeds (as of the TYCHOS model) of our Sun (29.7 km/s) and Mars (22.7 km/s). To be sure, a star has never been observed to move ten times that fast. Even the fastest moving star in our skies, the Barnard star, is reckoned to be traveling at about 110 km/s, more than 50% slower than our Sun's supposed motion around the galaxy.

Indeed, these foundational notions upheld by current theory truly stand out for their extraordinary claims. Give it a good thought: according to modern astronomy, our Sun would be the one and only star in our observed cosmos to have a mega-gigantic, unthinkably large "240-Million-year" orbit (with an incredibly small angular momentum, unlike any other star) around our galaxy. Our sun would be the fastest star of them all, travelling at a scorching 222 km/s and all the while "carrying" Earth (and our system's other planets) along with it. And yet, we earthly observers can only detect minuscule stellar parallaxes from one year or decade to the next?

In the latest decades of astronomical research, a particular discovery stands out for its paradigm-changing nature: the vast majority of our visible stars have turned out to be interlocked in what are known as binary systems. In binary systems, a **large** star and a **far smaller** celestial body (often too small and dim to be detected even with the largest telescopes) revolve in relatively short, *mutually intersecting* "local" orbits around a common center of mass, or "barycenter". Again, no binary systems are observed to have orbital periods lasting anywhere near 250 Million years.

I feel it is more reasonable to consider the possibility that our system is alike to other systems, rather than some sort of exception to the rule.

Preface Next Chapter

Chapter 1 — About Binary Star Systems

> *"In fact, the majority of stars happens to be part of a binary or multiple system, and consequently binary star research covers most areas of stellar astronomy."*

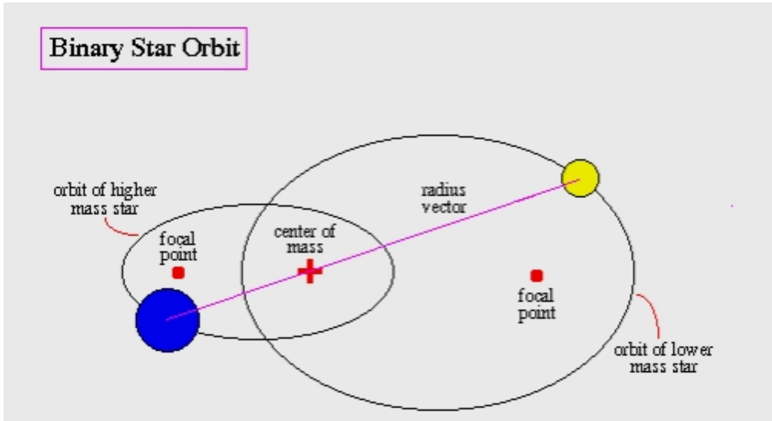
— *Binary stars and the VLTI: research prospects* by Andrea Richichi and Christopher Leinert (July 2000) from Proc. SPIE Vol. 4006, p. 289-298, *Interferometry in Optical Astronomy*, Pierre J. Lena; Andreas Quirrenbach; Eds.

It is important to know that Tycho Brahe never knew about binary systems. The very first binary system was discovered in 1650 by Giovanni Riccioli almost 50 years after Tycho's death, and only following the invention of the telescope. Therefore, one cannot blame Tycho for failing to notice & identify (within his very own, Tychonic model) the obvious binary nature of his proposed model, which famously featured his highly controversial (and much ridiculed) intersecting orbits of Mars and the Sun.

It was precisely this "bizarre feature" of Brahe's proposed cosmic model (the intersecting orbits of Mars and the Sun) that triggered the vociferous scoffing and derision of his peers: "Sooner or later, the Sun and Mars must smash into each other!". As we now know, however, binary systems are the most common stellar configuration in our cosmos. No binary star systems have ever been observed to self-destruct due to a collision between the larger and smaller bodies. I would strongly recommend reading Howard Margolis' impeccable demonstration that the mentally perceived collision of the Sun and Mars (in Tycho Brahe's model) has always been an illusion – albeit one that befuddled the entire scientific community for the best part of 400 years. It makes for an exemplary case study of how even the sharpest human minds can be fooled for centuries on end by relatively simple, illusory "tricks" of geometry.

See: *Tycho's Illusion: How it lasted 400 Years, and What that implies about Human Cognition* by H. Margolis (1998)

Let us begin with a classic binary star system, as illustrated on the below-linked webpage from the University of Oregon where we can read that the vast majority of the stars in the Milky Way are, in fact, binary stars resembling something like this basic configuration.

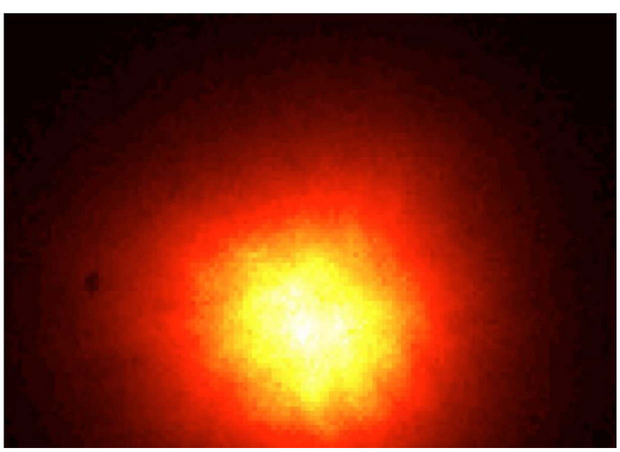


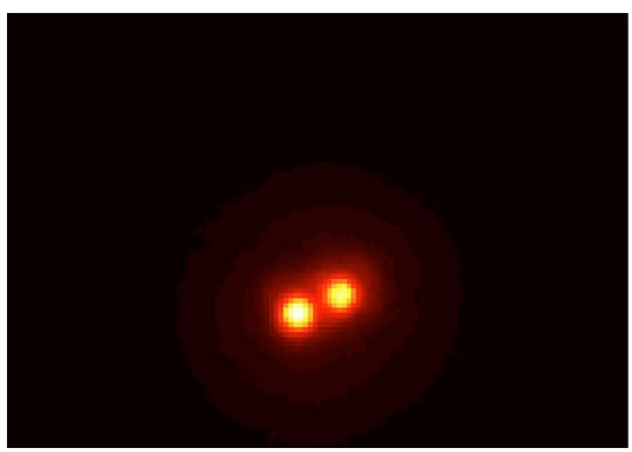
A schematic of a very basic binary star system
(Credit: University of Oregon)

> *"In fact, 85% of the stars in the Milky Way galaxy are not single stars, like the Sun, but multiple star systems, binaries or triplets."*

— *Binary Stars* by Jim Schombert (2018) for University of Oregon Astronomy 122: Birth and Death of Stars

As discovered only in recent decades, the **vast majority** (up to 85% and counting) of the stars in our skies — all of which we perceive with our naked eyes only as a single object — are in fact binary systems (*i.e.;* two or more celestial objects). In fact, this percentage is growing by the day thanks to advanced spectrometers and so-called Adaptive Optics (based on the Shack-Hartmann principle). The latter have, in later years, spectacularly improved the ability for observational astronomers to detect binary / double stars.





Above — ESO imagery of the binary star HIC 59206 imaged without and with adaptive optics correction. Note distinct binary appearance with adaptive optics. — ESO (May 13, 2003)

Please read about Adaptive Optics.

Needless to say, if it eventually emerges that 100% of our visible stars are locked in binary systems, our “lonely” single-star system (as per the Copernican model), would increasingly stand out as a uniquely exceptional, one-of-a-kind cosmic anomaly. It therefore stands to reason, from a purely statistical perspective, that our own star is likely to be part of a binary system.

Here’s an exemplary illustration of the intersecting orbits of a binary system:

Above — Source URL: http://www.skymarvels.com/infopages/stellarobjects.htm

Now, Alpha Centauri A and B are both fairly large celestial bodies. But more often than not, the “B-companions” in binary systems are far smaller and dimmer than their “A” hosts and/or simply too close to their larger companion to be easily discernible.

Here’s a brief selection of quotes about binary stars from various astronomy sources:

> *"There are many common misconceptions about binary star systems, one of the most common myths is that binary star systems are the cosmic oddity and that single star systems are the most prevalent, when, in fact, the opposite is true. 50 years ago binary stars were considered a rarity. Now, most of the stars in our galaxy are known to be paired with a companion or multiple partners."*

— *Binary Star Prevalence* from BRI

> *"Binary stars are two stars orbiting a common center of mass. More than four-fifths (80%) of the single points of light we observe in the night sky are actually two or more stars orbiting together. The most common of the multiple star systems are binary stars, systems of only two stars together. These pairs come in an array of configurations that help scientists to classify stars, and could have impacts on the development of life. Some people even think that the sun is part of a binary system."*

— *Binary Star Systems: Classification and Evolution* by SPACE.com Staff (January 17, 2018)

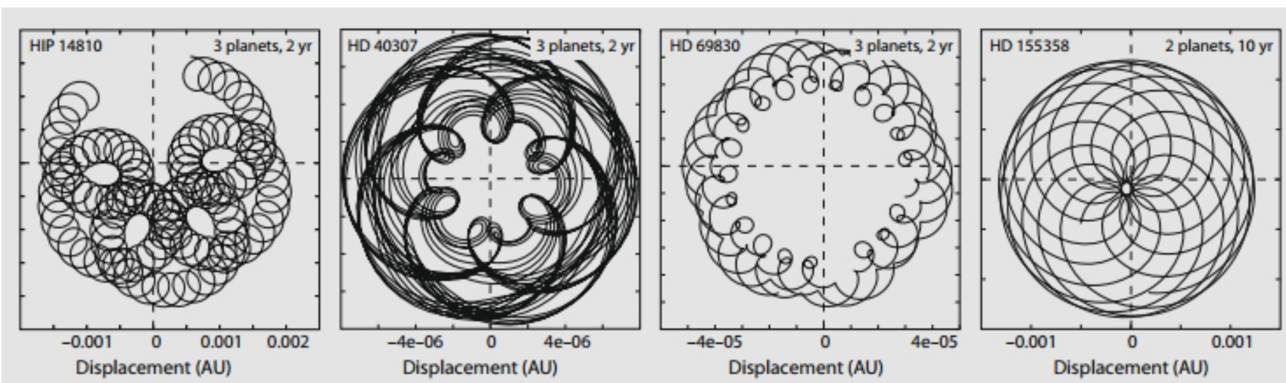
> *"Binary stars are of immense importance to astronomers as they allow the masses of stars to be determined. A binary system is simply one in which two stars orbit around a common centre of mass, that is they are gravitationally bound to each other. Actually most stars are in binary systems. Perhaps up to 85% of stars are in binary systems with some in triple or even higher-multiple systems."*

— *Binary Stars* by CSIRO Australia Telescope National Facility (2017)

Would you be surprised to know that the idea that the Sun is part of a binary system is not a new concept? The Binary Research Institute headed by Walter Cruttenden has been looking into this hypothesis for many years. Unfortunately, their reasoning-process is stuck in the Copernican heliocentric paradigm, and thus, their ongoing search for the Sun's elusive binary companion has never considered Mars as a possible candidate. Their current, favored candidate (for a binary companion of the Sun) appears to be Sirius. Sirius, however, is itself a binary system (Sirius A and B revolve around their common barycenter every 50.1 years). Nonetheless, Cruttenden (et al) have made a great job demonstrating, in methodical fashion, that the so-called "Lunisolar" theory (*i.e.;* Earth's purported "wobble" around its axis) is utterly untenable. But more about this later. You have probably noticed by now that I've suggested the body we know as planet Mars is our Sun's binary companion. Is this an unreasonable suggestion? I would argue, "No."

Understanding Precession of the Equinox by Walter Cruttenden and Vince Dayes (2003)

The below spirographic (or trochoidal) patterns are from a fairly recent study (2010) concerned with the "barycentric motion of exoplanet host stars". In the TYCHOS model — as we shall see — the paths of Mars, Venus and Mercury all bear some resemblance to these complex & beautiful orbital patterns that modern astronomers are observing nowadays in binary star systems.



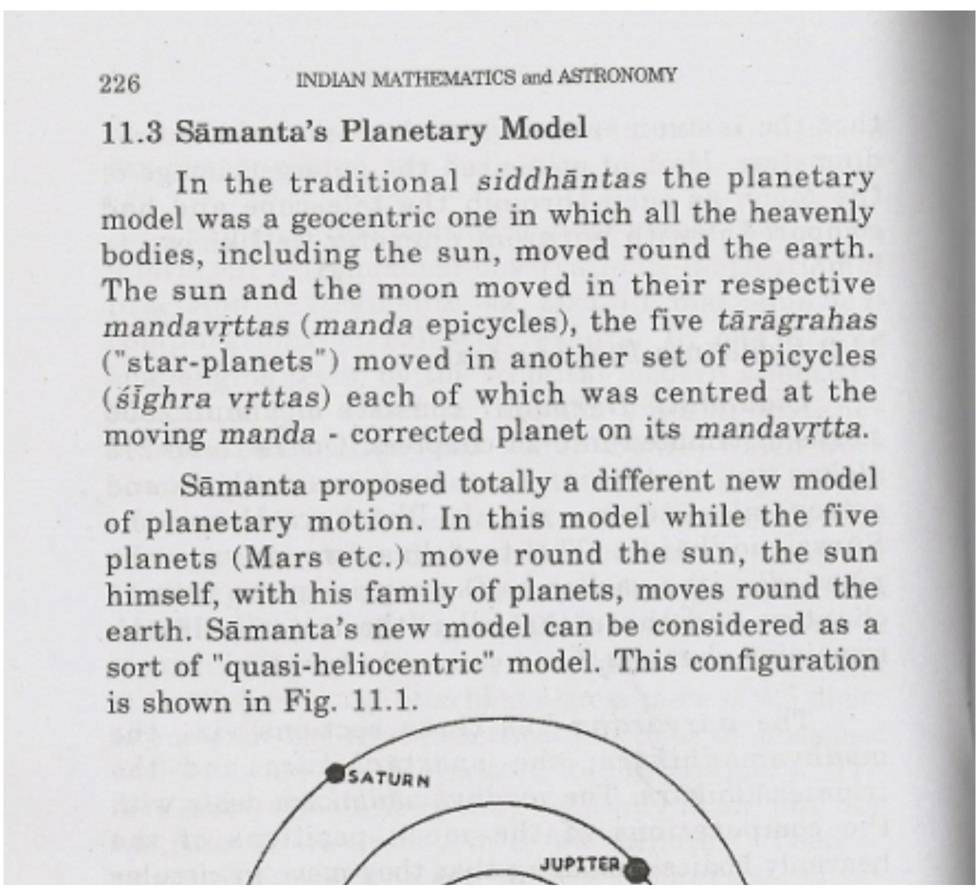
Above — from p. 6 of *The barycentric motion of exoplanet host stars* by M. A. C. Perryman and T. Schulze-Hartung (2010)

Indeed, one may justly wonder why our very own "Solar System" would **not** feature orbital patterns remotely similar to those above. Why would objects swirling around other stars than our own (the Sun) trace such charming & "creative" paths — as opposed to the dull & orderly elliptical orbits of our planets and moons (as in the heliocentric Copernican model)? Are we earthlings just … out of luck?

Chapter 2 — A brief look into the past regarding the Sun-Mars relationship

At this point, let us briefly step back in time and look at the observational work of some eminent astronomers of yore who, unwittingly, indicated that the Sun and Mars are binary companions. Keep in mind that, at the time, none of them knew about the existence of binary star systems.

Firstly, I'd like to show you a page that I scanned from a book titled *Indian Mathematics and Astronomy*. The book was graciously given to me by its author (as I visited him in Bangalore, India, in April 2016), namely Prof. Balachandra Rao, a now-retired professor of mathematics, astronomy historian and author of several captivating books on ancient Indian astronomy. The page illustrates the planetary model designed by Pathani Samanta, a man rightly heralded as India's greatest naked-eye astronomer of all times:


226 INDIAN MATHEMATICS and ASTRONOMY

11.3 Sāmanta's Planetary Model

In the traditional *siddhāntas* the planetary model was a geocentric one in which all the heavenly bodies, including the sun, moved round the earth. The sun and the moon moved in their respective *mandavṛttas* (*manda* epicycles), the five *tārāgrahas* ("star-planets") moved in another set of epicycles (*śīghra vṛttas*) each of which was centred at the moving *manda* - corrected planet on its *mandavṛtta*.

Sāmanta proposed totally a different new model of planetary motion. In this model while the five planets (Mars etc.) move round the sun, the sun himself, with his family of planets, moves round the earth. Sāmanta's new model can be considered as a sort of "quasi-heliocentric" model. This configuration is shown in Fig. 11.1.

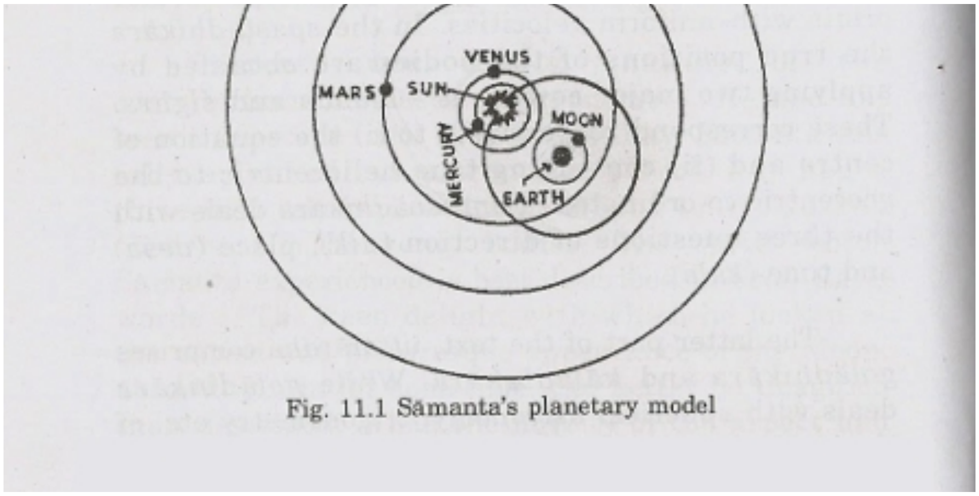
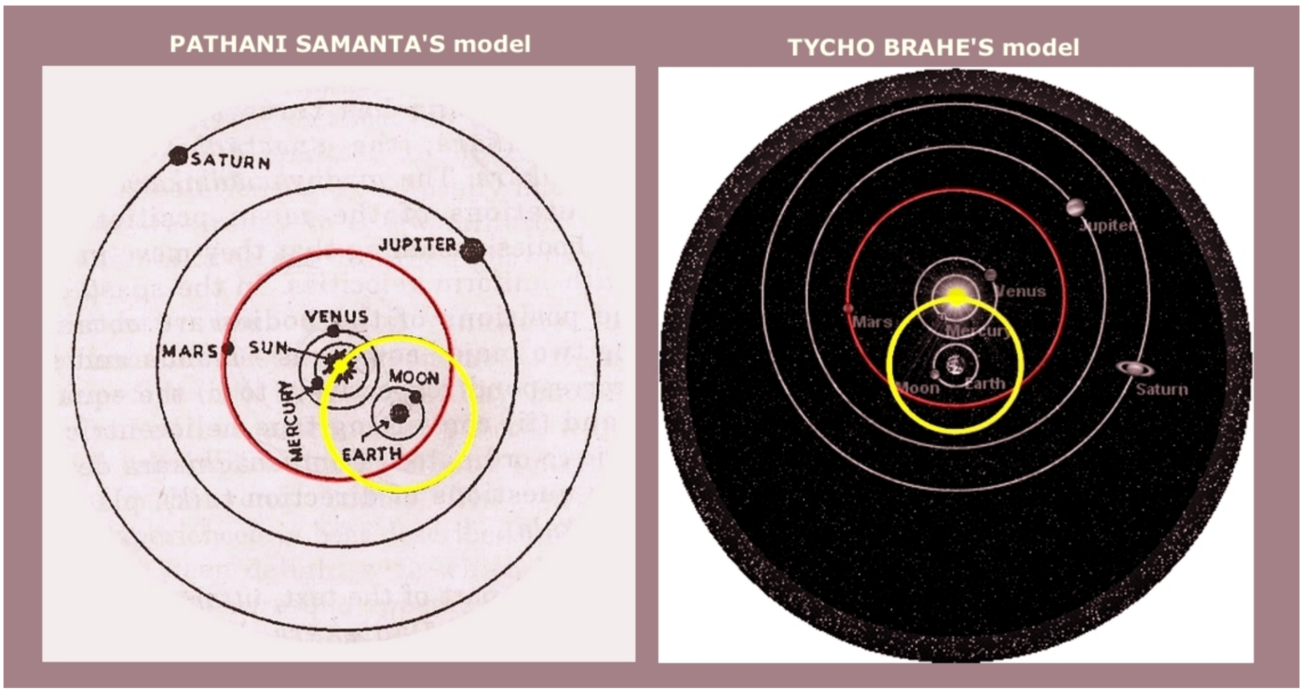


Fig. 11.1 Sāmanta's planetary model



As you can see, the two models of Pathani Samanta and Tycho Brahe are quite identical. I have highlighted (in yellow and red) the intersecting orbits of the Sun and Mars which, clearly, are consistent with what we would call today a binary pair.

Since Tycho predated Pathani by more than two centuries, one might suspect some plagiarism at play here. However, it appears to be well-documented that Pathani Samanta (who published a monumental work in Sanskrit, the “Sidhanta Darpana”) reached his conclusions through his very own observations and ingenuity, working in semi-seclusion and with little or no contact with the Western world for most of his lifetime. I find it most unlikely that Samanta simply plagiarized Brahe’s work.

Conversely, one might then just as well suspect Brahe of having “plagiarized” some ideas from another illustrious Indian astronomer/mathematician. Namely, Nilakantha Somayaji (1444-1544) who, in turn, predated Brahe by a century or so. So let's leave this at that, and instead ask ourselves a far more interesting question implied by these identical models:

"How and why did such diverse astronomers, after lifetimes of painstaking research, eventually reach such strikingly similar conclusions, independently of each other?"

Furthermore, as we take a closer look at them, there is one thing in both illustrations that intuitively appears to be missing. If you are game, please pause your reading for one minute and before reading on ask yourself: *what geometric shape (that should logically be there) is absent in both of the above planetary models?* Give it a good thought and continue reading when inspired to do so.

Here is what, in my view, constitutes a major logical anomaly in the above models: notice that the Moon, Mercury, Venus, Mars, Jupiter, Saturn and the Sun all have circular orbital paths drawn in the model. Only one celestial body is, inexplicably, lacking an orbit. That's right: **Earth!** Now, why would our planet not have an orbit, unlike all of its celestial companions? As I see it, the bizarre notion that Earth – and Earth only – would remain completely immobile among all of our revolving companions has to be a most unfortunate failure of imagination. Nonetheless, the highest praise goes to these two great astronomers of yore who provided us with the most priceless cosmic clue of all that the Sun and Mars are, in fact, "interlocked" in typical binary orbits, just like the vast majority of our surrounding star systems.

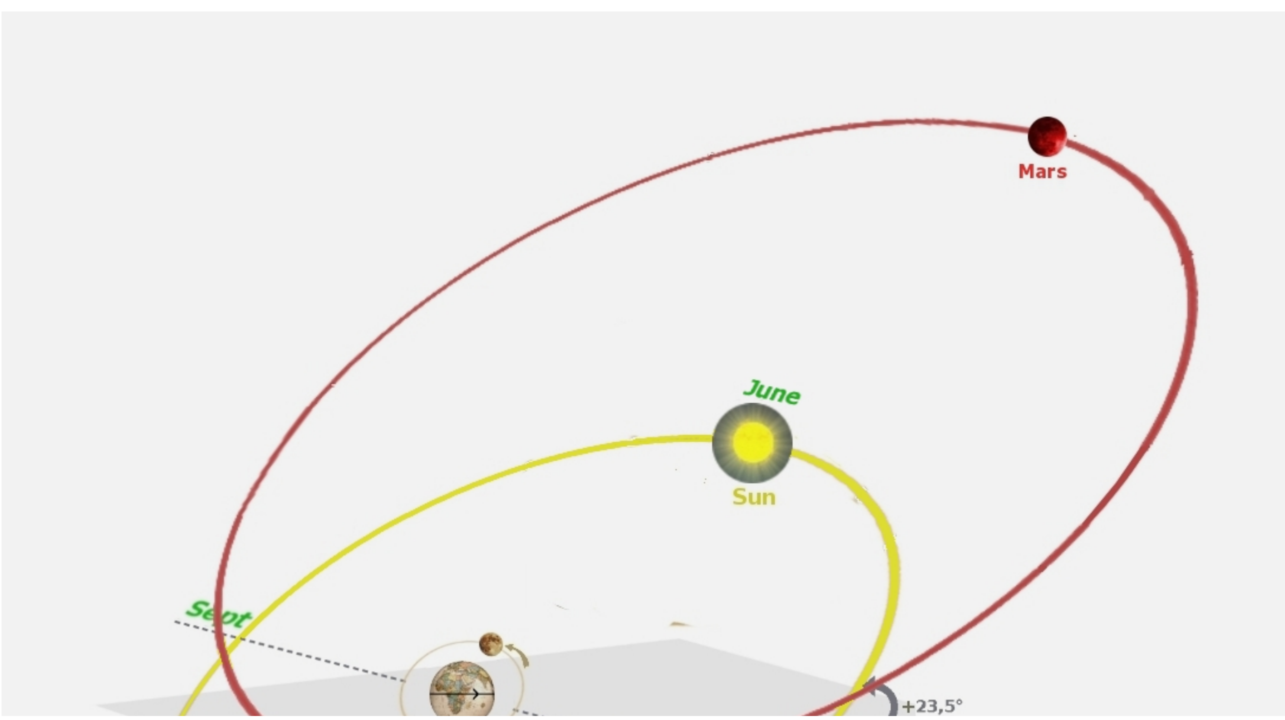
Previous Chapter Next Chapter

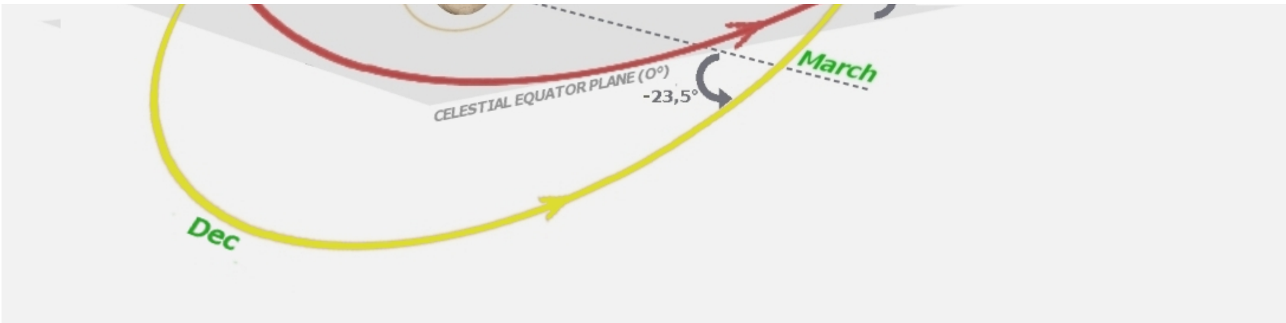
Chapter 3 — About our Sun-Mars binary system

The relatively recent realization that our visible stars have a smaller (and oft invisible) companion is the single most significant, paradigm-changing astronomical epiphany of our modern age. Today, astronomers are incessantly discovering new binary systems at an ever-increasing rate. One can only wonder why such persistent findings haven't yet sparked a major debate as to the validity of the Copernican model and its unique, "one-of-a-kind" configuration.

Below is one of my earliest TYCHOS graphics (2013) as I tried to wrap my head around the proposed geometry of Tycho Brahe's so-called "geo-heliocentric" model. At the time, I wasn't even aware that binary systems were by far the most common star formations in our skies. But then again – as already mentioned – neither were great astronomers like Tycho Brahe back in their day.

The intersecting orbits of Sun and Mars : a typical binary system

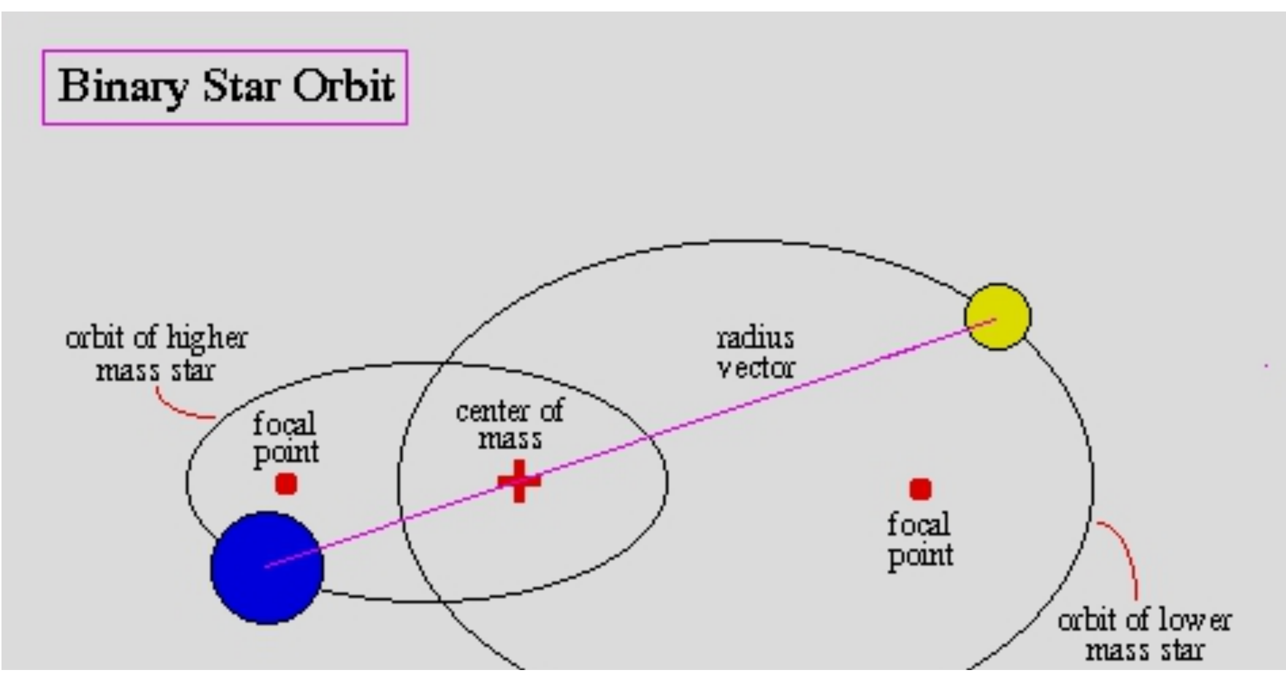


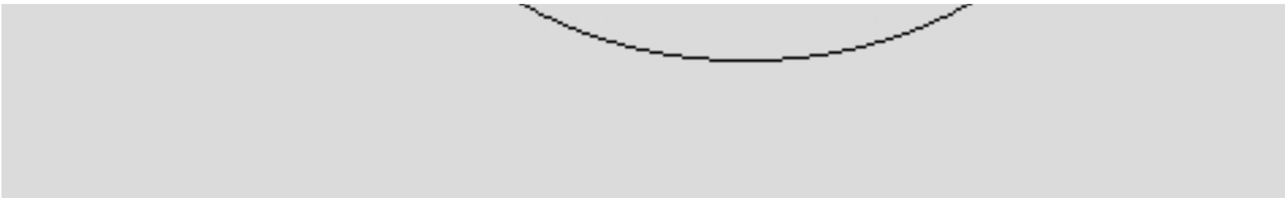


IMPORTANT NOTE: the above graphic is meant to be a "3/4 view" of our system – as if we were approaching our solar system in an imaginary spaceship at an angle, roughly at 45° above the "March / December" side. Thus, the apparent elliptical shapes of the Sun / Mars orbits are only a matter of perspective. In the TYCHOS model, ALL the orbits of our system's bodies are uniformly circular.

Note that, in my above graphic, Earth is still lacking an orbit of its own. Yet, we shall see about how I overcame that age-old obstacle in due time. Please know that I have earnestly strived to do my best to document a progressive, step-by-step account of my thought processes, as the TYCHOS model gradually took shape in my mind. I fully realize the initial difficulty to take in and visualize this new configuration of our so-called Solar System – given, perhaps, the novelty of it all. However, I hope that by proceeding in short, descriptive sections it will be easier for everyone to follow the methodological path which led me to formulate the TYCHOS model and to arrive at its logical conclusions.

Let us begin with a classic binary star system, as illustrated on the website previously referenced in Chapter 1.

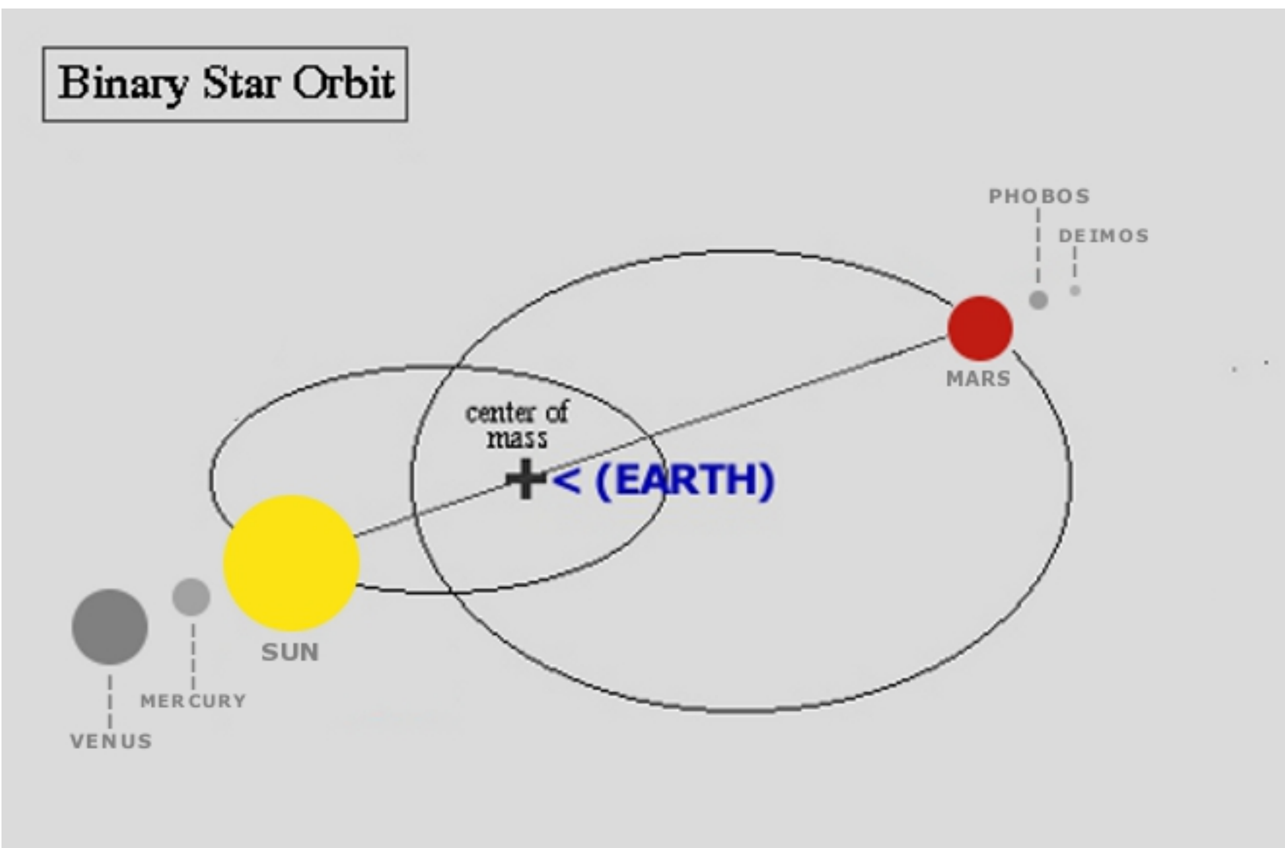




Notice that, if we substitute the above “high mass star” and “low mass star” with the SUN and MARS respectively (as I have done in the below adaptation) we obtain a neatly-balanced binary system that incorporates the two moons of the Sun (Mercury and Venus) and the two moons of Mars (Phobos and Deimos).

In addition, please separately observe the additional “plot twist” of paramount interest to us Earthlings:

In the TYCHOS, Earth is positioned near the center of mass (or barycenter) of the Sun-Mars binary system.



We can see just how harmonious such a binary system would be: Earth embraced by the Sun-Mars binary duo, each with their own two satellites. Now, if you are trained to think Relativistically, you might wonder: *“But what about the highly unequal masses of the Sun and Mars?”*

Note that binary star systems, as numerous as they are, pose a serious problem for Einstein’s theory of general relativity.

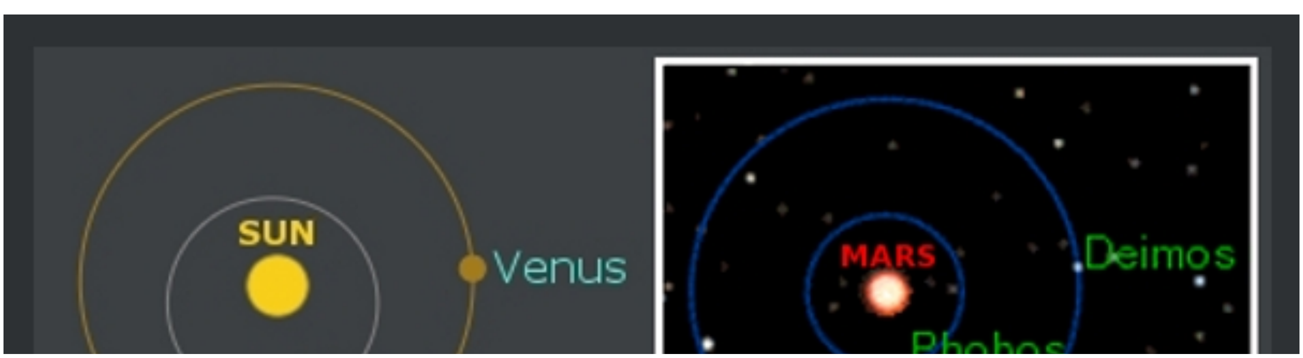
> *“If the general relativity method is correct, it ought to apply everywhere, not just in the solar system. But Van Flandern points to a conflict outside it: binary stars with highly unequal masses. Their orbits behave in ways that the Einstein formula did not predict. ‘Physicists know about it and shrug their shoulders,’ Van Flandern says. They say there must be ‘something peculiar about these stars, such as an oblateness, or tidal effects.’ Another possibility is that Einstein saw to it that he got the result needed to ‘explain’ Mercury’s orbit, but that it doesn’t apply elsewhere.”*

— *The Speed of Gravity — What the Experiments Say* by Tom Van Flandern (1998)
American Astronomical Society, DDA meeting #30, #10.04

We shall soon see that the highly unequal sizes of, for instance, Sirius A and Sirius B, are just as unequal as the Sun and Mars.

Comparing the moons of the Sun and Mars

In the TYCHOS model, Mercury and Venus are the Sun’s two tidally-locked moons, much as Mars also has two (lesser-known) tidally-locked moons: Phobos and Deimos, which were only discovered as recently as 1877 by Asaph Hall. (Tycho Brahe never observed them).



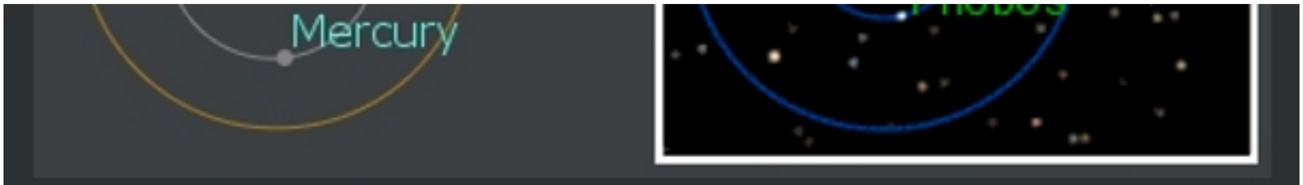


image: Screenshot from Tychosium   image credit: Astronoo.com

A closer look at the moons of Mars brings up some interesting interrelationships with their bigger sisters Mercury and Venus. Under the Copernican model, there would be no conceivable motive for these four celestial bodies to exhibit any sort of '"sympathy" with each other. Mars is supposed to be just another planet orbiting around the Sun. On the contrary, in the TYCHOS system, this is just the first of many incredible coincidences that suggests our entire system – each planetary body included – is locked in some form of magnetic harmony.

Consider these comparative facts about the moons of the Sun (Mercury and Venus) and the moons of Mars (Phobos and Deimos).

> Mercury's diameter is 2.5X smaller than Venus' diameter.
> Phobos' orbital diameter is 2.5X smaller than Deimos' orbital diameter.

> Deimos' diameter is 1.8X smaller than Phobos' diameter.
> Mercury's orbital diameter is 1.8X smaller than Venus' orbital diameter.

Things are beginning to look a little curious, aren't they? Moreover …

> Each year, Mercury revolves ca. 3.13 times around the Sun; whereas each day, Phobos revolves 3.13 times around Mars. As a way of comparison, think of the Sun that revolves once every year around Earth, whereas Earth rotates once every day around its axis. This may sound like a silly comparison (between a revolution period and a rotational period), unless you know that our Moon revolves around Earth in the same time as the Sun rotates around its axis (approx 27.3 days).

> Mercury orbits the Sun near-precisely 5X faster than Venus, while Phobos orbits Mars near-precisely 4X faster than Deimos. The ratios are extremely close to whole numbers, and congruent with the concept of non-relativistic time. That is to say, assuming no Einsteinian "time warp", these systems are directly interlocked with one another in real

time.

Clearly, all this appears to indicate some sort of "kinship" between the two moons of Mars and the two moons of the Sun. Under the Copernican model's configuration, these multiple resonances would be an utter mystery and would have to be classified as a string of "random coincidences". Conversely, under the TYCHOS model, all of this can be envisioned much more logically. It is a natural consequence of Mercury and Venus & Phobos and Deimos being, respectively, the moons of the Sun and the moons of Mars.

You might now rightly ask yourself, *"Why are Mercury and Venus the only 'planets' of our solar system* ***with no moons of their own?****"*

As a matter of fact, this is one of astronomy's longstanding (and still unsolved) mysteries. The truth of the matter is: no one actually knows why Venus and Mercury are "moonless". To dismiss the absence by calling it happenstance doesn't make the question go away. Meanwhile, no compelling theses on this spiny subject have been forthcoming to this day. Here are, for instance, NASA's (tentative) explanations of this major cosmic enigma.

> *"Most likely because they are too close to the Sun. Any moon with too great a distance from these planets would be in an unstable orbit and be captured by the Sun. If they were too close to these planets they would be destroyed by tidal gravitational forces. The zones where moons around these planets could be stable over billions of years is probably so narrow that no body was ever captured into orbit, or created in situ when the planets were first being accreted."*

— *Why don't Mercury and Venus have moons?* by NASA for Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) Education Center

Here's another (perhaps more intellectually honest) quote from a nasa.gov website.

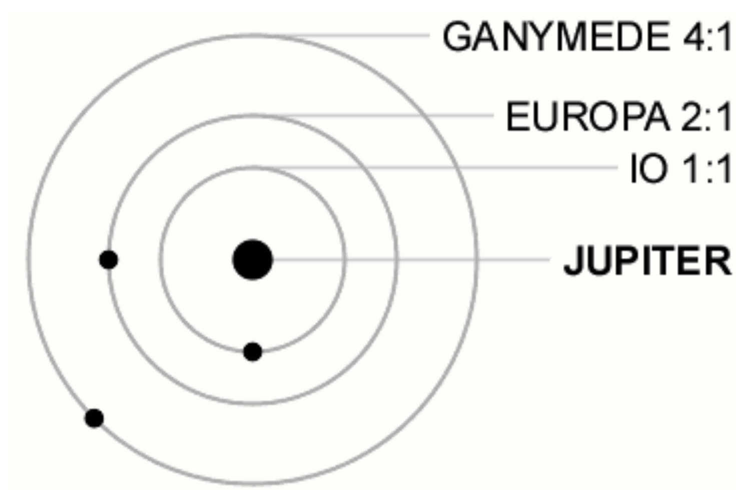
> *"Why Venus doesn't have a moon is a mystery for scientists to solve."*

— *How many moons?* by Kristen Erickson (2017) for NASA Space Place

Now, the TYCHOS model has a short answer to this "mystery"' : Venus and Mercury have no moons due to the simple fact that they ***are*** moons. Moreover, they are the two moons of the Sun just as Mars, its binary companion, has two moons. As it is, the notion that Venus and Mercury are moons (rather than planets) can be deduced in multiple ways. The first method has to do with their distinctively slow axial rotation speeds, which both appear to be 'intimately related' to the slowly-rotating Moon of Earth:

> The rotational speed of Mercury (as of the TYCHOS*) is no more than 5.465km/h (almost exactly 3X slower than our Moon).
>
> The rotational speed of Venus (as of the TYCHOS**) is no more than 2.711km/h (almost exactly 6X slower than our Moon).
>
> The rotational speed of our Moon (as of official astronomical data) is no more than 16.7 km/h.
>
> NOTE: In the TYCHOS model our Moon's rotation is
>
> - almost precisely 3X faster than Mercury's rotation
> - almost precisely 6X faster than Venus' rotation

Incidentally, if our three nearmost moons (our Moon, Mercury and Venus) are "locked" in a 1:3:6 ***rotational*** resonance, this is reminiscent of the well-known 1:2:4 ***orbital*** resonance of the three largest moons of Jupiter (Io, Europa and Ganymede).



Above — Source: Wikimedia commons via Wikipedia entry on "Io"

Here are my calculations for the rotational velocities of Mercury and Venus (as of the TYCHOS model paradigm). Please note that most (serious) astronomers will agree that both Mercury and Venus, as they return to perigee (*i.e.;* closest point to Earth), will always show the same face to us.

*In the TYCHOS model, Mercury returns to perigee in 116.88 days (or 2805 hours). Mercury's circumference is 15,329 km. Hence, a distance of 15,329 km covered in 2805 hours computes to a rotational speed of

15,329 km / 2805 hours = **5.465 km/h**

**In the TYCHOS model, Venus returns to perigee in 584.4 days (or 14,025.6 hours). Venus' circumference is 38,024.5 km. Hence, a distance of 38,024.5 km covered in 14,025.6 hours computes to a rotational speed of

38,024.5 km / 14,025.6 hours = **2.711 km/h**

These are all, of course, **exceptionally slow** rotational speeds, especially when compared to the rest of our system's celestial bodies. They are all in the rotational speed range of a children's merry-go-round. We may therefore formulate refined definitions of a "moon" or "lunar body", as opposed to a "planet".

1. No moons have major satellites of their own, since they are moons themselves.

2. A moon's rotation is always tidally locked to its host's nucleus, and this remains independent of its host's rate of axial rotation.

3. A moon rotates exceptionally slowly around its own axis – compared with all other known celestial bodies.

To verify the latter assertion, let us ask ourselves, *"Do any other celestial bodies in our system have such extremely slow rotational speeds as our Moon, Mercury or Venus?"* The answer is no. For instance, Jupiter rotates around its axis at a brisk *43,000 km/h* and Saturn rotates around its axis at about *35,000 km/h*. These are, of course, hypersonic speeds completely unlike lunar rotational speeds.

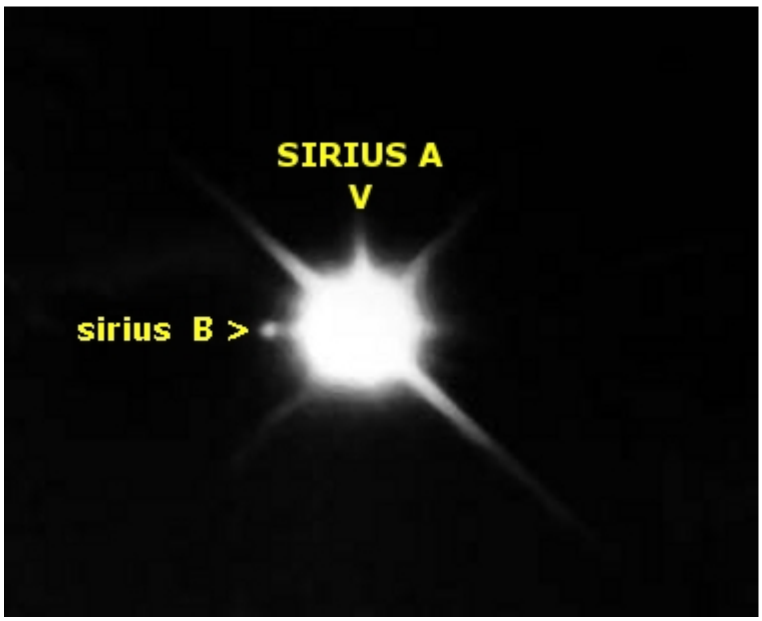
If you ask me about Mars, we will see about that later, as Mars's axial rotation turns out to be synchronous with Earth's axial rotation.

As for the question about Venus and Mercury being both tidally locked to the Sun (as posited by the TYCHOS model in contrast with previous theory), this will also be addressed later on, in the chapters dedicated to the Sun's two lunar satellites.

Previous Chapter Next Chapter

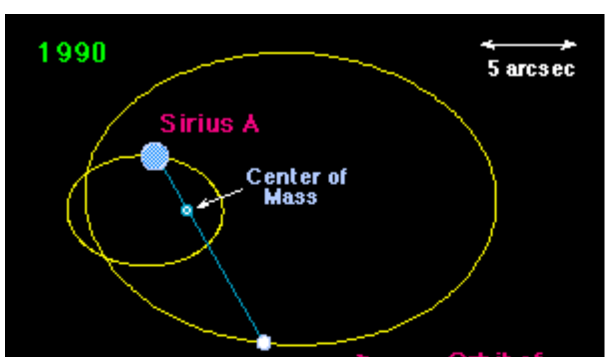
Chapter 4 — Sirius A and B — “Living proof” in support of the TYCHOS model

The very brightest of all the stars in our skies is Sirius. It is a two-body (or perhaps three- or four-body) system composed of (as far as is known today) a large star, Sirius A, and a far smaller object, Sirius B. The far smaller Sirius B was, in fact, only first observed as late (or as recently, if you will) as 1862 by Alvan Clark, with what was then the world’s largest refractor telescope.



First photograph of SIRIUS A and Sirius B (by Lindenblad — 1973)

Here is how some astronomy websites illustrate the orbits of SIRIUS A and Sirius B).



Sirius A and B in 1990

Above images — *The Dogon and Sirius* by Martin Clutterbuck

As mentioned earlier, binary systems such as the one composed of Sirius A and Sirius B (what with their vastly unequal sizes) pose a very serious problem for Einstein's theory of general relativity (as well as for Newton's gravitational "laws"). The issue of the relative dimensions of Sirius A and B is of primary interest to the TYCHOS model. To wit, the very first objection that Copernican astronomers will have against the notion that Mars is the Sun's binary companion will, inevitably, be the following:

"Preposterous! Our tiny little Mars (with its far smaller mass) cannot possibly be the Sun's binary companion!"

As I will demonstrate, this predictable objection is a non-starter. The empirically verifiable fact that the diameters of Sirius A and Sirius B are proportionally identical to our Sun and Mars invalidates this core objection right off the bat. I shall now expound this in due detail.

Please note that I am about to compare solely the observed angular diameters of these 4 bodies — since any estimation of their respective masses is nothing that can be empirically verified or demonstrably proven from Earth. In fact, all mass estimations are based upon Einstein's and Newton's postulated physical laws. Astronomy literature offers no rational explanation as to why the "midget star" Sirius B, which is only slightly smaller than our planet (91.6% of Earth's diameter), should possibly have a larger mass than that of the Sun! Yet, in recent astronomy texts, you may read extraordinary things such as:

> *"The force of gravity on Sirius B is 350,000 stronger than on Earth, meaning 3 grams of matter (roughly a sugar cube) would weigh 1,000 kilos!"*

— *Sirius Star*, SolarSystemQuick.com (2010)

As for the diameter of Sirius B, on Wikipedia we can read that:

> *"In 2005, using the Hubble telescope, astronomers determined that Sirius B has nearly the diameter of the Earth, 12,000 kilometres, with a mass 102% of the Sun's."*

— Wikipedia entry on "Sirius"

You see, the current scientific reasoning (in astronomy circles) goes a bit like this:

"Since Newton's Gravitational Laws predict so elegantly the masses of our own solar system, our entire universe must therefore obey the same laws. Therefore, since Sirius B is far smaller than Sirius A (though the two of them revolve around each other), then the mass of Sirius B must be phenomenally large."

I trust that anyone can sense the inherent fallacy of such logic. What we have here is nothing but a "textbook case of confirmation bias" on the part of our world's Copernican astronomers.

Let us now set aside the mass question and just compare the observable, relative diameters of our Sun and Mars, and contrast them directly with those of Sirius A & B.

Diameter of SIRIUS A: 2,390,000 km
Diameter of SIRIUS B: 11,684.4 km
Sirius B's diameter is 0.4888 % that of SIRIUS A

Diameter of our Sun: 1,391,400 km
Diameter of Mars: 6792.4 km
Mars's diameter is 0.4881 % that of the SUN

(Sirius A and B dimensional data from Wikipedia.)

That's right — **0.4888% versus 0.4881%** … a proportional difference of barely 0.0007% !

Thus, since the relative diameters of SUN & MARS versus those of SIRIUS A & SIRIUS B are nearly identical, the objection that *"Mars is far too small to be the binary companion of the Sun"* can be promptly dismissed. The very existence of the Sirius A – Sirius B binary system constitutes verifiable, empirical evidence that such a system can and does exist in our cosmos.

Perhaps an easier way to remember this proportional similarity between the Sirius system and our own Solar System (which, to my knowledge, no one has ever pointed out to this day) is to express it as follows:

Sirius B is approximately 204 times smaller than Sirius A.

and

Mars is approximately 204 times smaller than the Sun.

The two components of the brightest star in our sky are thus proportionally "identical" to the Sun and Mars; is this just a mere coincidence? Who knows? In any event, this fact should put to rest any objection as to the sheer plausibility (existing gravitational "Laws" notwithstanding) of our big Sun and the far smaller "planet" Mars being binary companions.

Yet, there may be even more astounding similarities in store between the Sirius system and our own Solar System; although further studies are needed to confirm its existence, it would appear that the Sirius binary system may harbor a third body – provisionally named "Sirius C".

We shall now take a look at what is currently known about this presumed third component of the Sirius system and the fascinating aspects surrounding some ancient accounts pointing to its possible existence.

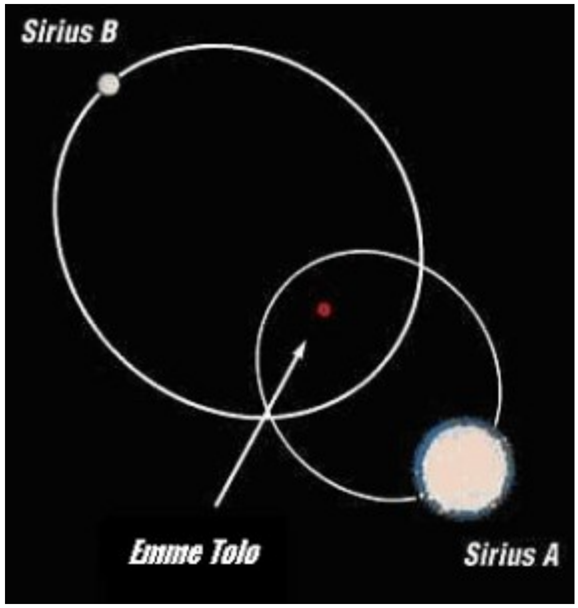
About "Sirius C"

In the above diagram ("Sirius A and B in 1990"), we see a blue dot indicating the "Center of Mass" of the Sirius binary system. If Earth occupies the barycentric zone of the Sun / Mars binary system, could there be a planet located at the barycenter of the Sirius A / Sirius B binary system? As it is, the possible existence of a 3rd body ("Sirius C") within the Sirius system is a longstanding (and still-ongoing) debate. A fairly recent French astronomical study appears to have corroborated the probable existence of Sirius C:

Is Sirius a Triple Star?

by D. Benest and J.L. Duvent (1994) for *Astronomy and Astrophysics* 299, 621-628

Here follows a simple diagram (author unknown) to be found on various websites depicting a proposed orbital configuration of the Sirius system. It features the elusive "Sirius C" (*a.k.a.* "Emme Tolo") positioned at the barycenter of the Sirius A / B binary system:



Above source — *The Dogons and the Stars of Sirius* by Pacal Votan (2007)

"Emme Tolo" is the name given to the elusive (as yet unseen) Sirius C by the Dogons, an ancient African tribe whose culture and religion was based around their inexplicably advanced knowledge of the Sirius system. As it is, some of the Dogons' astronomical knowledge has been confirmed in modern times, such as, for instance, their astounding estimation of 50 years for the orbital period of the Sirius binary system (today reckoned to be 50.1 y). In fact, it still remains a veritable mystery just how the Dogons even knew of the existence of Sirius B since it is not (currently) visible with the naked eye — but only with large, powerful telescopes.

Amazingly, the Dogons somehow also knew about an even smaller body revolving (in lunar fashion) around "Emme Tolo" (Sirius C) — much like our Moon revolves around Earth. They named this satellite "Nyan Tolo", which translates as "the Women's Star". Of course, our Moon (*la Luna* in Italian, and in Greek mythology represented by the gorgeous goddess Selene) has always been "the women's star", what with its sidereal orbital period of 27.3 days (which more or less matches the average female menstrual cycle).

The Dogon Tribe: Connection Sirius by Ivan Petricevic (2007)

I don't wish to dwell too long on the Dogons and their inexplicably-advanced knowledge of the Sirius system, since this whole topic appears to have been, in later years, “sensationalized” and exploited (to generate popular book sales) by a number of authors from the UFO/New Age crowd and submerged by a dross of fanciful conjectures. Suffice to say that we simply don’t know how the ancient Dogon tribe acquired this knowledge. It seems unlikely, however, that this entire Dogon affair is just a figment of someone’s imagination. In any event, if it should turn out that Sirius C (“Emme Tolo”) and its moon (“Nyan Tolo”) both exist, we will certainly have to seriously consider the compelling prospect that the Sirius System is some sort of “**Twin family**” of our own solar system:

SIRIUS A	=	the “TWIN” of our SUN
SIRIUS B	=	the “TWIN” of Mars
SIRIUS C	=	the “TWIN” of Earth
Nyan Tolo	=	the “TWIN” of our Moon

So, once more: would it be “preposterous” to think that Mars is the Sun’s binary companion? Would the (alleged) huge mass of the Sun versus the (alleged) tiny mass of Mars rule out the idea that the two of them are binary companions? According to modern astrophysics, given the *currently-assumed* masses of Sun and Mars, yes. Nonetheless, I think it is now wise to ask if all of those “mass” assumptions – as imagined by Sir Isaac Newton – have any bearing on the physics of two celestial (binary) bodies revolving around each other.

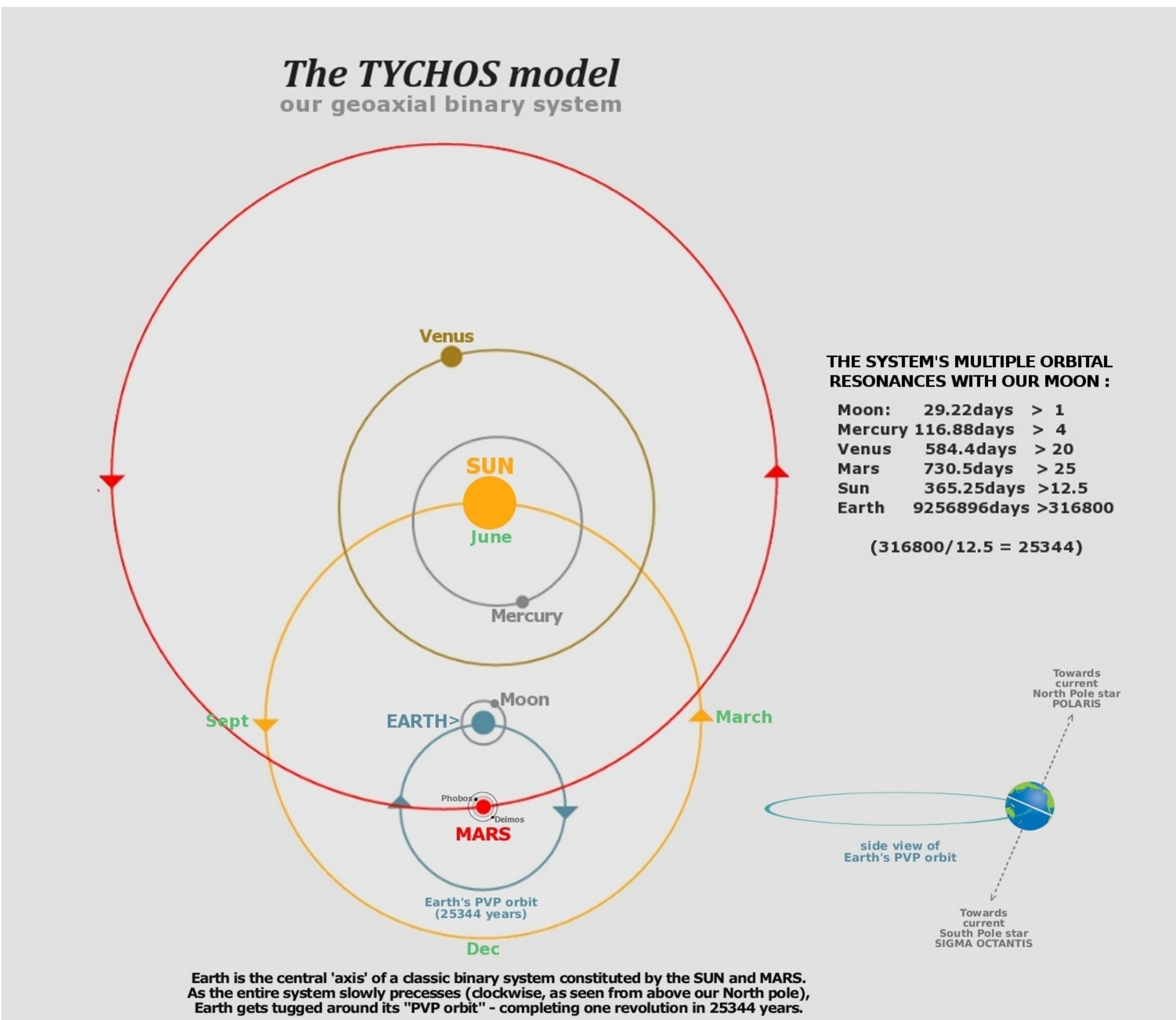
In conclusion, I submit that the very existence of the Sirius system is strongly supportive of the TYCHOS tenets. It provides empirical evidence that a small celestial body can indeed be the binary companion of a far larger celestial body. Whether the Dogon story is fictitious or not will not change the observable facts.

Next, I will introduce the basic configuration of the TYCHOS system. Although it may seem somewhat premature to unveil it at this early stage I feel it is necessary in order for the reader to get a general overview of the TYCHOS before tackling the successive chapters.

Previous Chapter Next Chapter

Chapter 5 — Introducing the TYCHOS model

Below is a basic configuration of the TYCHOS or what we may call our “geoaxial binary system”. In the TYCHOS, the Sun and Mars are the main players of a typical binary system. At or near its barycenter, we find Earth and our Moon, while the Sun (escorted by its two moons, Mercury and Venus) and Mars (escorted by its two moons, Phobos and Deimos) perform their binary dance around our planet. It is Earth’s physical motion around its “PVP” orbit (see blue circle) that causes our North stars to change over time – a very slow process commonly-known as the “precession of the equinoxes”.



The SUN and MARS are both escorted by two moons, Venus & Mercury - and Phobos & Deimos. Remarkably, the orbital periods of all of our system's bodies turn out to be exact multiples of our own Moon's synodic period (29.22 days) - and are thus united in a most harmonious resonance.

Simon Shack - 2018

The Sun revolves once a year around Earth, traveling at 107,226 km/h (the orbital speed attributed to Earth in the Copernican model) while Mars, its binary companion, revolves once every two solar years around the Sun and Earth both. In the TYCHOS, Earth is inclined at about 23° in relation to its orbital plane – yet (unlike current theory) its Northern hemisphere remains tilted at all times 'outwards', i.e. towards the external circuit of the Sun.

There is no need for Earth's "wobble around its polar axis" (as of Copernican theory). Nor do we hurtle around space at hypersonic speeds. Earth only rotates once every 24 hours while it slowly gets tugged around at 1.6 km/h (about 1 mph) along its own clockwise path. It completes one revolution around its "PVP orbit" every 25344 years (a period also known as "The Great Year"). The "PVP" orbit ("Polaris-Vega-Polaris") and Earth's snail-paced orbital motion will of course be thoroughly illustrated further on, as they constitute the core postulations upon which the TYCHOS model is founded.

Oddly enough, Tycho Brahe apparently believed to his last day that Earth was totally stationary, did not rotate around its axis and that the stars all revolved around it in unison. One can only wonder how Tycho reconciled this belief with, for instance, the slow alternation of our polar stars through the ages. Eventually however (in 1622), Tycho's trusty assistant Longomontanus (in his *Astronomia Danica*, regarded as "Tycho's testament") allowed for Earth's daily rotation around its axis in what became known as the "semi-Tychonic" system. The observational accuracy of Longomontanus' refined system has, to this day, never been surpassed:

> *Longomontanus, Tycho's sole disciple, assumed the responsibility and fulfilled both tasks in his voluminous 'Astronomia Danica' (1622). Regarded as the testament of Tycho, the work was eagerly received in seventeenth-century astronomical literature. But unlike Tycho's, his geoheliocentric model gave the Earth a daily rotation as in the models of Ursus and Roslin, and which is sometimes called the 'semi-Tychonic' system. […] Some historians of science claim Kepler's 1627 'Rudolphine Tables' based on Tycho Brahe's observations were more accurate than any previous tables. But nobody has ever demonstrated they were more accurate than Longomontanus's 1622 'Danish Astronomy' tables,*

> *also based upon Tycho's observations.*

— Wikipedia entry on Christen Sørensen Longomontanus

The TYCHOS system, it should be noted, is nothing but a natural evolution of the semi-Tychonic system, and is fully consistent with the unequaled observational accuracy of the same. However, the TYCHOS provides what one may call the "missing pieces of the puzzle" to the extraordinary work of Tycho Brahe and Longomontanus. Alas, their work was annihilated by the emergence of the Copernican heliocentric theory, which for unfathomable reasons prevailed – in spite of its numerous problems and aberrations. As we shall see, these problems stem from a distinctly unphysical nature. It is a poorly-known fact that the Copernican theory was by no means immediately embraced as a self-evident truth. It was strongly (and justly) rejected for several decades by the wider scientific community due the many leaps of logic that its core premises demanded. One of the most formidable mental leaps required in order to accept the Copernican theory was, of course, the unthinkable dimensions and distances that the stars would have in relation to our system.

> *Most scientists refused to accept [Copernicus's] theory for many decades — even after Galileo made his epochal observations with his telescope. Their objections were not only theological. Observational evidence supported a competing cosmology,the "geo-heliocentrism" of Tycho Brahe. The most devastating argument against the Copernican universe was the star size problem. Rather than give up their theory in the face of seemingly incontrovertible physical evidence, Copernicans were forced to appeal to divine omnipotence.*

— *The Case Against Copernicus* by Dennis Danielson and Christopher M. Graney

Previous Chapter

Next Chapter

Chapter 6 — Mars, the "Key" to our system

Johannes Kepler famously stated that

> *"Mars is the key to understanding the solar system."*

Kepler, of course, notoriously obsessed about Mars for five harrowing years and, in his correspondence with fellow scientists, referred to his relentless pursuit as *"his personal war on Mars"*. We now know that (presumably out of sheer exhaustion) Kepler eventually resorted to the shameless fudging and manipulation of Tycho's data published in his *Astronomia Nova*, a book still regarded as the "Bible of the Copernican Revolution". This shocking discovery by Prof. Donahue, the American translator of Kepler's epochal treatise, was made in 1988. Now, if Kepler had to cheat to make his heliocentric model work, what does this tell us about the overall credibility of the Keplerian and Copernican theories?

It will remain a mystery why Kepler, Tycho's "math assistant", eventually dismissed his own master's cosmic model in favor of the Copernican – and this in spite of having plotted (at some point of his strenuous war on Mars) a working diagram of Mars's geocentric motions, titled *De Motibus Stellae Martis*. History books only tell us that Kepler, upon Tycho's untimely death (at age 55), seized the bulk of his master's laboriously-collected observational tables and annotations, only to set about flipping Tycho's model on its head. Professor Donahue's detailed descriptions of how Kepler fudged his all-important Mars computations (moulding them so as to make them "fit" with the core tenets of his thesis) make for a most compelling read:

Kepler's Fabricated Figures – Covering up the Mess in the New Astronomy by W. H. Donahue (1988, Journal for the History of Astronomy, Vol.19, NO. 4/NOV, P.217)

This short article succinctly sums up Kepler's falsification of his much-heralded master work, *Astronomia Nova*.

> *"Done in 1609, Kepler's fakery is one of the earliest known*

> *examples of the use of false data by a giant of modern science. Donahue, a science historian, turned up the falsified data while translating Kepler's master work, Astronomia Nova, or The New Astronomy, into English."*

— *Pioneer Astronomer Faked Orbit Theory, Scholar Says* by New York Times (January 23, 1990)

Kepler's manipulative antics may well go down in history as the triumph of mathematical abstraction over the empirical method. In his urge to make the complex & bewildering behavior of Mars agree with the fledgling Copernican theory, Johannes Kepler not only misused and twisted — but outright *subverted* Tycho Brahe's most exacting observational data acquired throughout his lifetime.

Mars's two Empiric Sidereal Intervals (ESIs)

Let us presently take a look at what the Maya knew about Mars. The ancient Maya astronomers were clearly aware of the peculiar sidereal period(s) of Mars — as viewed from Earth. As they kept count of the amount of days needed for Mars to realign again with a given reference star, they saw that Mars had in fact two sidereal periods: a more frequent, lengthier one of about 707 days — the "Long ESI" — and an odd, shorter one of about 543 (± 6.79) days — the "Short ESI".

It is the "Short ESI" (of ca. 543 days – or ca. 1.5 solar years) that is of primary interest to us. As will be comprehensively demonstrated in Chapter 7, the Copernican model cannot possibly account for this odd / shorter sidereal interval of Mars.

> *"We discuss here a kind of period that we call the empiric sidereal interval (ESI), which we define as the number of days elapsed between consecutive passages of Mars through a given celestial longitude while in prograde motion. At first glance, one would imagine that the ESI would fluctuate widely about some mean because of the intervening retrograde loop, which in the case of Mars occupies 75 days on average between first stationary (cessation of) and second stationary (resumption of normal W-to-E motion). However, a closer look at modern astronomical*

> *ephemerides reveals that for a practical observer there are really two ESIs, a lengthier one that includes the retrograde loop (the long ESI) and a shorter one that does not (the short ESI)."*

— *Ancient Maya documents concerning the movements of Mars* by Harvey M. Bricker, Anthony F. Aveni and Victoria R. Bricker in Proc Natl Acad Sci U S A. (February 2001)

The above-linked paper (a highly-recommended read) describes in great detail the Maya astronomers' exacting knowledge of Mars's sidereal periods — although it ultimately fails to address the profound implications raised by the existence of these **two** ESI's of Mars.

The binary nature of the TYCHOS system with Mars's peculiar, epitrochoidal orbital motion around the Sun, geometrically explains why Mars can realign with a given star within as little as 543 (± 7) days, or about 1.5 years. In Maya astronomy, this ca. 543-day period is called the Short ESI (Empiric Sidereal Interval) whereas Mars's "habitual", longer sidereal period of ca. 707.5 days is called the Long ESI. So why is the currently-accepted value of Mars's sidereal period "686.9 days" as computed by Kepler?

Well, here are the (observable) facts: Mars will typically realign with a given reference star on seven successive occasions in successive intervals of circa 707.5 days (on average) — but the eighth time around, Mars will realign with that same star in only about 543 (± 7) days. That is, over a ca. 15-year time span, Mars exhibits seven Long ESIs (of ca. 707.5 days) + one Short ESI (of ca. 543 days)!

MARS sidereal period ESI sequence:

707.5 / 707.5 / 707.5 / 707.5 / 707.5 / 707.5 / 707.5 / 543

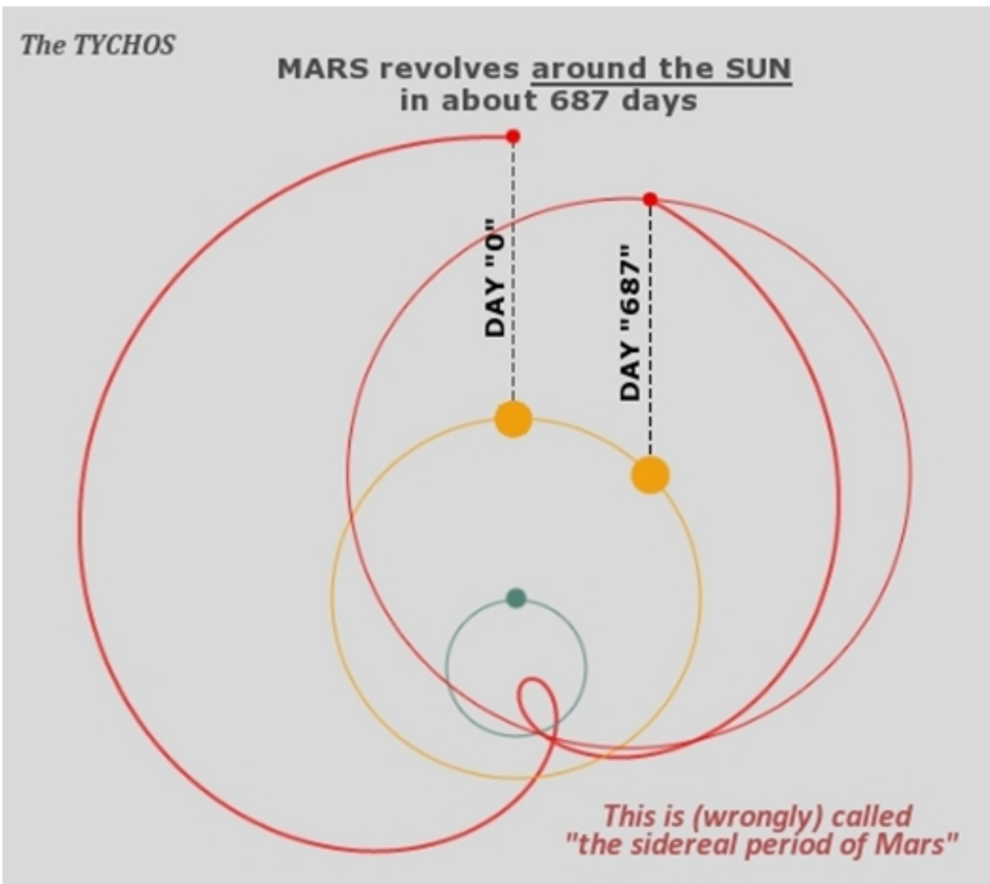
Total: 5495.5 days – or ca. 15 years.

Now, since 5495.5 / 8 = 686.9375 days, we can see how Kepler must have just "averaged out" these eight observable Mars periods in order to get his estimated sidereal period of Mars. As it is, we are told that this supposed 686.9-day period (said to represent one Martian year) is not something that can be observed from Earth. The (currently-claimed) Keplerian 686.9-day value of Mars's sidereal period was just mathematically extrapolated *on the assumption* that Earth revolves around the Sun.

Yet Mars does indeed, in reality (and as can be directly observed), alternate its sidereal periods as of the above ESI sequence!

You may now rightly ask yourself, *“**How** is this even possible? **How** can Mars realign with the same star — as seen from Earth — in two wholly different time periods (707.5 and 543 days)?”* This is indeed a very good question. The short answer is: in the Copernican model, it simply can’t. In the TYCHOS model, it can and will naturally do so — for demonstrable, geometric reasons which I will now expound.

Please note that, in the TYCHOS, Mars does indeed have a 686.9-day period (or ca. 687d) — but that’s **the period needed for Mars to revolve once around the Sun**. Ergo, it is ***not*** Mars’s “true mean sidereal period” as Kepler had it. It is the period for Mars to return to its degree position relative to the Sun, as I have illustrated below.



Why is Mars behaving in this way? It will become clear as we take a look at the synodic period of Mars.

About the synodic period of Mars

We just saw that Mars’s “habitual” sidereal period (the Long ESI) lasts for around

707.5 days (about 23 days less than two solar years of 730.5 days. More precisely, Mars returns facing the same star 22.8 days earlier than the Sun does, in a two-year period). The average synodic period of Mars is 779.2 days; this is the time period needed for Mars to line up again with the Sun as viewed from Earth. We see that this is 48.7 days more than two solar years (730.5 + 48.7 = 779.2). Now, we also see that:

48.7 days + 22.8 days = **71.5 days**
i.e. the average duration of the "retrograde periods" of Mars

This leads us to a most remarkable realization: since the two binary companions, Sun and Mars, are locked in a 2:1 orbital ratio, one might think that the two of them will "meet up" every 730.5 days (i.e. 2 solar years) ; but due to Mars retrograding biyearly by ca. 71.5 days (on average), Mars will "slip out of phase" with our timekeeper, the Sun — hence, with our earthly calendar. Therefore, Sun and Mars will conjunct (as viewed from Earth) only every 779.2 days

707.7 + 71.5 = 779.2

Thus, in 16 solar years MARS completes 7.5 synodic periods.

779.2 X 7.5 = 5844 days = 16 solar years.

In 16 years, Mars and the Sun do in fact conjunct with Earth — although on opposed sides of our planet. Mars will need another 7.5 synodic cycles, for a total of 32 years (i.e. 2 X 16 or 15 + 17) to complete one of its 32-year cycles. Since Mars processes biyearly (vis-à-vis the Sun) by ca. 45 min. of Right Ascension (on average), in 32 solar years it will process by about:

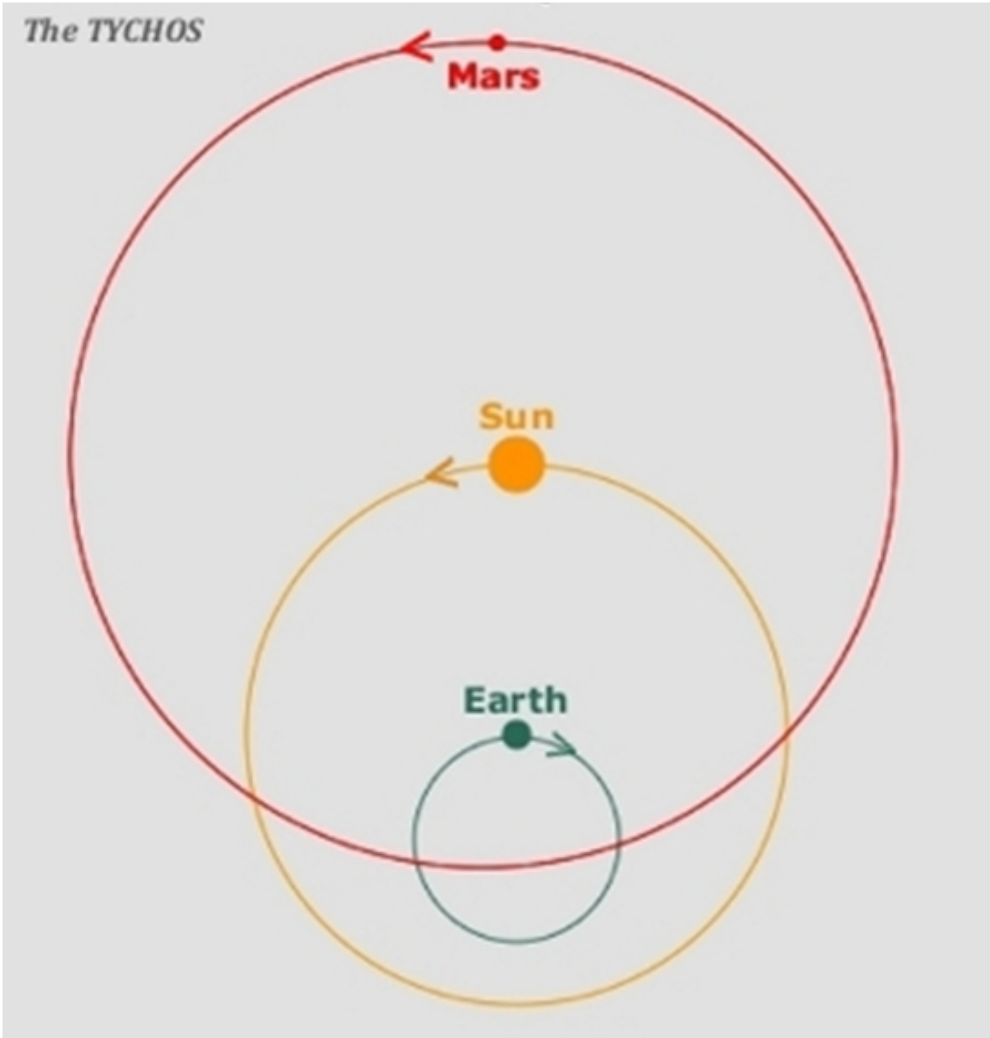
45 min. X 32 = 1440 min.
a full 360° procession around its "host", the Sun.

Next, we will see how the respective orbital paths of Sun & Mars, as concluded by Tycho Brahe, can and do indeed intersect in typical binary fashion — much like Sirius A and Sirius B.

The synchronized 2:1 binary dance of Sun and Mars

As mentioned earlier, Tycho Brahe's boldest contention was, undoubtedly, that the orbits of Mars and the Sun intersect. Back then, Tycho's opponents would jeer:

“Absurd! Preposterous! Sooner or later, Mars and the Sun must collide!” Today, their ways may perhaps be excused for back in those days, no one was aware of the very existence of binary systems.



As you can see, the above orbital configuration is perfectly consistent with the models of Tycho Brahe and Pathani Samanta (as illustrated in Chapter 2) albeit with a little — yet crucial — addition: the clockwise orbit of Earth. For now, let us focus our attention on Mars and its peculiar motion around the Sun and Earth.

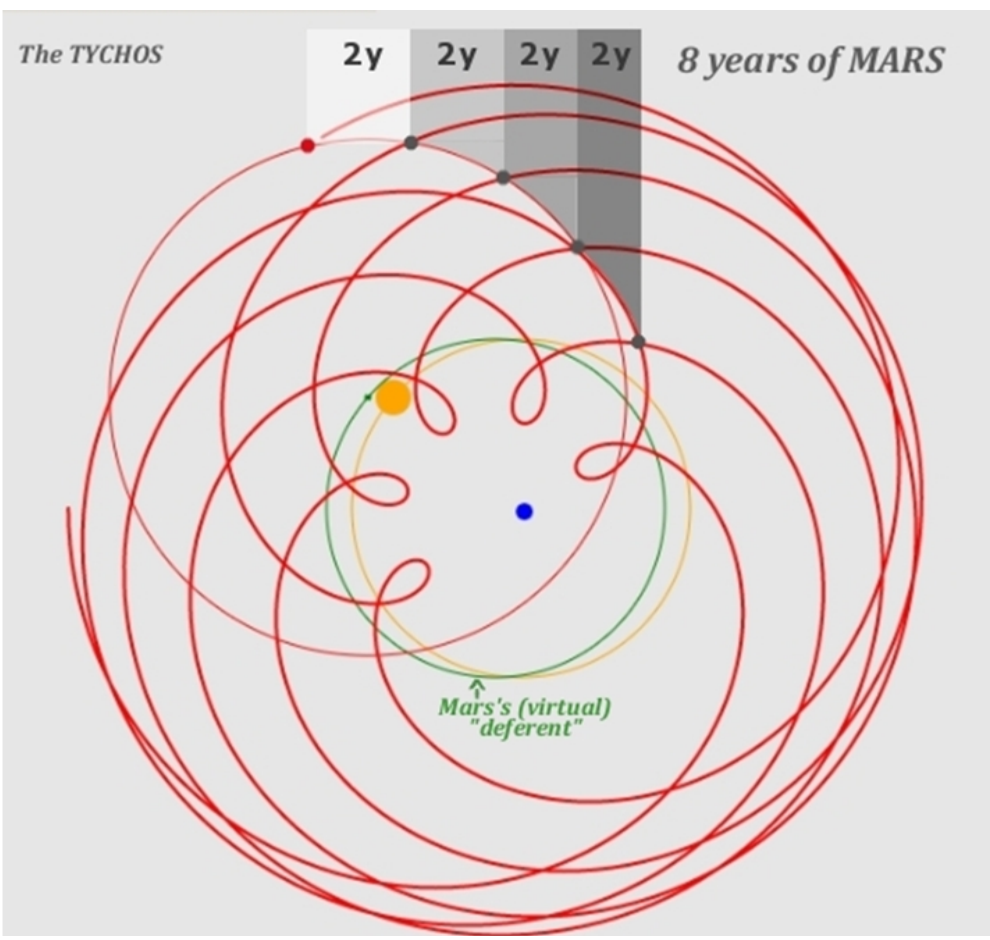
Seeing Mars’s path is essential viewing for the reader. It shows you the first version of what eventually became the TYCHOS Planetarium, a joint effort between my invaluable research assistant & computer programmer Patrik Holmqvist and yours truly. Naturally, our initial objective was to animate and digitally simulate the motions of Mars — under the TYCHOS model’s paradigm — so as to verify its sustainability. On my side, I provided the observational data (borrowed from official, undisputed astronomy tables — yet interpreted from a “Tychonic perspective”) while Patrik, on his side, translated it all into computer language.

Watch animation of Mars's path around the Sun

The oddly-shaped "teardrop-loops" that Mars performs as it passes closest to Earth are, undeniably, a most difficult thing for the human mind to process. They are caused by the spirographic pattern of orbits in the shape of circles (and not ellipses or any other irregular shape) as they move in relation to one another. The "line" it draws is not circular but Mars is only ever moving in a circle, whose center is itself moving in a circle.

Once you overcome this cognitive hurdle, you will soon realize that it is nothing but a natural geometric consequence of a body revolving (in uniform circular motion) around another revolving body — the two of them remaining, at all times, "magnetically attached". In fact, the Sun and Mars exhibit unequivocal evidence of being an interlocked binary pair.

In the TYCHOS model the Sun and Mars binary orbits are "interlocked" in a perfect 2:1 orbital resonance. However, this exact 2:1 Mars:Sun orbital ratio is not directly observable or noticeable from Earth, due to Mars's peculiar epitrochoidal motion which causes it to return, every two solar years, at different celestial longitudes as illustrated below.



We may thus envision just why it has been nigh impossible, throughout the ages, for any observational astronomer to detect this harmonious 2:1 binary dance of the Sun and Mars — since Mars never returns to the same place within a 2-year period. Mars's virtual "deferent" shown in the above graphic indicates Mars's orbital offset (of ca. 22.2 Million km) in relation to the Sun's orbit. The actual reason for this apparent offset of Mars's circular orbit needs further study, yet it is fully consistent with observation — as I will now expand upon.

As it is, the motions of Mars posed the greatest difficulties to the astronomers of yore, Tycho included:

> *"We have seen that Tycho, like Ptolemy and Copernicus, assumed the solar orbit to be simply an excentric circle with uniform motion. But already in 1591, he might have perceived from the motion of Mars that this could not be sufficient, as he wrote to the Landgrave that 'it is evident that there is another inequality, arising from the solar excentricity, which insinuates itself into the apparent motion of the planets, and is more perceptible in the case of Mars, because his orbit is much smaller than those of Jupiter and Saturn.' "*

— p.346, *Tycho Brahe: a picture of scientific life and work in the sixteenth century* by John Louis Emil Dreyer (1890)

Mars has been the single most problematic body of observational astronomy, and the reasons for this should become clear as we go along. All over the literature, you may find statements hinting at the "uniqueness" of Mars's cosmic behavior in comments like:

> *"Among the planets, Mars is a maverick, wandering off from the deferent-epicycle model more than most of the other planets."*

— *The Ballet of the Planets: A Mathematician's Musings on the Elegance of Planetary Motion* by Donald Benson (2012)

Of course, in the TYCHOS model, one may easily imagine why Mars is a "maverick" of sorts — for the simple reason that it is the binary companion of the Sun. In hindsight, one of Kepler's most famous quotes rings like a most appropriate omen, the irony of which I trust future astronomy historians will underline:

> *"By the study of the orbit of Mars, we must either arrive at the secrets of astronomy or forever remain in ignorance of them."*

— Johannes Kepler

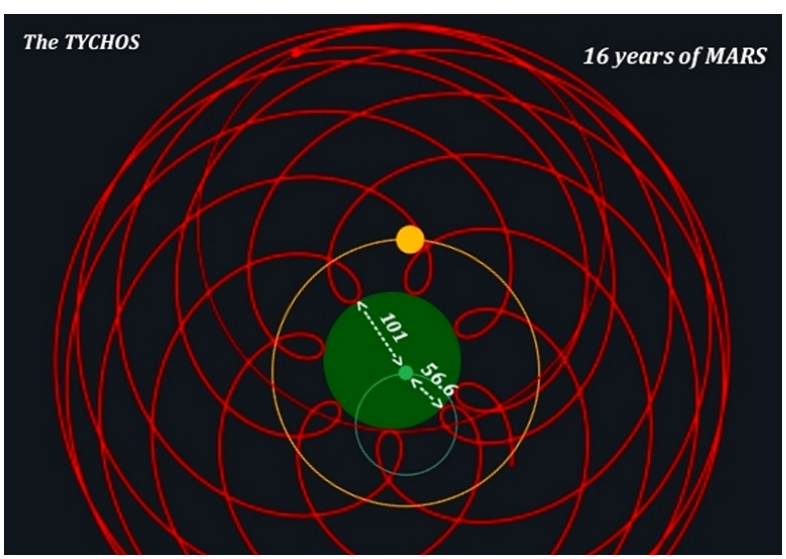
Mars's fluctuating oppositions

Whenever Mars finds itself at the opposite side of the Sun ("in opposition"), it is also as close at it gets to Earth in any given circa 2.13-year period (779.2 days on average). However, these closest passages fluctuate considerably : their range spans between 56.6 Mkm and 101 Mkm (on average) — a difference of 44.4 Mkm. This is due to the above-mentioned "offset" of 22.2 Mkm (which, of course, adds up to a total of 44.4 Mkm from side to side).

For instance, during Mars's opposition of August 10, 1971, Mars came as close as 56.2 Mkm to Earth, whereas on February 25, 1980, Mars's opposition occurred as far as 101.32 Mkm from Earth.

As you can more easily see in my below graphic, the cause of this discrepancy is simply Mars's variable proximity from Earth each time it transits in opposition:

16 years of Mars and Mars's "opposition ring"



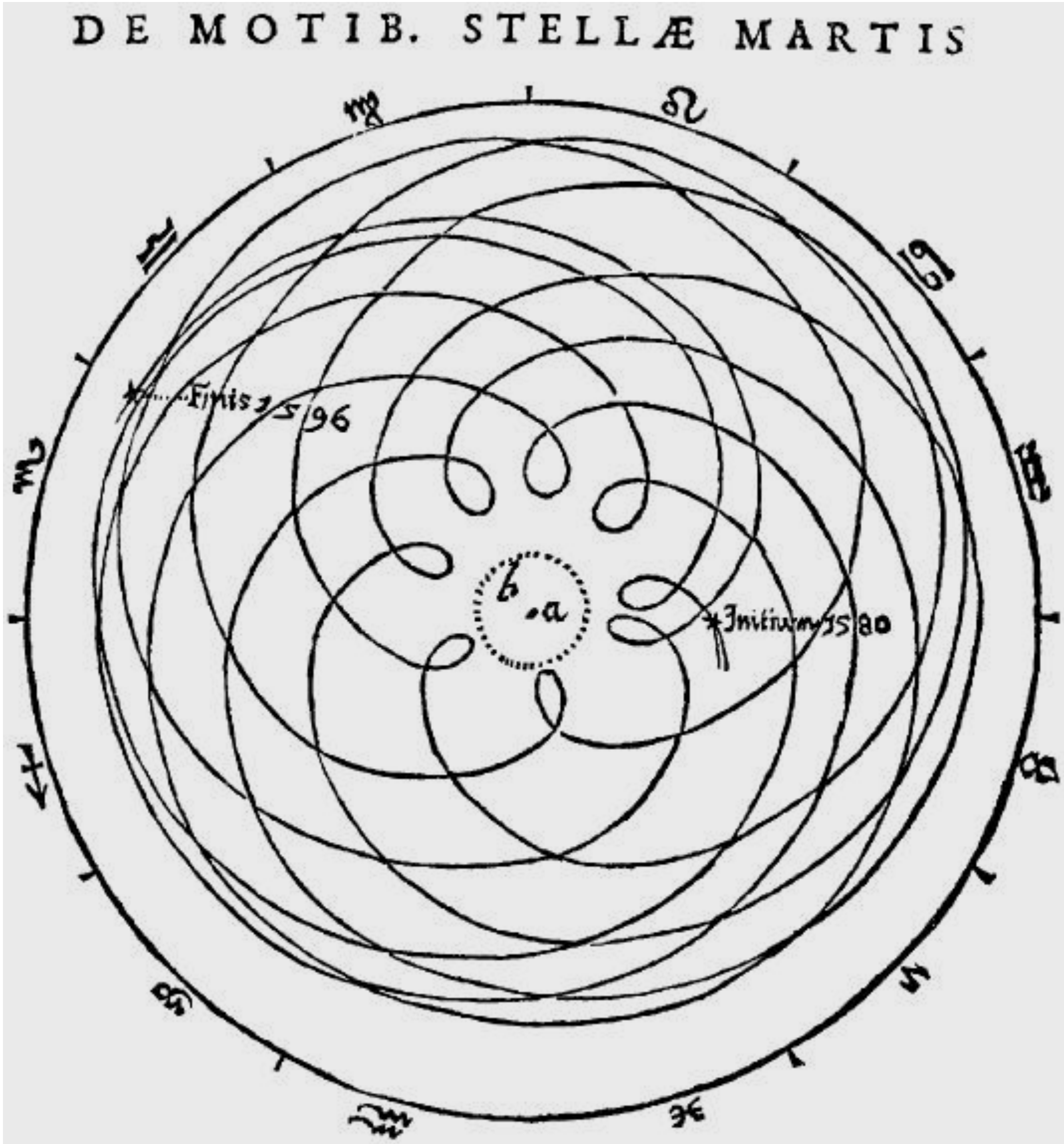
I call the green circle in the above graphic "Mars's Opposition Ring". The Mars oppositions regularly occur around this virtual ring, sometimes as close to Earth as 56.6 Mkm (on average) and sometimes as far as 101 Mkm (on average).

Note that, during the closest Mars oppositions, an earthly observer will see Mars retrograding for what will appear to be a shorter time than during the furthest oppositions. This, due to the different Earth-Mars distances, which can be demonstrated as follows:

> Around August 2003, Mars was as close to Earth as it has been for a very, very long time: only 55.76 Mkm.
>
> Around March, 2012 (another Mars opposition period), Mars was much further away from Earth: 100.78 Mkm.
>
> We see that 100.78 / 55.76 ≈ 1.8074 (Ergo, Mars was about **1.8X** further away in 2012 than it was in 2003).

Now, it can be verified on the NEAVE Planetarium that Mars was observed to retrograde by 40 min of RA (Right ascension) in 2003 and by 72 min. of RA in 2012. We see that 72 min. / 40 min. = **1.8**. Hence, the age-old mystery of the *variable durations* of Mars's retrograde motions is solved: it is simply a "time-space" illusion caused by the different Earth-Mars distances — from one opposition to another. This particular concept of "time-space" should be easily understood since the Sun is our temporal reference frame (our earthly "clock"). The apparent spatial motions of its binary companion, Mars, will fluctuate in accordance with Mars's distance from Earth.

Most remarkably, it so happens that Kepler, during his five-year-long "war on Mars", evidently spent some serious time considering a geocentric configuration of our system — and even named Mars a "star". Below is his little-known diagram, *De Motibus Stellae Martis* ("Of the Motion of the Star Mars"). It was obviously based on and computed around his master's (Tycho Brahe) exacting observations, yet he ultimately discarded it. Compare Kepler's below diagram with my above "16-years of Mars” graphic; it looks like Kepler had at one time really been on to something!



Presumably, Kepler was simply unable to conceive how and why Mars could possibly trace such a peculiar trajectory. When it comes to envisioning the geometric dynamics of two magnetically-bound, mutually-orbiting objects (such as the Sun and Mars), the cognitive power of the human mind meets its limits. Modern motion graphics can help us overcome this mental hurdle and realize that these central “teardrop loops” are nothing but natural geometric manifestations of (binary) uniform circular motion.

Is Mars a planet or a star?

As we just saw, Kepler called Mars a star for unknown reasons. The reader may also have wondered why Mars (an object we have always considered as a planet) would revolve around our star, the Sun, while binary systems (such as Sirius A and Sirius B) are considered to be pairs of stars revolving around each other. Although it is beyond the scope of this treatise to determine just how stars and planets are formed, I nonetheless feel the need to state my support to a school of thought that, basically goes like this:

"Planets are nothing but very old stars which have cooled and solidified into rocky spheres."

To be sure, this is not the current position of academia which considers stars and planets as wholly different, mutually exclusive entities. In their voluminous study Stellar Metamorphosis, Jeffrey Wolynski and Barrington Taylor make a most compelling case that planets are, quite simply, old stars:

> *"It is suggested that the rule of thumb of stellar age delineation is that old stars orbit younger ones, the younger ones being the more massive, hotter ones."*

— *Stellar Metamorphosis* by Jeffrey Wolynski & Barrington Taylor (2017)

In the TYCHOS, of course, the older star Mars orbits a younger, much larger and hotter star (the Sun). And yes, this would also suggest that our Earth is an ancient star. The fiery, hot magma occasionally spurting out of our volcanoes should be an indication to this fact.

A relevant discussion extracted from the Stellar Metamorphosis thread at the Thunderbolts.info forum

The 79-Year cycle of Mars

> *"Long before Ptolemy, the Babylonians knew that the motion of Mars is repeated, very nearly, in a 79-year cycle – that is, oppositions of Mars occur at nearly the same longitude every 79 years."*

— Further pages from *The Ballet of the Planets: A Mathematician's Musings on the*

Elegance of Planetary Motion by Donald Benson (2012)

The intervals between two Mars oppositions **closest** to (or between two Mars oppositions **furthest** from) Earth (minimum 56.6 Mkm / maximum 101Mkm) will alternate between 15 and 17 years, due to the peculiar epitrochoidal path of Mars around the Sun and Earth. It is a cyclic 15y / 17y / 15y / 15y / 17y pattern that repeats every 79 years, in approximately five 16-year cycles.

$$79 / 16 = 4.9375$$

This unique, alternating 15/17-year-pattern of the Mars cycles has never been satisfactorily explained until now. None of our other outer planets exhibit such an irregular pattern. Jupiter, for instance, invariably returns to the same place in our skies in about 12 solar years.

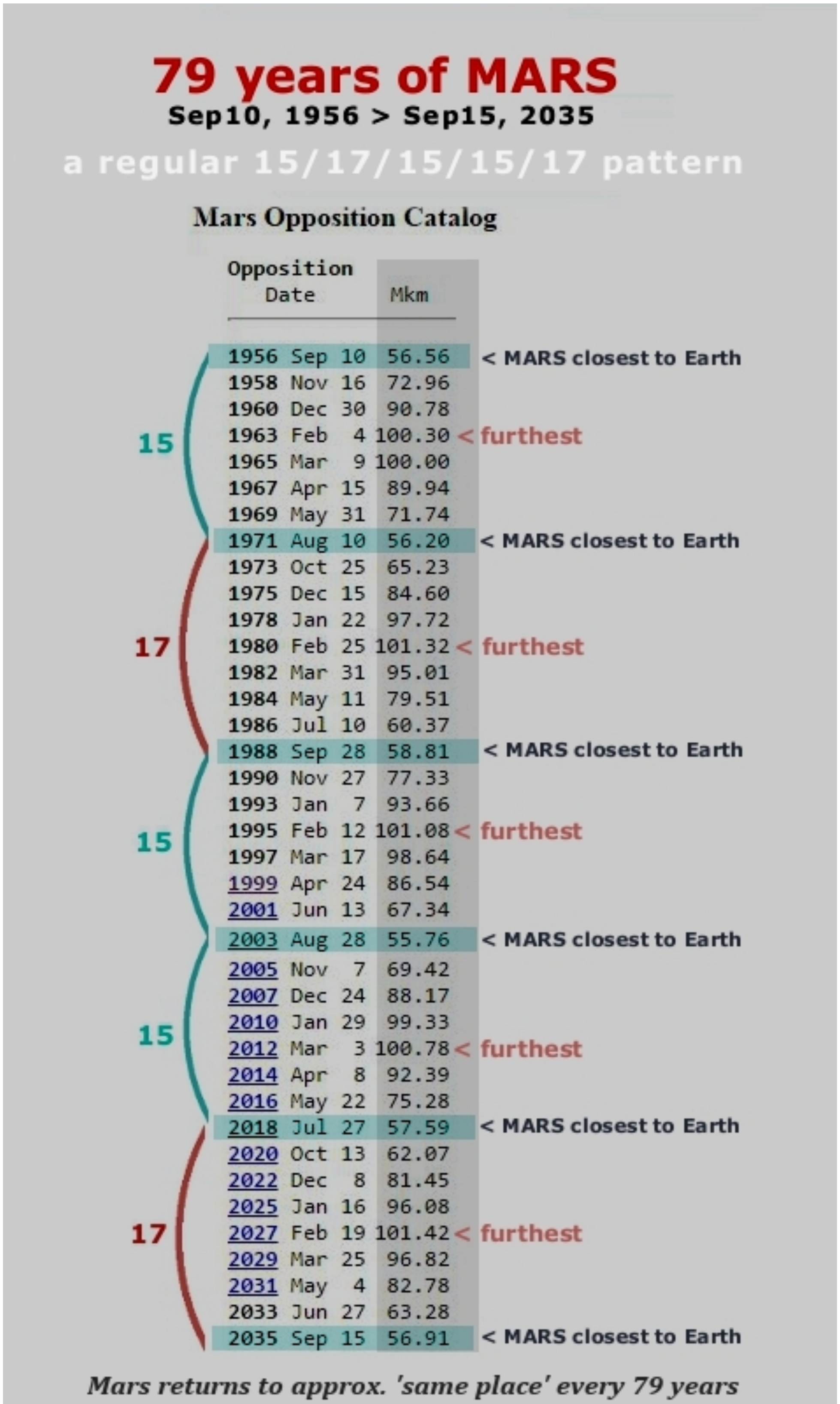
We thus envision the possibility that there is no need for Kepler's notions of elliptical orbits, or for the idea of accelerating and decelerating planets, let alone an Einsteinian temporally warping time-space.

In the TYCHOS model, the orbital speed of Mars is shown to be uniform and constant since it always returns at (near-)equidistant points of its "opposition ring". Hence, those *"elliptical orbits" and "accelerating / decelerating orbital speeds"* (as promulgated by Kepler's "Laws of planetary motion") could well be illusory and may have to be revised, or possibly discarded altogether. Before Kepler's laws came along, astronomers all over the world had been relentlessly pursuing the ideal concept of uniform circular motion. In fact so had Kepler himself before he started stretching and squeezing those recalcitrant Martian motions (observed by Tycho Brahe) in order to make them obey his ever-more-complex equations.

> "The testimony of the ages confirms that the motions of the planets are orbicular. It is an immediate presumption of reason, reflected in experience, that their gyrations are perfect circles. For among figures it is circles, and among bodies the heavens, that are considered the most perfect. However, when experience is seen to teach something different to those who pay careful attention, namely, that the planets deviate from a simple circular path, it gives rise to a powerful sense of wonder, which at length drives men to look into causes."
>
> Johannes Kepler, Chapter 1 of the *Astronomia Nova*
> (Donahue translation, p. 115)

From a short, illustrated webpage *Kepler's Discovery* well worth reading in its entirety. (Source URL: http://www.keplersdiscovery.com/Hypotheses.html)

Here follows an extract from a Mars Opposition Catalogue, listing some past and future opposition dates of Mars (between September 1956 and September 2035) along with the respective Mars-Earth distances. As you can see, these distances vary from a minimum of ca. 56 Mkm to a maximum of ca. 101 Mkm. This full Mars opposition cycle resumes every **79 years** — in the cyclic 15 y / 17 y / 15 y / 15 y / 17 y pattern mentioned earlier:


79 years of MARS
Sep10, 1956 > Sep15, 2035
a regular 15/17/15/15/17 pattern

Mars Opposition Catalog

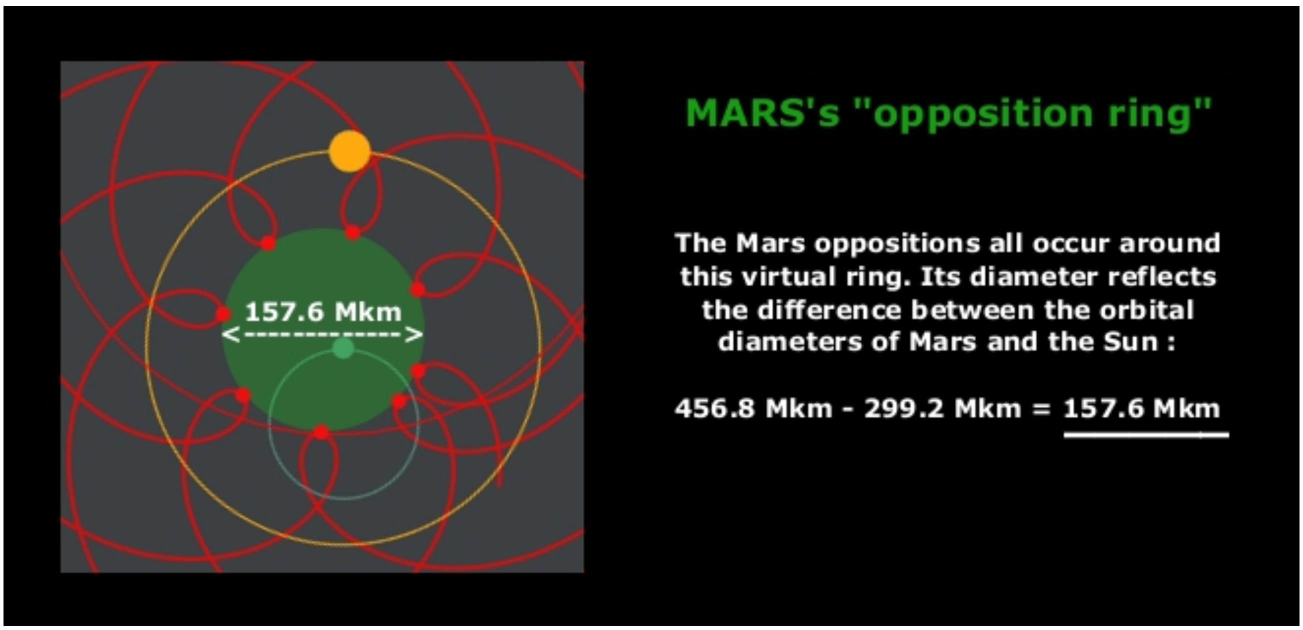
	Opposition Date	Mkm	
	1956 Sep 10	56.56	< MARS closest to Earth
	1958 Nov 16	72.96	
	1960 Dec 30	90.78	
15	1963 Feb 4	100.30	< furthest
	1965 Mar 9	100.00	
	1967 Apr 15	89.94	
	1969 May 31	71.74	
	1971 Aug 10	56.20	< MARS closest to Earth
	1973 Oct 25	65.23	
	1975 Dec 15	84.60	
	1978 Jan 22	97.72	
17	1980 Feb 25	101.32	< furthest
	1982 Mar 31	95.01	
	1984 May 11	79.51	
	1986 Jul 10	60.37	
	1988 Sep 28	58.81	< MARS closest to Earth
	1990 Nov 27	77.33	
	1993 Jan 7	93.66	
15	1995 Feb 12	101.08	< furthest
	1997 Mar 17	98.64	
	1999 Apr 24	86.54	
	2001 Jun 13	67.34	
	2003 Aug 28	55.76	< MARS closest to Earth
	2005 Nov 7	69.42	
	2007 Dec 24	88.17	
15	2010 Jan 29	99.33	
	2012 Mar 3	100.78	< furthest
	2014 Apr 8	92.39	
	2016 May 22	75.28	
	2018 Jul 27	57.59	< MARS closest to Earth
	2020 Oct 13	62.07	
	2022 Dec 8	81.45	
	2025 Jan 16	96.08	
17	2027 Feb 19	101.42	< furthest
	2029 Mar 25	96.82	
	2031 May 4	82.78	
	2033 Jun 27	63.28	
	2035 Sep 15	56.91	< MARS closest to Earth

Mars returns to approx. 'same place' every 79 years

Above — “Mars Oppositions from the years 1950 to 2934” from *Mars Oppositions* by Hartmut Frommert (2008)

As you are reading, please make a note of this peculiar 79-year Mars cycle. We will soon look into the lesser-known 79-year cycle of the Sun, and demonstrate an even closer interrelated pattern between the Sun and Mars.

The Mars oppositions, with their average minimum distance from Earth of 56.6 Mkm and average maximum distance of 101 Mkm gives us the interesting size of our opposition ring: approximately 157.6 Mkm-wide.



As it happens, this value (157.6 Mkm) reflects the difference between the orbital diameters of Mars and the Sun!

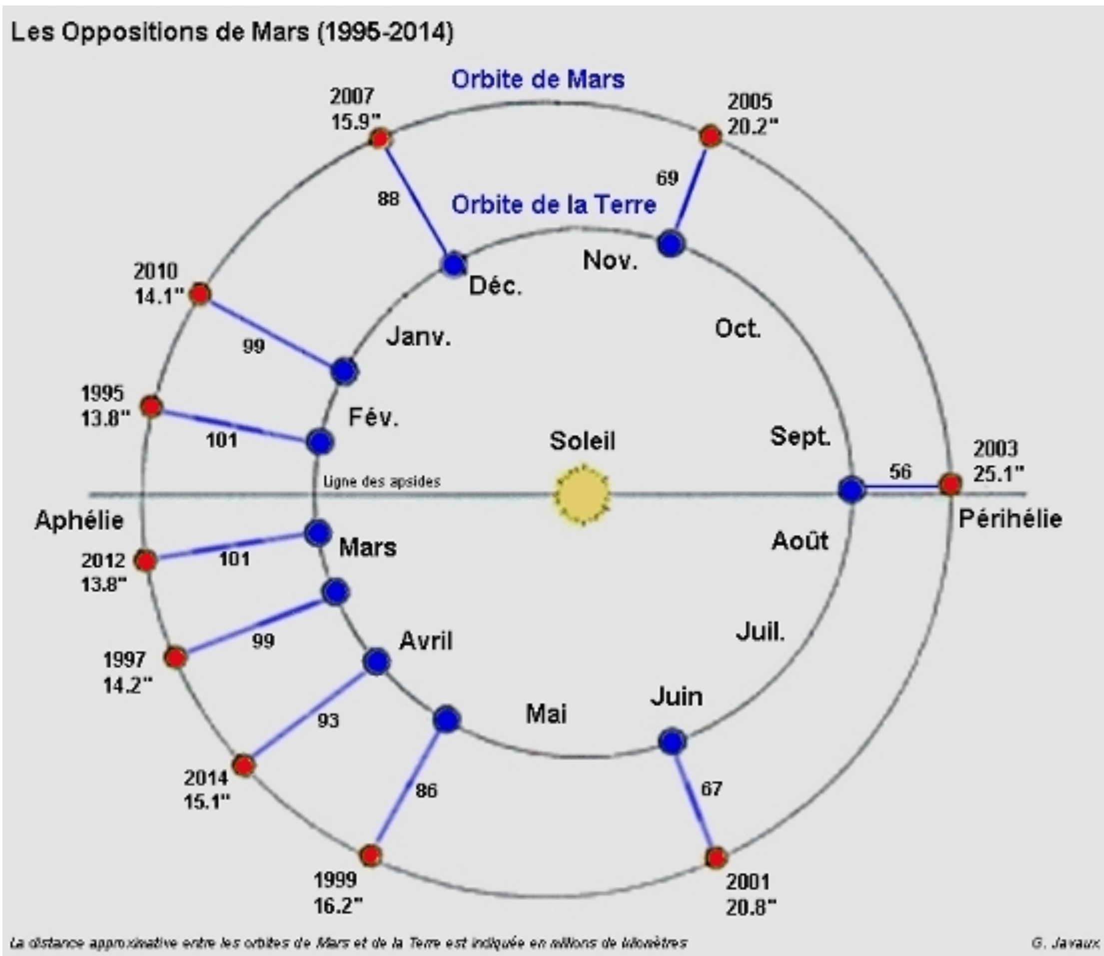
Why is this significant? Consider the following:

> Difference between orbital diameters of Mars and the Sun:
> **456.8 Mkm – 299.2 Mkm = 157.6 Mkm**
>
> Diameter of the “opposition ring” of Mars (around which all Mars oppositions occur) = **157.6 Mkm**

This means that the difference in orbital diameters between the Sun and Mars is *equivalent* to the difference in Mars’s own oppositions.

Note also how, in the TYCHOS, the Mars oppositions occur in a neat and orderly manner, as Mars regularly returns to a place practically equidistant from the previous opposition point. This is in stark contrast with the Copernican model, according to which the various Mars oppositions would occur quite haphazardly around Mars's orbit, at randomly-spaced celestial positions.

Here's a Copernican chart of a number of Mars oppositions (1995-2014). According to the currently-accepted geometry of our Solar System, the Mars oppositions would occur (every 779.2 days on average) at apparently "random", wildly unequal distances from each other.



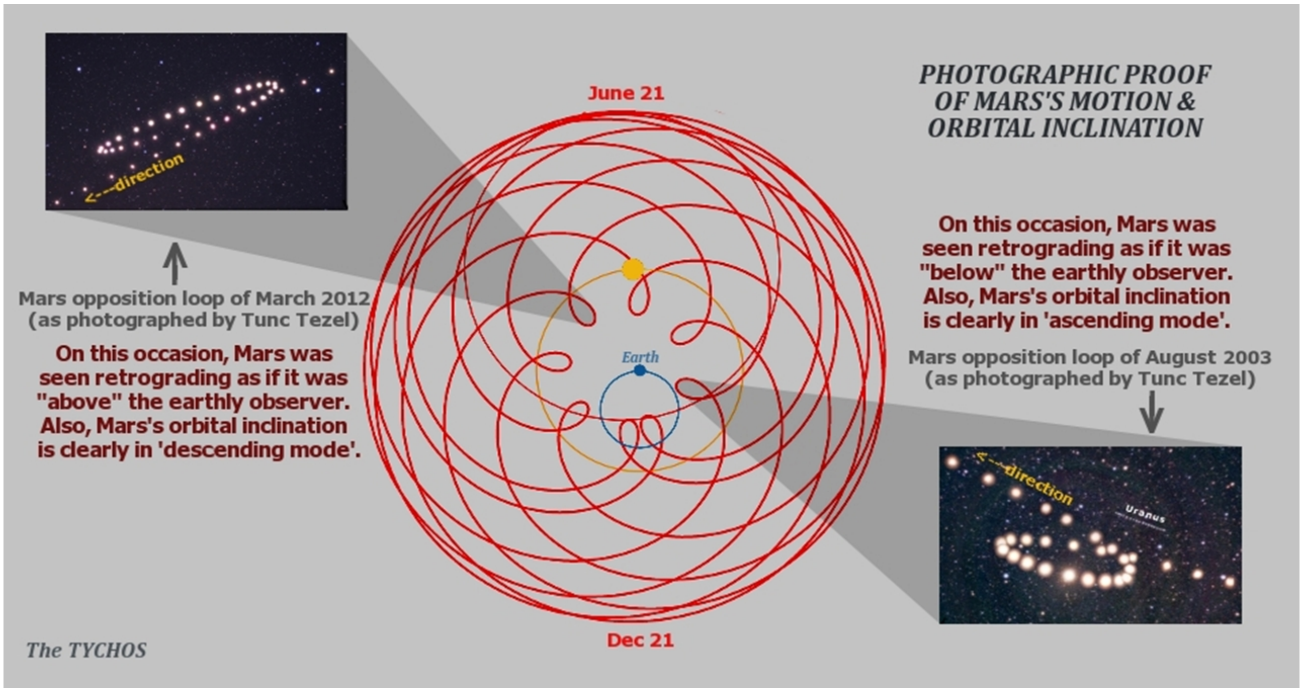
Above — from *Les Oppositions de la planète Mars* (April 2014) by Gilbert Javaux

As you can see, in the light of this, the Copernican model doesn't appear to be so "elegant" after all.

Mars's retrograde periods

My next graphic illustrates two such closest and furthest Mars oppositions (of August

2003 and March 2012) and their consequent retrograde periods during which we see Mars moving "backwards" for about 72 days (on average). The two said oppositions were documented by astro-photographer Tunc Tezel, who patiently snapped pictures of Mars at regular intervals for several months:



We see that, unlike our so-called outer planets (from Jupiter outwards), Mars traces a distinctive "teardrop-shaped" loop whenever it transits in opposition. We also see that Mars's orbit is inclined just as would be expected in the TYCHOS model.

In the picture at top left (a Martian retrograde period which lasted from January 30th to April 21st, 2012), Mars is seen descending in our (Northern hemisphere) skies, much like the Sun does between July and September. Whereas in the bottom right picture (a Martian retrograde period which lasted from August 1st to October 3rd, 2003), Mars is seen ascending in our (Northern hemisphere) skies, much like the Sun does between February and March (always keep in mind that, whenever Mars transits in opposition, the Sun will be transiting at the *opposite* side of Earth).

Under Copernican theory, it is simply unfathomable why Mars (whose orbital inclination vis-à-vis Earth's orbit is said to be only 1.85°) would possibly trace such pronounced ***and*** steeply inclined "teardrop loops" — whenever Earth "overtakes Mars on its inner lane". Those retrograde loops are thought to be illusory — caused by Earth's superior orbital speed (with respect to Mars's orbital speed).

However, a mere orbital speed differential fails to explain why Mars would perform such peculiar teardrop-shaped loops. We should expect Mars to just reverse and resume direction in a straight line or, at the most, to trace only a very slightly "z" or "s"-shaped pattern; this, because Mars's orbital inclination in relation to Earth's orbit is reckoned to be no more than 1.85° as indicated in this NASA Fact Sheet:

MARS FACT SHEET
BY DR. DAVID R. WILLIAMS (NASA, DECEMBER 23, 2016)

As we shall see, Mars's retrograde periods are not by any means the biggest problem with the Copernican model. There are a number of far graver (and indeed insurmountable) problems with the cosmic model we were all taught in school. The next chapter should, in a science-minded world, definitively spell the end of the Copernican era of astronomical belief.

Previous Chapter Next Chapter

Chapter 7 — The Copernican model is geometrically impossible

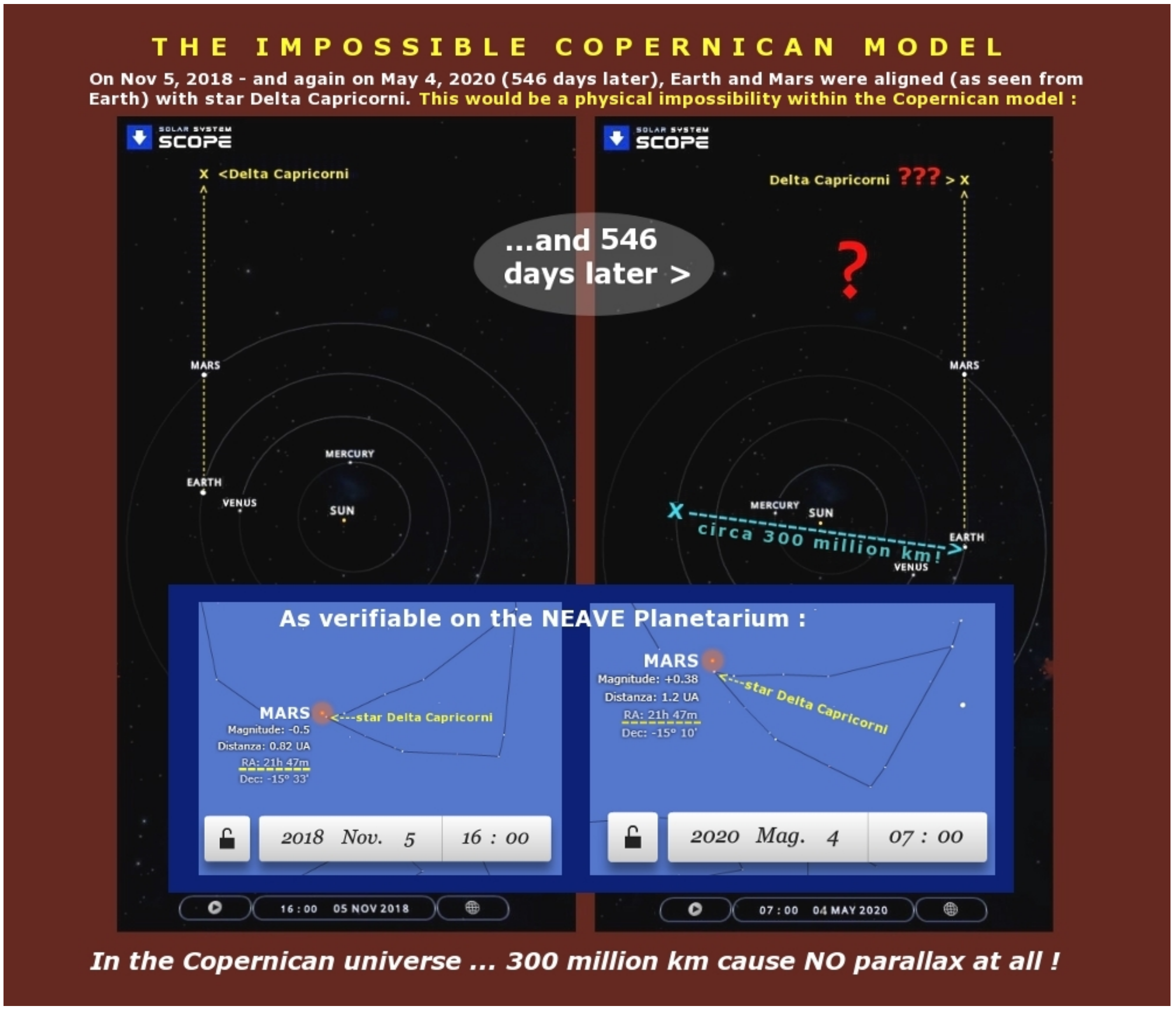
It is a widely-held misconception that heliocentric and geocentric models are equally valid and viable. However, there can only be one correct interpretation of our celestial mechanics and geometry that unfailingly predicts for all the interactions between our Solar System's companions vis-à-vis the more distant stars. Through sound logic, induction and deductive reasoning ("à-la-Sherlock Holmes") we should be able to discard the impossible hypotheses and retain the sole configuration which makes physical, geometrical, mechanical and optical sense, and is consistent at all times with empirical observation when tested.

And here is where the Copernican theory miserably falls apart. As you will see, what follows categorically disqualifies the Copernican model as a viable proposition, since its proposed geometry isn't only problematic or questionable. It is outright impossible, unless you rewrite fantastic physical laws to excuse it. I shall demonstrate this fact with the following, exemplary case.

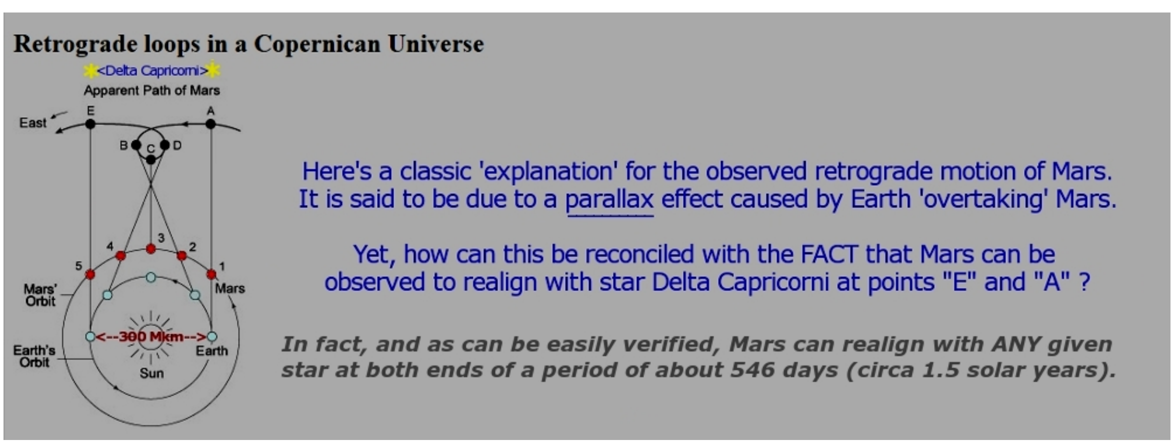
On November 5, 2018 we will see Mars aligned with the star **Delta Capricorni (*a.k.a.* "Deneb Algedi")**. Then, 546 days later, when according to the Copernican model Earth will find itself on the opposite side of its orbit, Mars will ***once again*** (as viewed from Earth) align with the star Delta Capricorni!

There are two types of planetariums we may take astronomical data from. One attempts to place every cosmic body in our system in its place within the Copernican system, such as SCOPE (which features an attempt at an "overhead" view of our system, as if we were looking at it from above our North Pole). The other type of planetariums (such as NEAVE and STELLARIUM) is considerably more realistic and verifiable, as it simulates our stars' and planets' positions just as we can observe them from Earth. Bear this in mind in the following comparison.

The two below pairs of screenshots (from the SCOPE and NEAVE planetariums) compare the positions of Earth and Mars on two given dates separated by 546 days (ca. 1½ years). In this time interval, both Earth and Mars would have (***according to the Copernican model***) moved laterally by about 300 Mkm. Yet, on both of these dates, an earthly observer will see Mars perfectly aligned in conjunction with star Delta Capricorni. **How can this possibly occur in reality (as it does) if the Copernican model were true?**



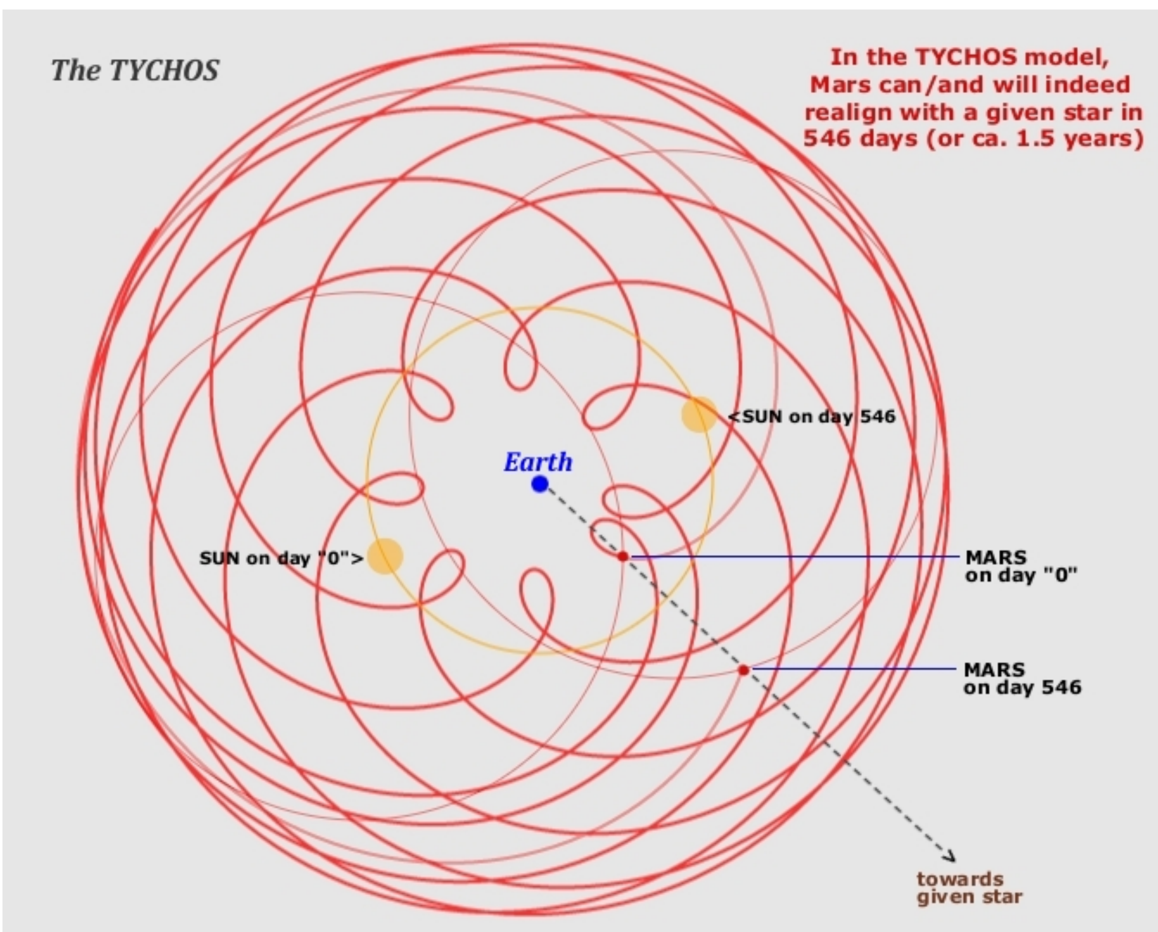
In order to put this problem in due perspective, let us look at a classic explanation for the observed retrograde motion of Mars:



Note that this particular parallax issue (Mars-Earth alignment with a given star) should not be confused with the historical and ongoing controversy regarding stellar parallax (that is, the nigh-undetectable parallax between nearby and more distant stars, which we will explore later). In the present case, we are dealing with the immensely more problematic **total** absence of parallax between a given, distant star and the two **far closer** objects, Earth and Mars. The two of them should, according to the Copernican model, somehow be able to remain aligned with that same star after having displaced themselves laterally by about 300 Million kilometers!

On the other hand, the TYCHOS model provides a plain and reliable geometry that explains why Mars will, at times, only need 546 days to return to a given star (even though Mars's habitual sidereal period, the "Long ESI", lasts for ca. 707 days). Here is how:

How the TYCHOS accounts for Mars aligning with the same star twice within 1.5 years

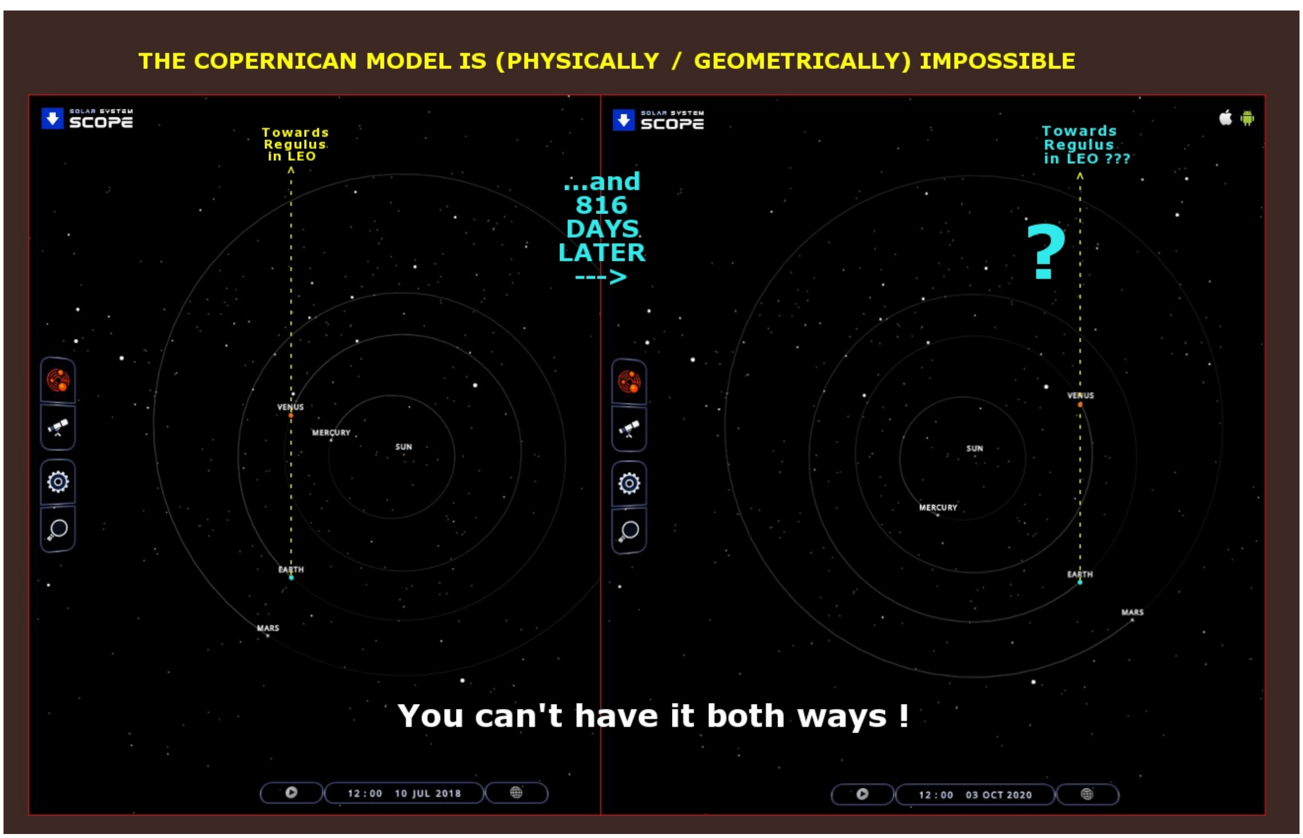


The TYCHOS model needs no magical & otherworldly laws of optics and perspective to account for our observed cosmic motions. Mars will simply be ***actually*** located in line with the same star, in a very real physical sense, at both ends of a 546-day (or 1 ½ year) period. This, due to its peculiar epitrochoidal path around the Earth-orbiting Sun, which causes Mars to pass through the same "line of sight" from an Earthly perspective (although at different Earth-Mars distances).

Later on, you may wish to verify this for yourself (Mars's Short ESI) by perusing the TYCHOS Planetarium (Chapter 21). Today, the TYCHOS is the ***only*** existing model which can explain why Mars can possibly conjunct twice with a given star within a 1.5-year period.

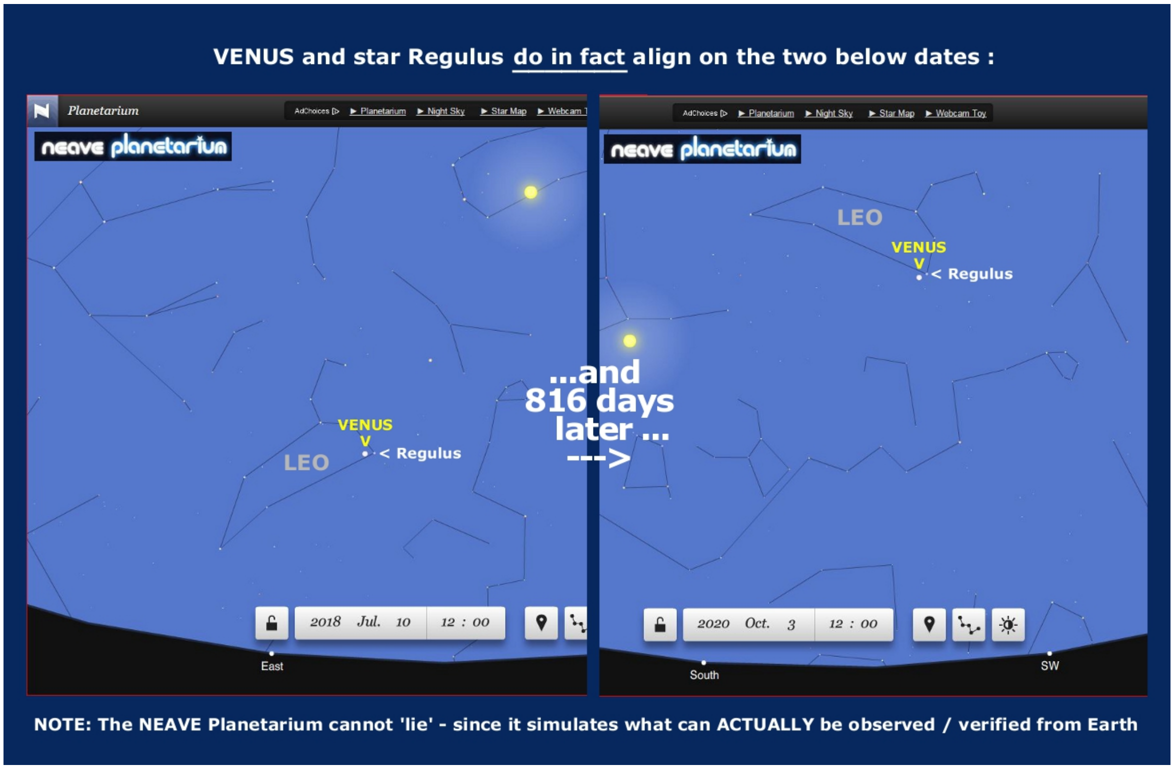
The impossible (Copernican) 816-day re-conjunction of Earth and Venus with a given star

Next, we will compare two other screenshots from the SCOPE planetarium. They depict two conjunctions of Earth and Venus with star Regulus (in the Leo constellation) occurring within an interval of 816 days (or 2.234 years). In that time period, according to the Copernican model, Earth and Venus would both move laterally (vis-à-vis the Sun) by about 200 Mkm. Yet, an earthly observer will see Venus conjunct with star Regulus on both of these dates! How can the Copernican model possibly describe this real event?



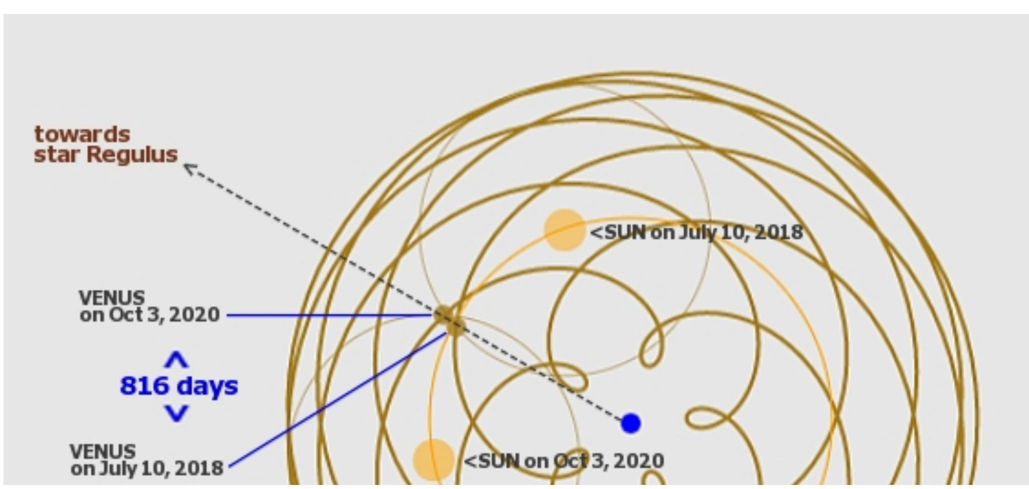
NOTE: The two dotted lines are perfectly parallel and - of course - the two SCOPE screenshots have NOT been rotated in any way.

The NEAVE planetarium which simulates (far more realistically) our cosmic motions, just as we observe them from Earth, confirms that we can – in reality – observe Venus and Regulus conjuncting at both ends of our chosen 816-day period:



Once again, the TYCHOS model can geometrically demonstrate how and why Venus will indeed return facing a given star in 816 days:

How Venus returns facing the same star within 816 days — in the TYCHOS



Just as in the Martian example, Venus orbits the Sun, which orbits the Earth. As such, Venus will physically return in alignment with a given star, as it follows the Sun's path through the constellations. Venus' ***distance*** from Earth may change, but its heavenly ***position*** as seen from Earth will appear to be replicated.

Later on, you may wish to verify Venus's 816-day period for yourself by perusing the TYCHOS Planetarium. Today, the TYCHOS is the only existing model which can explain why Venus can possibly conjunct twice with a given star at both ends of an 816-day period.

The Copernican model's dubious duration of the retrograde periods

Another problem afflicting the Copernican model is its apparent, irreconcilable geometry with regards to the observed retrograde periods of Venus and Mercury (circa 45 and 23 days respectively). Let us first see how the NEAVE Planetarium depicts a typical retrograde period of Venus just as is observed from Earth.

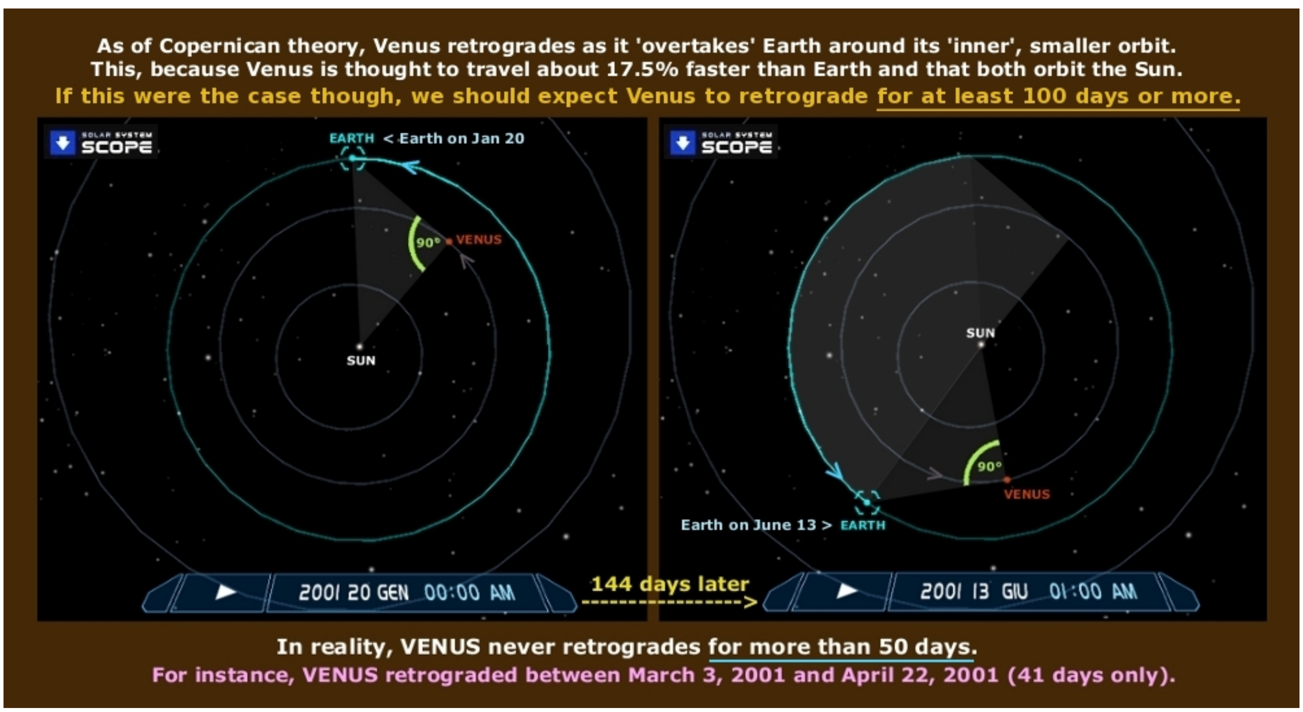
My example: July 25, 2015 to Sept 11, 2015, a 48-day retrograde period.

The red arrows and dotted lines/curves are my own additions to the above screenshots from the NEAVE planetarium

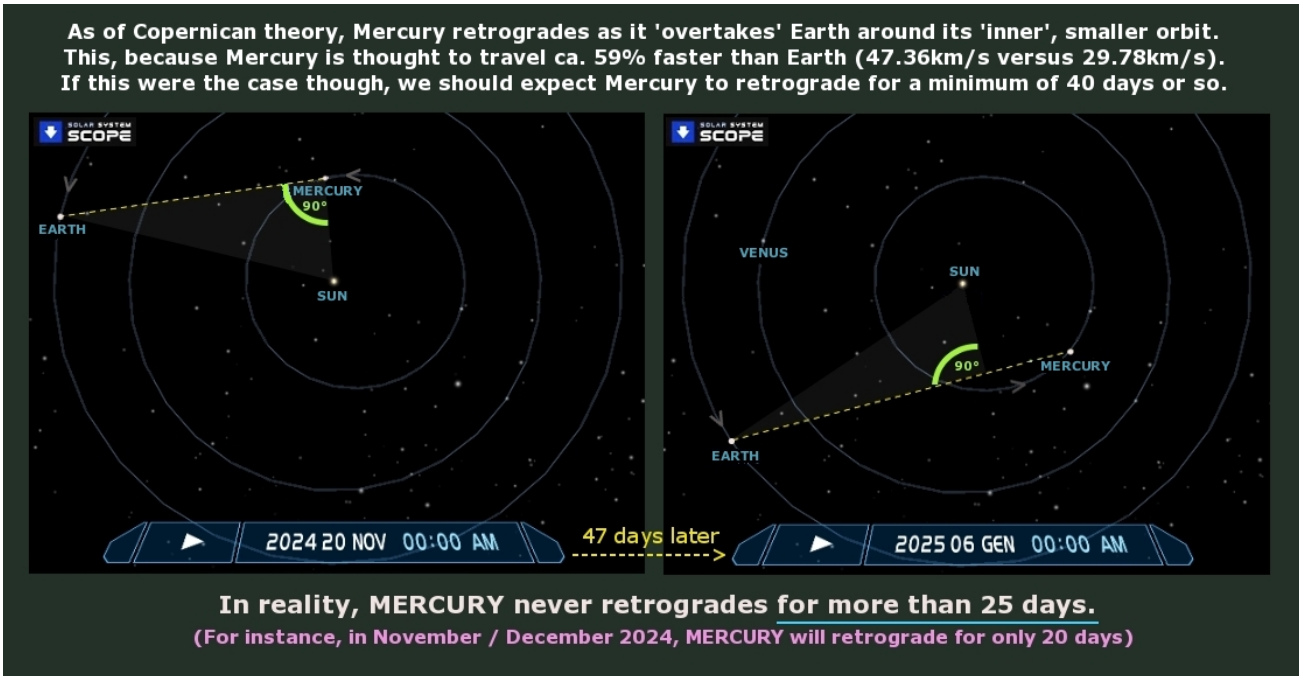
It is an observed and indisputable fact that Venus *never* retrogrades for more than 50 consecutive days.

Now, according to Copernican theory, the reason why we see Venus and Mercury retrograding is because they periodically "overtake us" as their orbital motion around the Sun brings them towards Earth (that is, towards "our orbital side of the Sun"). The two of them are, of course, considered to travel a good deal faster than Earth.

If this were true, however, Venus and Mercury would be seen retrograding for much longer than 45 and 23 days. This can be demonstrated with my following illustrations. My 90° angles indicate the moments in time when Venus and Mercury should, theoretically, gradually start reversing their perceived orbital directions in relation to the Sun (which, under the Copernican model, would of course constitute our central point of directional/angular reference).



One may argue that my stated *"at least 100 days or more"* estimate is vague. In that case, I challenge any Copernican advocate to provide a cogent, illustrated explanation as to why Venus is always observed to retrograde for ***fewer than 50*** consecutive days. Indeed, the very same problem afflicts the retrograde period of Mercury, which never retrogrades for more than 25 days.



Under the Copernican model, the duration of Venus' and Mercury's retrograde periods make very little "geoptical" sense (my neologism inferring "what should be logically observed under given geometric & optical constraints"). Venus and Mercury do retrograde, as they are observed to do, for as little as 45.6 days and 22.8 days on average.

Yet in a Copernican perspective, we should certainly expect them to retrograde for longer. The *observed* duration of the retrograde motions of both Venus and Mercury appear to be outright irreconcilable with the currently-accepted geometry of our system.

Before proceeding to expound the more technical aspects of the TYCHOS model (as well as the methods and logical processes behind its formulation) I have highlighted in the following chapters a number of intrinsically problematic aspects of the Copernican model that the TYCHOS does away with, corrects or effectively resolves.

Previous Chapter Next Chapter

Chapter 8 — The apparent retrograde motions of our "P-Type" planets

Here on Earth, we only have a handful of clear, empirically solid clues to help us figure out the celestial mechanics of our cosmos. If we are going to ignore these precious few indicators, we might as well not bother thinking through the mechanics of our cosmos at all. The apparent "retrograde" motions of our system's bodies are among these precious few, invaluable observations. The fact that our planets appear to periodically come to a halt — and start moving backwards for a few weeks or months — is something that has mystified astronomers. However, contrary to popular belief, these (irregular) retrograde motions have never been accounted for in a satisfactory manner.

Now, if you are among those contending that Earth is non-rotating, totally stationary and/or flat as a French pancake, you will still need to explain why our planets periodically appear to reverse course. It is hard to imagine what exactly such an explanation could be, but if you're determined to believe such theories, you could come up with something to this tune:

"Oh, we occasionally see those planets retrograding because they are, in fact, rocket-propelled spaceships … and from time to time, the pilots will slam their engines into reverse gear!"

While we may laugh at such fanciful theories, it is a poorly-acknowledged fact that the question of the observed irregularity of our outer planets' retrograde and stationary periods is still far from being settled. To wit, the Copernican/Keplerian model does not adequately account for the irregular nature of these intervals; while the ancients ultimately failed to reconcile them with the Aristotelian ideal of uniform circular motions, a notion which model-makers pursued for millennia.

> The ancients never believed that the planets actually halted in space and traveled backward for a while; they assumed there was a mechanism by which the motion *appeared* retrograde from our vantage point. They also believed in the Aristotelian ideal that planets move with constant speed in circular orbits. Therein lay

the seemingly insurmountable challenge to astronomical model-makers: how to account for a planet's observed irregular movements without violating the Aristotelian principle of circular motion at constant speed. That these model-makers nearly succeeded is a testament to their ingenuity.

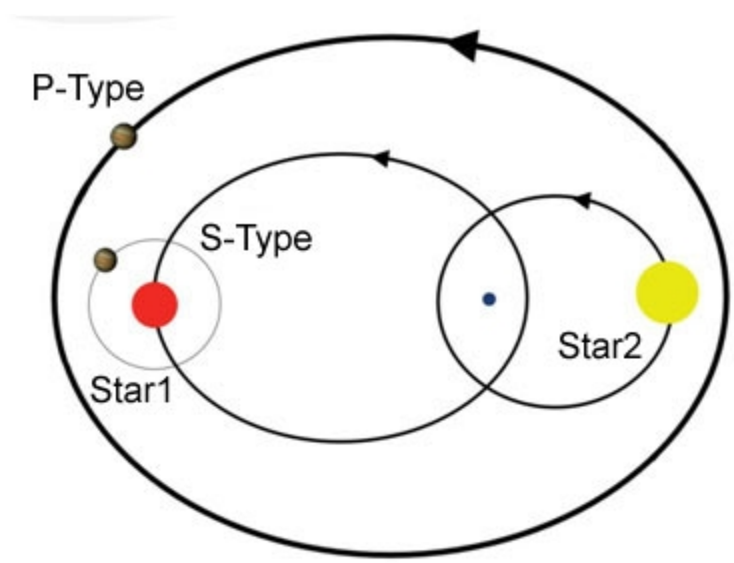
Extract from "PARALLAX: The Race to Measure the Cosmos"- by Alan W. Hirshfeld

Above — extract from p. 20, *Parallax: The Race to Measure the Cosmos*, Publisher: W. H. Freeman (May 1, 2001)

As we saw in Chapter 7, the retrograde motions of Mercury and Venus are incompatible with the Copernican/Keplerian model, since their observed durations are inconsistent with a heliocentric geometry. In fact, the same can be said about the retrograde motions of our so-called "outer planets" (from Jupiter to Pluto) or what we should more correctly refer to as our binary system's "P-type planets". We shall start with these and see if the TYCHOS can overcome the incongruities afflicting the heliocentric interpretation of our outer planets' irregular motions in our skies.

Unless you are an astrophysicist, you might wonder what a "P-Type" planet is. A clear explanation can be found at this web page of the Vienna University's department of Astrophysics.

Dynamics and observational prospects of co-orbital planets in double stars by Dr. Richard Schwarz (2017)



Please overlook the highly elliptical orbital shapes in this graphic from the above site and note the P-Type planet's behavior in relation to the *central celestial bodies.*

P-Type planets are bodies that circle around a binary system. They are **circumbinary**. In the case of our own Sun-Mars binary system, these would be our outer (*a.k.a.* “superior” or “Jovian”) planets from Jupiter outwards: Jupiter, Saturn, Uranus, Neptune and Pluto. As of the Copernican theory, the retrograde motions of our outer planets are meant to be caused by Earth periodically “overtaking them” as we hurtle around the Sun around our “inside lane”, faster than each one of them.

For instance, Jupiter is observed to periodically stop moving (remaining stationary for a variable number of days) and start “retrograding” for about 120 days (i.e.; moving in the opposite direction of its ordinary motion). Curiously though, Jupiter can remain stationary for as many as 24 days or for as little as 12 days! This substantial irregularity has been an enigma; what could supposedly cause Jupiter (as it gets routinely overtaken by Earth every thirteen months or so) to take such distinctly longer or shorter “lunch breaks”? This can hardly be imputable to any sort of Keplerian variables or perturbations, for these large disparities between Jupiter’s standstill intervals can occur within relatively short time periods. Let’s have a look at a typical such period (between 2019 and 2020) as predicted by Copernican planetariums:

- On April 2, 2019, Jupiter stops moving, and remains stationary for **17 days.**

- Between April 20, 2019 and July 30, 2019, Jupiter is observed to retrograde.

- On July 30, 2019, Jupiter stops again, and remains stationary for **24 days.**

- Between August 24, 2019 and May 8, 2020, Jupiter is observed to move prograde.

- On May 8, 2020, Jupiter stops again, and remains stationary for **14 days.**

One can only wonder why Jupiter would possibly behave in this way in the Copernican model. Shouldn’t Jupiter remain stationary for a fairly equal number of days, each time it meets up with Earth around their concentric, near-circular orbits?

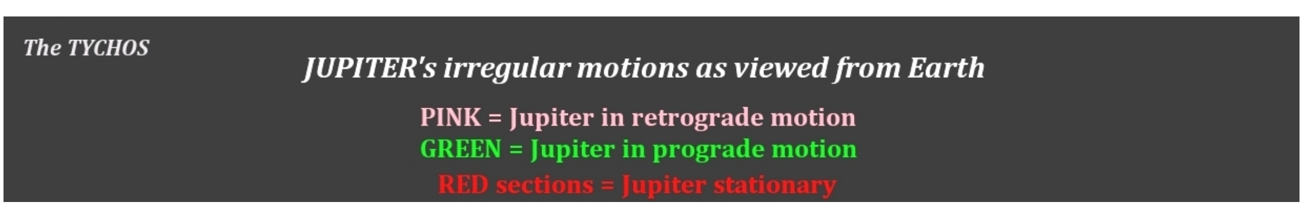
The TYCHOS model submits the following explanation for this substantial variance, although the reader may have to return to it later on in order to fully conceptualize it (in Chapter 26, I will expound in more detail what I call "a Man's Yearly Path", the peculiar loop around which we all "swirl" each year). For now, suffice to say that the annual, asymmetrical frame of reference of any earthly observer follows a geometric curve known as a "prolate trochoid".

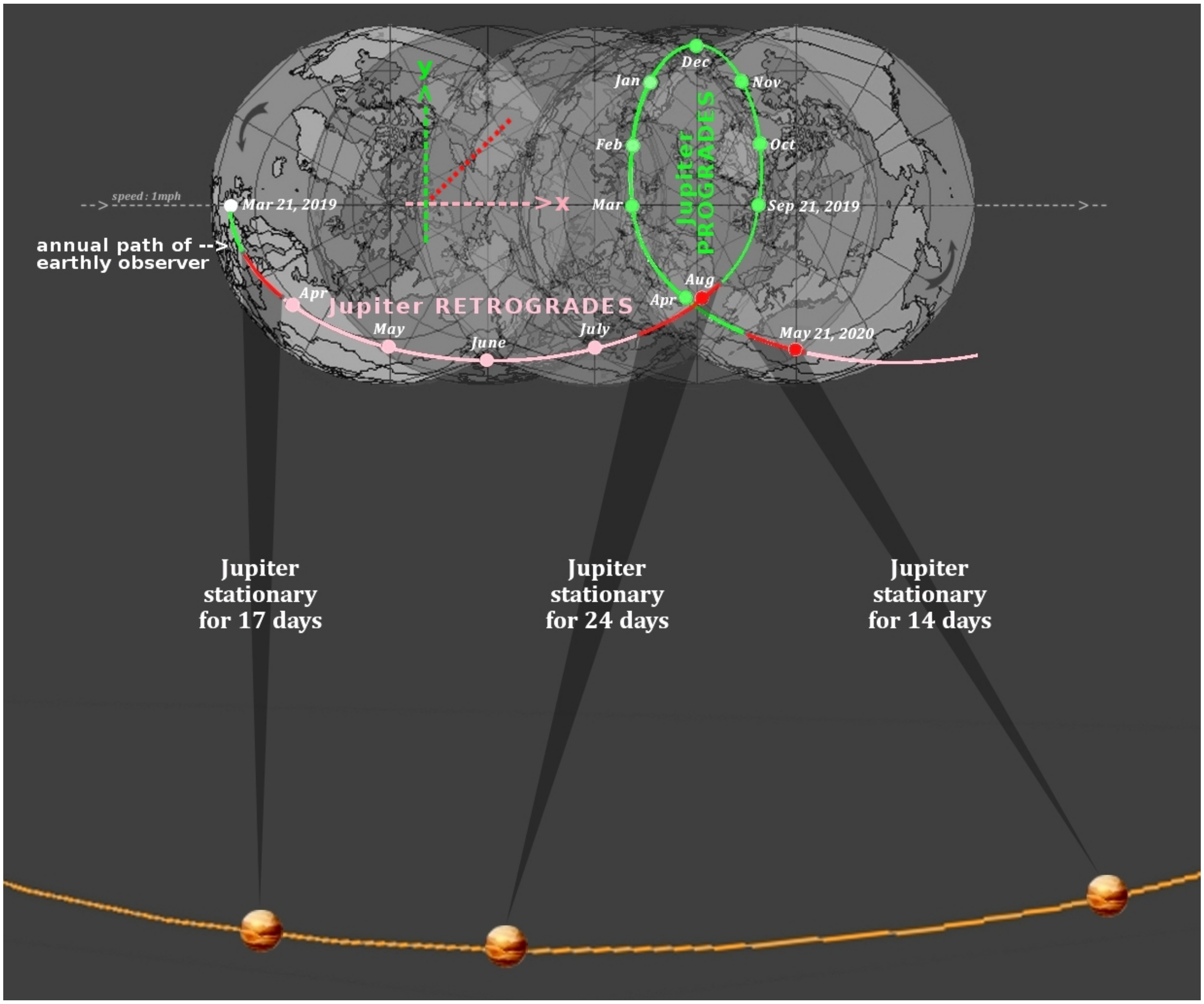
A so-called "prolate trochoid"

In order to visualize how such a trochoid can manifest itself in the real world, imagine affixing a little fluorescent sticker on the side of your bicycle tire. If you just spin the wheel around its axis, the sticker will revolve in simple, uniform circles. But if you hop on your bike and start pedalling down the road, passers-by will see your fluorescent sticker tracing such trochoidal loops.

In the TYCHOS, Earth spins once daily around its axis while slowly moving forward. If you could hover above Earth for a full year and film a time lapse video of someone lighting a firecracker outside their house at midnight every night, those flashes will trace a trochoidal path similar to one of the three above loops. We may thus imagine the difficulty for earthly observers to make sense of any long-term astronomical observations since they are themselves being carried around this looping trajectory.

This leads us to how the TYCHOS model can geometrically account for Jupiter's odd behavior. In the TYCHOS, the three well-known motions of Jupiter (prograde, stationary & retrograde) are plotted in my below graphic. The irregularities of Jupiter's alternating retrograde and prograde motions is caused by the "accelerating and decelerating" *transverse* displacements of the observer in relation to Jupiter's (more or less *perpendicular* to the viewer) direction of travel. Likewise, the duration of Jupiter's standstill intervals will also fluctuate substantially. This, due to the constantly-variable vectors of the annual trochoidal curve (with respect to Jupiter's celestial positions) along which any earthly observer will be carried.



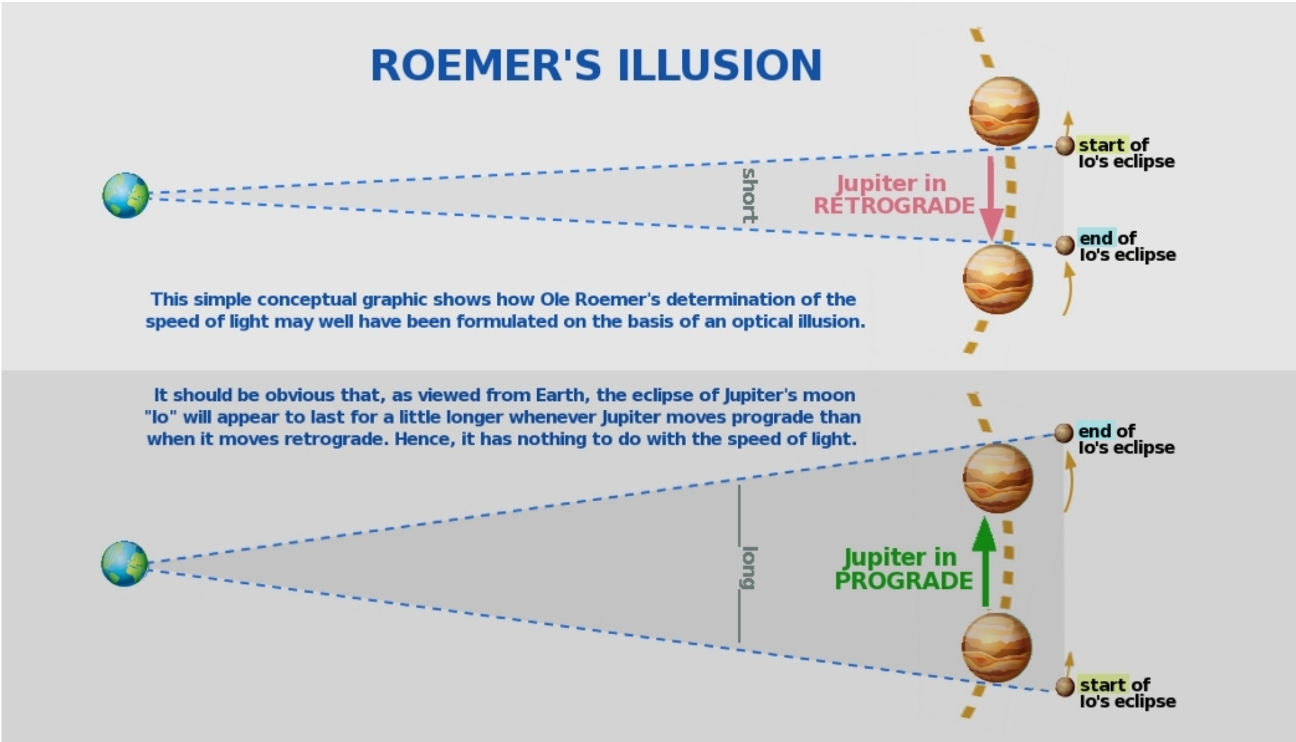


Note that Jupiter's three "stationary intervals" depicted in my above 2019/2020 example clearly correspond to time periods during which an earthly observer's annual motion will transition between the "x" and "y" coordinate axes constituting the vector components of a Man's Yearly Path. In fact, **all** of our "P-Type" planets are observed to behave in similar manners, as they alternate between prograde, stationary & retrograde motions. The irregularity of these various intervals are a natural consequence of our ever-shifting, "non-linear" (or, if you will, "non-uniform") earthly frame of reference.

Roemer's Illusion

The Danish astronomer Ole Roemer is famously credited for having first determined (or approximated) the speed of light. As the story goes, Roemer made this epochal discovery while observing the motions of Jupiter's largest moon "Io" (which employs about 42½ hours to revolve around Jupiter). He noticed that the eclipse periods of Io, as it passed behind Jupiter, were irregular; they lasted longer (as his heliocentric reasoning went) *“whenever Earth was receding from Jupiter”* and they lasted for a few minutes less *“whenever Earth was approaching Jupiter”*. According to his calculations, the total time-discrepancy amounted to about 22 minutes. He came to the conclusion that this 22-minute difference (subsequently adjusted to 17 minutes) was due to the time needed for light to travel across the distance of 2AU (twice the distance between Earth and the Sun).

In the TYCHOS, Roemer’s observations have a plain, “geoptical” explanation I’ve illustrated below. Whenever Jupiter appears to retrograde, the eclipses of Io will appear (as viewed from Earth) to last for a slightly shorter time than when Jupiter moves prograde. The time differential is thus nothing more than an angular “space-time” optical illusion.



Please note that my above graphic isn’t about disproving the currently-accepted velocity of light (approx. 300,000 km/s). It is only meant to show that Roemer’s acclaimed (yet misinterpreted) observational discovery can be readily accounted for by the TYCHOS model without the need for Earth’s supposed orbital motion around the Sun.

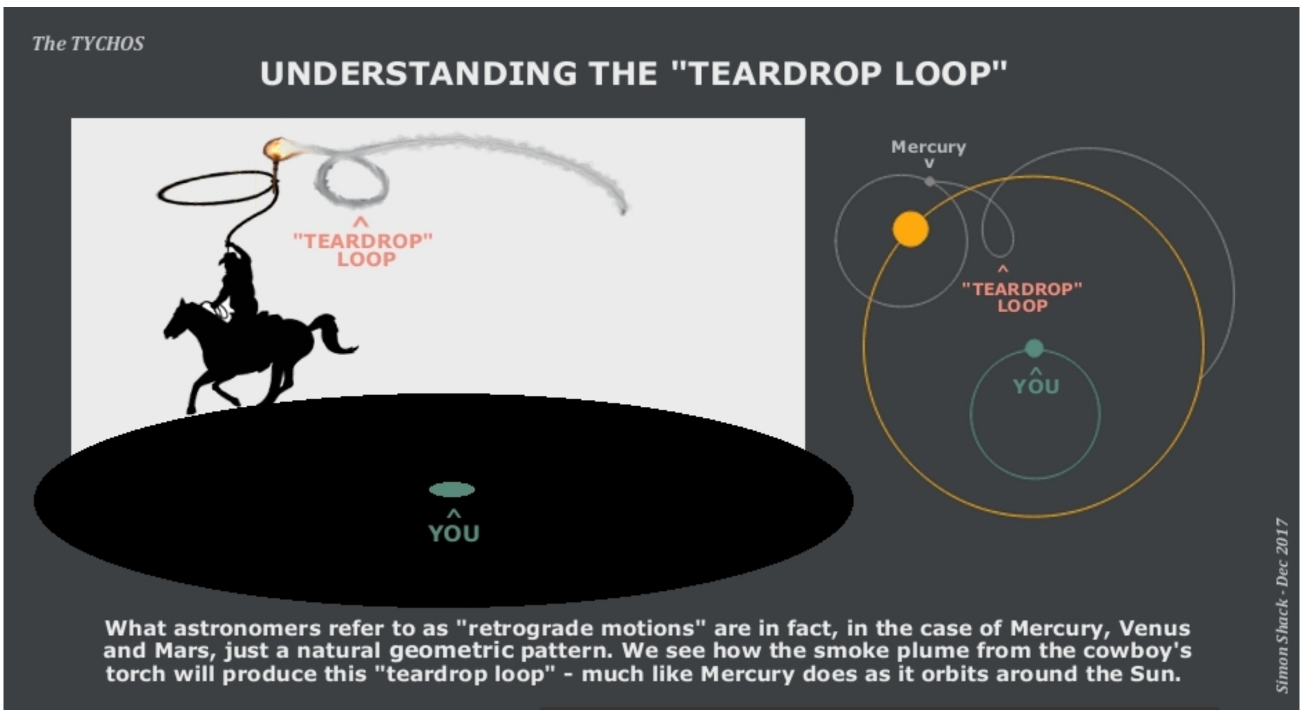
In short, the irregular periods of Io’s eclipses are quite simply a direct consequence of Jupiter’s alternating motions as viewed from Earth. One may say that the history of astronomy is riddled with illusory conclusions. One of the weaker spots of the human mind appears to be its spatial perceptions when confronted with the many tricks of perspective that nature loves to play on us.

Previous Chapter

Next Chapter

Chapter 9 — The retrograde periods of Venus and Mercury

The retrograde periods of Venus and Mercury (the Sun's two moons) occur in a similar mode as those of Mars: they both produce teardrop-shaped loops as they transit in inferior conjunction with the Sun. It is a perfectly natural, dynamic geometric pattern (known in geometry as an epitrochoid) yet one that the human mind has, understandably, some difficulty to conceptualize. My below graphic, however, should make it easy to visualize how and why these "teardrop loops" occur.

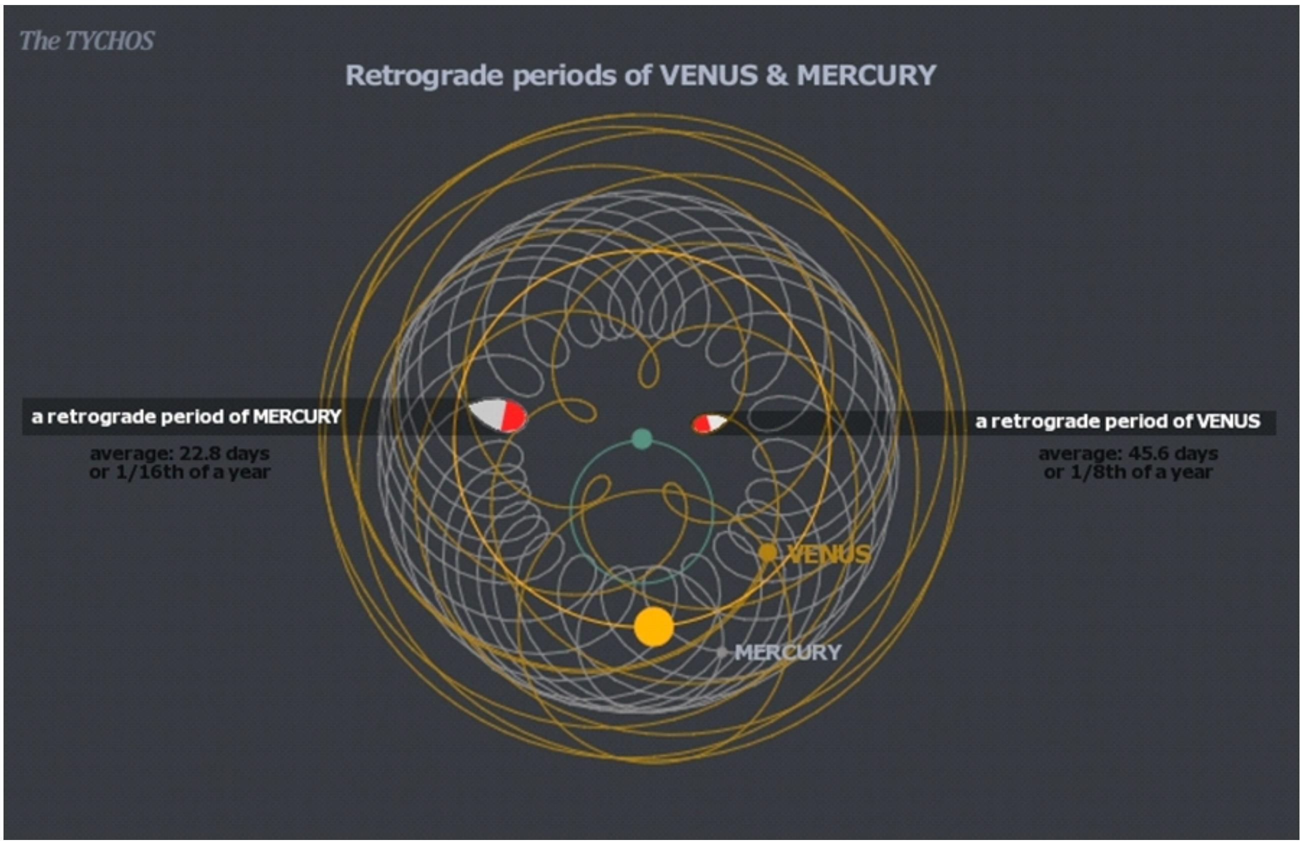


As you can see, this type of retrograde motion is not merely an illusion of perspective, like the so-called "retrograde" motion that affects our P-Type planets as they appear to move backwards against the background stars. In this case, the backward motion is part of the actual physical path traced by the observed object. In the above fanciful picture, our cowboy's torch will leave a teardrop-shaped smoke plume because the torch ***actually*** swirled around that patch of sky. The "teardrop loop" is simply a consequence of the horse's forward motion coupled with the gyrating lasso's circular motion.

[Watch animation of Mercury’s path around the Sun]

[Watch animation of Venus’s path around the Sun]

If you are ready to introduce yourself to a simulation of the full TYCHOS system, please read Chapter 21 on the Tychosium 2-D program. The below screenshot from the Tychosium highlights a retrograde period of each of the Sun’s two moons.



RETROGRADE PERIODS OF MERCURY & VENUS

> The retrograde period of Mercury lasts for ca. 22.828 days on average — or 1/16th of a solar year.
>
> The retrograde period of Venus lasts for ca. 45.656 days on average — or 1/8th of a solar year.

During these briefer periods, we see Mercury and Venus moving in the opposite direction of the Sun. Thereafter, they resume so-called “prograde” motion, moving West-to-East in our skies, along with the Sun.

PROGRADE PERIODS OF MERCURY & VENUS

> The prograde period of Mercury lasts for ca. 94 days on average.

> The prograde period of Venus lasts for ca. 538.7 days on average.

During these much longer prograde periods, we see Mercury and Venus moving as we expect, in the same direction as the Sun.

Note that there is nothing elliptical at all about the lunar motions of Venus and Mercury. They both perform uniformly circular orbits around their orbiting host, the Sun, maintaining their consistent and steady distances relative to her.

As can be readily visualized in the two above-linked animations, what needs to be understood about these odd, “teardrop-shaped” retrograde loops (performed by Venus, Mercury and Mars) is that they are entirely dependent on the orbital speed of these bodies as they revolve around the Sun. For instance, let us imagine for a moment that Mercury’s orbital speed were 8X slower than it is in reality. Well, here is a simulation of how Mercury would behave in relation to the moving Sun.

Hypothetical “Mercury” orbiting approximately 8X slower

As you can see, if only Mercury were moving 8X slower, then it would have no retrograde period. From Earth, we would just see Mercury as a moon revolving around the Sun – at times in front of it and at other times behind it – yet always moving in the same direction as its host. The retrograde motions of Mercury, Venus and Mars are a consequence of their relatively high orbital speeds while all of them simply revolve in uniform circular motion around the Sun, along its annual path round the Earth.

Let’s now take a closer look at some other aspects of our Sun’s two moons, Mercury and Venus.

Previous Chapter Next Chapter

Chapter 10 — Mercury — the Sun's junior moon

Mercury was a grave matter of concern for astronomers in the last century, with its seemingly erratic behavior. Since the precession of its perihelion was in conflict with Newtonian predictions (thus threatening the long-established and vigorously-defended heliocentric model), Einstein pulled out of his hat some fancy equations that, basically, told us that we cannot trust our eyes.

As it turns out, Mercury's behavior is not so erratic at all. Yes, its orbital plane is slightly inclined (as viewed from Earth) in relation to the Sun's orbital plane, which causes its elevation vis-à-vis the Sun to oscillate quite a bit, yet it simply revolves around the Sun in lunar fashion. It rotates around its axis 2X faster than Venus and 3X slower than our Moon — and orbits the Sun once in 116.88 days (on average) — which is precisely 4X the time needed for our Moon to orbit once around Earth (29.22 days).

Now, these would all be rather odd "coincidences" under the Copernican model under which the orbital paths of Mercury and Earth's Moon are entirely separate and independent of each other. Conversely, Mercury and our Moon's many uncanny common traits would appear to make far more sense within the TYCHOS model, wherein Mercury revolves around the Sun, which in turn revolves around the Moon and Earth. We will see further on (in chapter 29) that our Moon and Mercury are, indeed, very much "intimately related".

Is Mercury tidally or magnetically locked to the Sun in some way, just as our Moon is tidally locked to Earth? Until around the year 1965, every astronomer in the world would have told you that, yes, Mercury is "tidally locked" with the Sun (meaning that it always shows the same face to the Sun). That was the year that official NASA and Russian Space Agency sources announced with great fanfare that, according to their modern radar data, Mercury was ***not***, after all, tidally locked with the Sun. This caused an uproar in the astronomy community and the question is still debated to this day. As I will now demonstrate, however, Mercury is most likely tidally locked with the Sun (and so is its "big sister" Venus, which I've expounded further on) much like our Moon is tidally locked with Earth.

Mercury’s Short and Long ESI (Empiric Sidereal Interval)

Every 7 years, an Earthly observer will see Mercury realign six times with any given star at ca. 358-day intervals. However, the 7th time, it will “run late” by about 50 days and only line up again with the star in 408 days.

Why does this take place?

You guessed it. Just like Mars, Mercury also has two Empiric Sidereal Intervals: a “Short ESI” and a “Long ESI”.

In 14 years, Mercury completes 12 Short ESIs (of ca. 358 days) and two Long ESI (about 50 days longer). Below is a charted sample of a 14-year Mercury cycle (from July 6, 1998 to July 5, 2012) which I compiled with the NEAVE online Planetarium.

I chose – for a reason that should become clear – to start counting Mercury’s yearly revolutions at a given moment in time (just as it entered a Long ESI) as it transited in front of a given star which I used as reference. My celestial reference point was the star “Asellus Australis” in the Cancer constellation.

I found that Mercury lined up with my reference star on the following dates:

LONG:	July 6, 1998 **Start**	→	Aug 19, 1999	=	409
SHORT:	Aug 19, 1999	→	Aug 11, 2000	=	358
SHORT:	Aug 11, 2000	→	Aug 3, 2001	=	357
SHORT:	Aug 3, 2001	→	July 25, 2002	=	356
SHORT:	July 25, 2002	→	July 17, 2003	=	357
SHORT:	July 17, 2003	→	July 9, 2004	=	358
SHORT:	July 9, 2004	→	July 4, 2005	=	360
LONG:	July 4, 2005	→	Aug 16, 2006	=	408
SHORT:	Aug 16, 2006	→	Aug 8, 2007	=	357
SHORT:	Aug 8, 2007	→	July 30, 2008	=	357
SHORT:	July 30, 2008	→	July 22, 2009	=	357
SHORT:	July 22, 2009	→	July 14, 2010	=	357
SHORT:	July 14, 2010	→	July 7, 2011	=	358
SHORT:	July 7, 2011	→	July 5, 2012 **End**	=	364

TOTAL : 5113 days

Average sidereal period of Mercury:

5113 / 14 ≈ **365.22**

Note that this is almost exactly 1 solar year. (Please see Chapters 31 and 32 regarding the precise length of a year in the TYCHOS model).

As you can see, we have a pattern which repeats every 7 years – yielding a mean figure of Mercury's sidereal period amounting to 365.22 days. In other words, if you know when and where to start computing Mercury's celestial motions, you will find that Mercury is very much locked with the Sun's yearly orbit around Earth. This is because Mercury is a moon of the Sun.

It is truly perplexing that, as far as I know, no one has noticed to this day the fact that Mercury's sidereal periods can be averaged out (in spite of their irregularity) to nigh precisely 1 solar year. To be sure, this would constitute a most astounding "coincidental happenstance" under the Copernican model (wherein Earth and Mercury supposedly revolve at different speeds around the Sun).

You may now be asking yourself, *"Why does the TYCHOS model contend that Mercury's mean synodic period amounts to 116.88 days rather than 115.88 days as most astronomy tables show?"*

Here is a series of 14 intervals I have personally verified for Mercury's synodic periods, over a 1636-day time span.

Note: a **synodic period** is the time interval between two successive conjunctions of any given celestial body with **the Sun**.

14 successive Mercury Synodic Periods

Source: NEAVE Planetarium

Oct 24, 2003	→	March 3, 2004	=	131 days
March 3, 2004	→	June 18, 2004	=	107 days

June 18, 2004	→	Oct 5, 2004	=	109 days
Oct 5, 2004	→	Feb 14, 2005	=	132 days
Feb 14, 2005	→	June 3, 2005	=	109 days
June 3, 2005	→	Sept 17, 2005	=	106 days
Sept 17, 2005	→	Jan 26, 2006	=	131 days
Jan 26, 2006	→	May 19, 2006	=	113 days
May 19, 2006	→	Aug 31, 2006	=	104 days
Aug 31, 2006	→	Jan 7, 2007	=	129 days
Jan 7, 2007	→	May 3, 2007	=	116 days
May 3, 2007	→	Aug 15, 2007	=	104 days
Aug 15, 2007	→	Dec 18, 2007	=	125 days
Dec 18, 2007	→	April 16, 2008	=	120 days

Average:

1636 / 14 ≈ 116.857 days

Hence, my 116.88-day value for Mercury's true mean synodic period appears to be virtually on the mark.

Previous Chapter Next Chapter

Chapter 11 — Venus — the Sun's senior moon

It has been observed that Venus invariably presents **the same face** (to us earthly observers) each time it transits closest to ***Earth***, every 584.4 days or so. Note that Venus is, of all our surrounding celestial objects, the one that passes closest to Earth.

As it is, this apparent "tidal" locking of Venus with Earth is, still today, a complete mystery to modern astronomy. Of course, according to the Copernican model, Earth travels at its own speed around a larger orbit than Venus, which in turn travels somewhat faster around its smaller orbit, yet Venus always appears to show the same face to us every time it passes closest to Earth (when Venus is at so-called inferior conjunction with the Sun). Well, and once again, this would be another "extraordinary coincidence" as viewed under the Copernican model.

> *"The periods of Venus' rotation and of its orbit are synchronized such that it always presents the same face toward Earth when the two planets are at their closest approach. Whether this is a resonance effect or merely a coincidence is not known."*

— NinePlanets.org — Venus

> *"Every 584 days, Venus and Earth come to their point of closest approach. And every time this happens, Venus shows Earth the same face. Is there some force that makes Venus align itself with the Earth rather than the Sun, or is this just a coincidence?"*

— ABC Australia Television's The Lab — Venus, 2017

> *"Whether this relationship arose by chance or is the result of some kind of tidal locking with Earth is unknown."*

— Wikipedia entry on “Tidal locking”

> *“Tidal locking of Venus planet: […] so that the Venus planet shows always almost the same face to the Earth planet during each meeting, and shows that same face to both Earth and Sun during heliocentric opposition of Earth and Venus planets.”*

— *Orbital resonance and Solar cycles* by P.A. Semi (March 2009)

Everyone knows of this, but who can explain it? In the TYCHOS this “puzzling” fact is considerably less mysterious. Venus, just like Mercury, is tidally locked with the Sun, quite simply because the two of them are moons of the Sun. Our own Moon, as we well know, is also tidally locked with its host planet.

Venus employs 584.4 days to circle the Sun once. This is somewhat longer than 1.5 solar years (365.25 X 1.5 = 547.875 days), the difference being:

584.4 – 547.875 = **36.525 days**

This is 1/10th of 365.25 days and 1/16th of 584.4 days. Why have I noted this?

As we will see further on, for every 16 solar revolutions around Earth, Venus conjuncts with the Sun 10 times (as seen from Earth). Hence, every 8 years, Venus conjuncts with the Sun 5 times. Every 16 years Venus aligns with Mars (albeit at diametrically opposed sides of Earth) and every 32 years or so Venus and Mars conjunct, this time on the same side of Earth.

The entire system is not just composed of magnetically-locked micro systems but is itself a perfectly synchronized system with each component relating to the other.

Venus has an 8-year cycle (2922 days) during which Venus completes 5 synodic periods of 584.4 days each (or 1.6 years).

365.25 X 8 = 2922 days

and

584.4 X 5 = 2922 days

As you may note for later, this is one hundred 29.22-day periods — *i.e.;* our “TMSP”.

(The TMSP, our Moon’s True Mean Synodic Period of 29.22 days, will be expounded and illustrated in Chapter 27.)

Verifying the TYCHOS average value of 584.4 days for Venus’ synodic period

Someone may object that the average Venus’ synodic period (as stated in official astronomy tables) is 583.9 days and not 584.4. I challenge the figure with the following evidence. Here is a series of five successive synodic periods which I have personally verified perusing the NEAVE Planetarium.

It is also something that anyone can easily verify for themselves. The synodic cycle of a planet is the number of days it takes for it to realign with the Sun as seen from Earth. All planets’ orbits are slightly **off-center** with respect to the body they revolve around (though please note this is entirely different from Kepler’s presumed “elliptical orbits” which do not exist as such in the TYCHOS).

These synodic period values fluctuate somewhat over time. We know that Venus realigns five times with the Sun in 8 years. We know that after 8 years, it roughly realigns with the Sun and the same star. Since we know these things, we should therefore obtain a more correct and significant mean synodic period by *averaging* five synodic periods of Venus.

Aug 13, 2011	→	Mar 24, 2013	=	589 days
Mar 24, 2013	→	Oct 25, 2014	=	580 days
Oct 25, 2014	→	June 5, 2016	=	589 days
June 5, 2016	→	Jan 8, 2018	=	582 days
Jan 8, 2018	→	Aug 13, 2019	=	582 days

Total: 2922 days
(or exactly 365.25 X 8)

Average length of Venus synodic period:

2922 / 5 = 584.4

The TYCHOS "584.4" value for the mean synodic period of Venus is thus beyond dispute, since it can be empirically observed.

As current theory has it, Venus rotates around its axis in a **clockwise** fashion. This, however, is an unproven claim which originates (much like the supposedly unreliable and "non-tidally-locked Mercury" story) from purported radar surveys performed back in the 1960's. Countless debates about this specific issue can be found in astronomy literature yet none has ever reached a definitive conclusion about this matter.

In the TYCHOS, the reason why Venus appears to rotate around its axis in clockwise fashion is self-evident; since Venus employs more than one year (in fact, 1.6 solar years) to complete one rotation around its axis and to return to its perigee, Venus will appear (to an earthly observer) to rotate clockwise — that is, in the opposite direction of its revolution around Earth!

Previous Chapter Next Chapter

Chapter 12 — Tilts, inclinations, obliquities & oscillations

The well-known notion of Earth's so-called "axial tilt" is, of course, a fundamental requisite for the Copernican model to work, since Earth's alleged obliquity is meant to account for our alternating seasons. The most popularly-held, yet academically-supported theory as to exactly why Earth's axis would be skewed at an angle goes like this:

> *"When an object the size of Mars crashed into the newly formed planet Earth around 4.5 billion years ago, it knocked our planet over and left it tilted at an angle."*

— *What Is Earth's Axial Tilt or Obliquity?* (Time and Date)

You may be forgiven for raising your eyebrows at the above explanation which reeks of journalistic sensationalism à-la-The Discovery Channel. To be sure, Earth's "axial tilt" ranks among the most sacrosanct axioms of (Copernican) astronomy. After all, if Earth were truly orbiting around the Sun, the only possible explanation for our seasons would be that its axis is tilted in relation to its orbital plane.

In the TYCHOS, Earth is also tilted at about 23° in relation to its orbital plane, yet with some notable differences: it is the Sun that revolves around Earth (and not vice versa), while our planet's own orbital motion proceeds (over a full Great Year) with our Northern hemisphere tipping "outwards" (i.e.; towards the Sun's external orbital path) at all times.

Interestingly, and for all the uncertainties afflicting modern astrophysics, it appears to be beyond dispute that our planet's Northern hemisphere is much "heavier" than its Southern hemisphere. In any event, it is a notion seemingly agreed upon by both mainstream and dissident scientists alike:

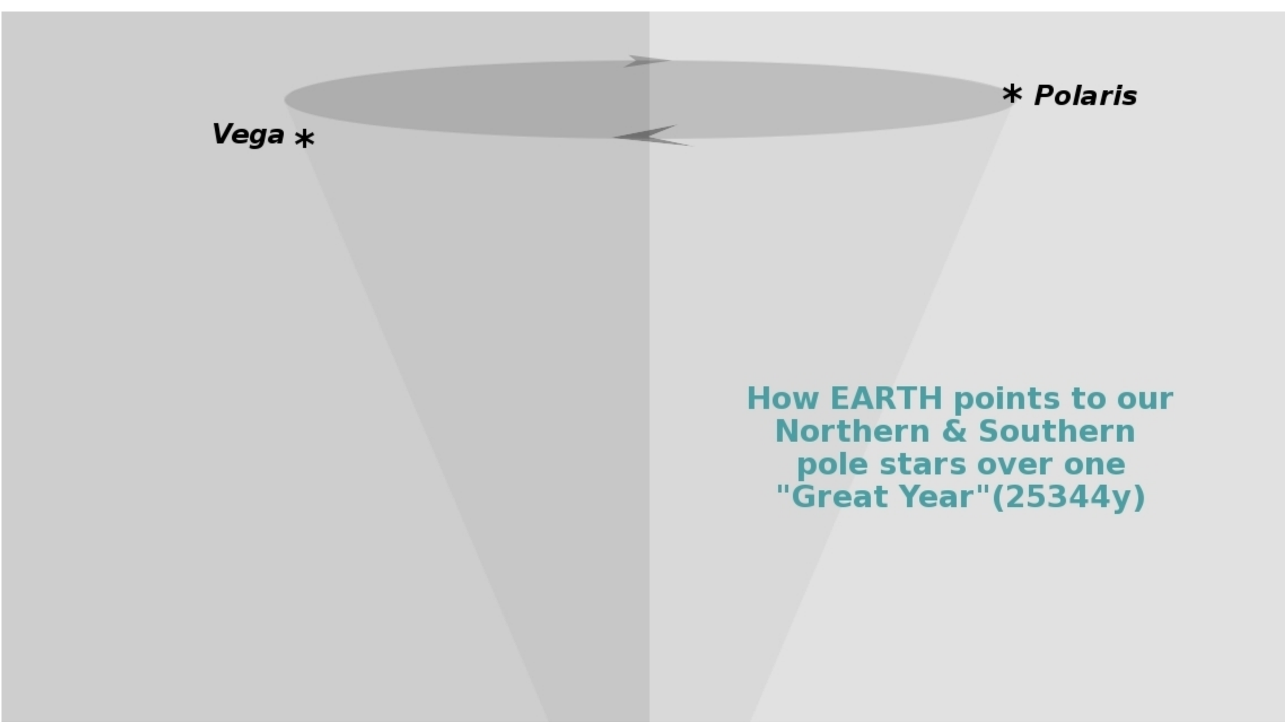
> *"The northern hemisphere consists of the great land masses and*

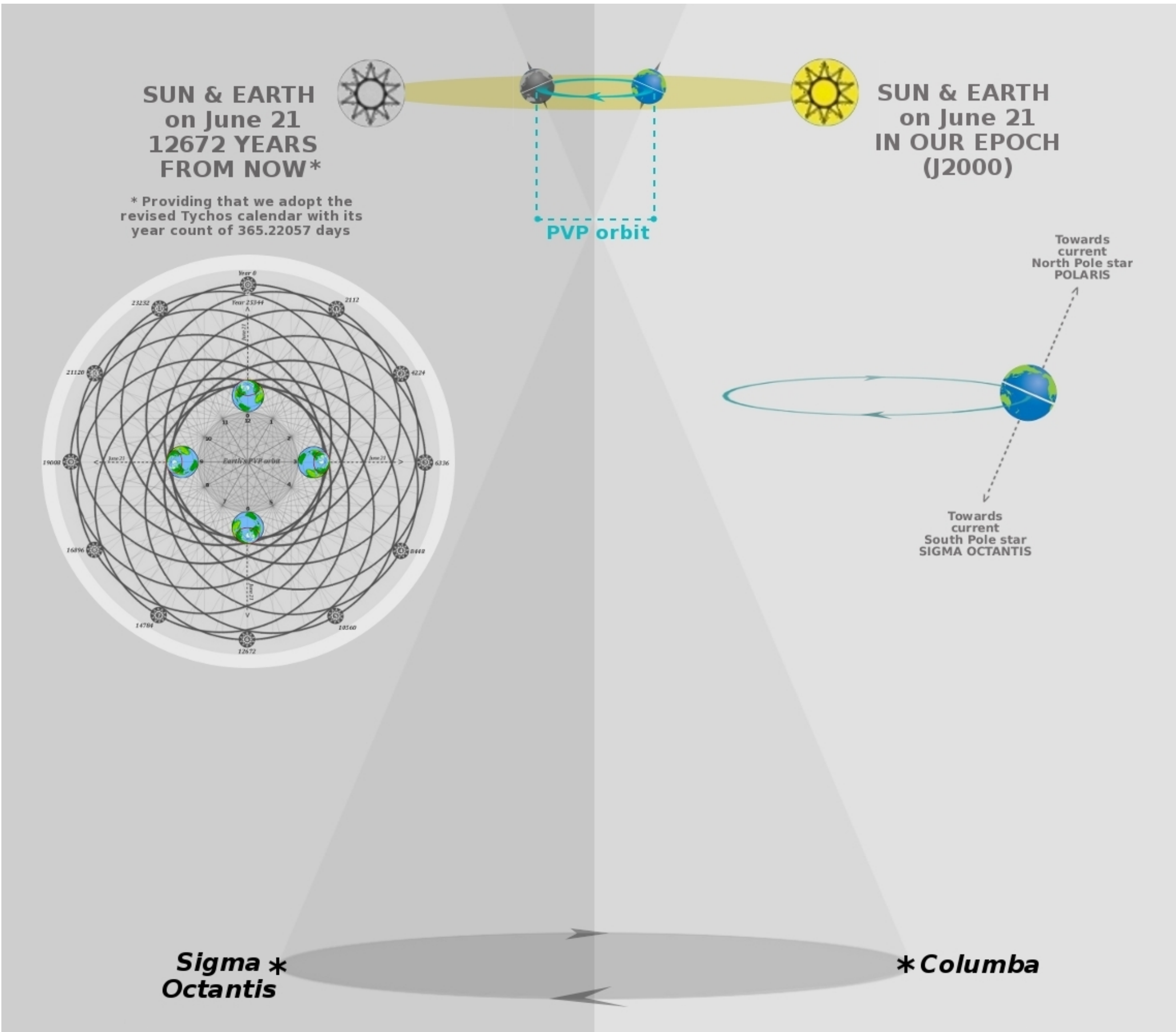
> *higher elevations, from a mechanical aspect, the Earth is top heavy, the northern hemisphere must attract a stronger pull from the Sun than the southern hemisphere. This lack of uniformity should impact on the movements of the Earth.”*

— p. 164, *Big Bang or Big Bluff* by Hans Binder (May 2011)

It would thus seem intuitively logical, even to devout Newtonian advocates, that Earth’s heavier part would hang “outwards” as our planet circles around its own orbit. Conversely, it is hard to fathom how Earth’s axis would maintain its fixed, peculiar inclination while circling around the Sun as of the heliocentric theory. Yet, one of the latter’s most problematic aspects has to be its proposed cause for the observed secular stellar precession and our alternating pole stars. As will be expounded in Chapter 18, the hypothesized retrograde “wobble” (or “third motion”) of Earth has been thoroughly disproved in recent years.

On the other hand, as illustrated in my next graphic, the TYCHOS provides an uncomplicated solution to account for the secular stellar precession and our ever-changing pole stars. The observed motions of our pole stars are simply caused by Earth’s slow, “clockwise” motion around what I have called the “PVP orbit” (Polaris-Vega-Polaris). Earth employs 25344 solar years to complete one PVP revolution. Our current Northern and Southern pole stars are Polaris and Sigma Octantis, but over time they will be replaced by other stars such as Vega (ca. 11,000 years from now) and Eta Columba (ca. 12,000 years).





The Sun's "mysterious" 6 or 7 degree tilt

> *"It's such a deep-rooted mystery and so difficult to explain that people just don't talk about it."*

You may have never heard of it, but one of the most baffling mysteries in astronomy is the 6° (or 7°) tilt of the Sun — or, as some have it, what is tilted is the "plane of all of our planets' orbits with respect to the Sun".

Here's more of my extract from an article on Astronomy.com musing about this still unexplained riddle:

> *"The Sun's rotation was measured for the first time in 1850 and*

> *something that was recognized right away was that its spin axis, its north pole, is tilted with respect to the rest of the planets by 6 degrees. So even though 6 degrees isn't much, it is a big number compared to the mutual planet-planet misalignments. So the Sun is basically an outlier within the solar system. This is a long-standing issue and one that is recognized but people don't really talk much about it. Everything in the solar system rotates roughly on the same plane except for the most massive object, the Sun — which is kind of a big deal."*

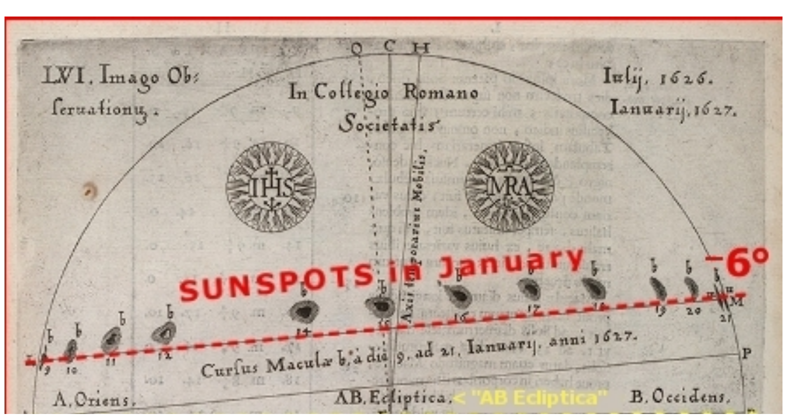
— *Planet Nine may be responsible for tilting the Sun* by Shannon Stirone (2016)

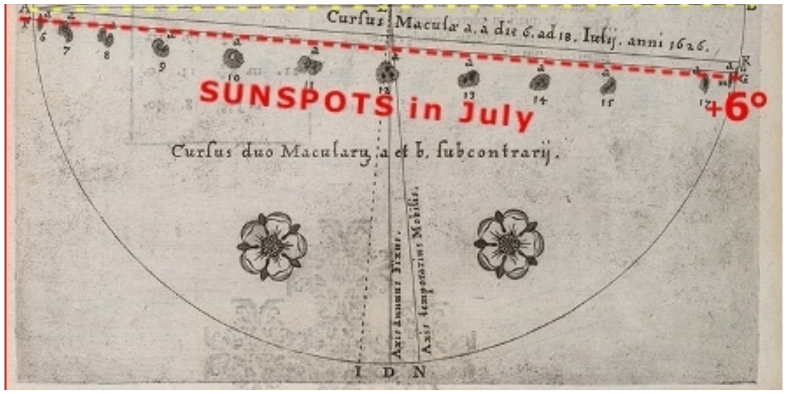
As a matter of fact, this tilt of the Sun's rotation axis with respect to our ecliptic plane was known long before 1850; it was discovered by Christoph Scheiner back in the 1600's during his extensive 20-year-long sunspot observations. His work was richly illustrated and published in his monumental treatise *Rosa Ursina* (1630).

> *"Scheiner, in his massive 1630 treatise on sunspots entitled 'Rosa Ursina', accepted the view of sunspots as markings on the solar surface and used his accurate observations, to infer the fact that the Sun's rotation axis is inclined with respect to the ecliptic plane."*

— *1610: First telescopic observations of sunspots, Solar Physics Historical Timeline* by UCAR/NCAR 2018

In the below illustration by Cristoph Scheiner, I have highlighted the -6 and + 6° inclinations of his observed sunspot transits in January and July.





Needless to say, this tilt is no trivial matter. It was and still is a crucial issue with regards to the entire heliocentrism-vs-geocentrism debate. In fact, the "sunspot-issue" triggered a bitter and infamous 30-year-long feud between Galileo and Christoph Scheiner (who, incidentally, was a staunch supporter of the Tychonic model).

To understand the importance of this issue, you will just have to ask yourself the following questions: *"Why would the Sun or all of our planets' orbits be tilted at 6° (or at **any** degree) to each other? Isn't the Sun supposed to be a gigantic central mass around which all of our planets are revolving around? And if so, why then would our planets' orbits **not** be co-planar with the Sun's rotation around itself? Can Newtonian or Einstenian physics explain it?"* The answer to this last question is a definite "No".

Today, astronomers still refer to this six-degree tilt as a "deep-rooted mystery" as we can read on PHYS.org:

> *"All of the planets orbit in a flat plane with respect to the sun, roughly within a couple degrees of each other. That plane, however, rotates at a six-degree tilt with respect to the sun — giving the appearance that the sun itself is cocked off at an angle. Until now, no one had found a compelling explanation to produce such an effect. 'It's such a deep-rooted mystery and so difficult to explain that people just don't talk about it', says Brown, the Richard and Barbara Rosenberg Professor of Planetary Astronomy."*

— *Curious tilt of the sun traced to undiscovered planet* by California Institute of Technology (2016)

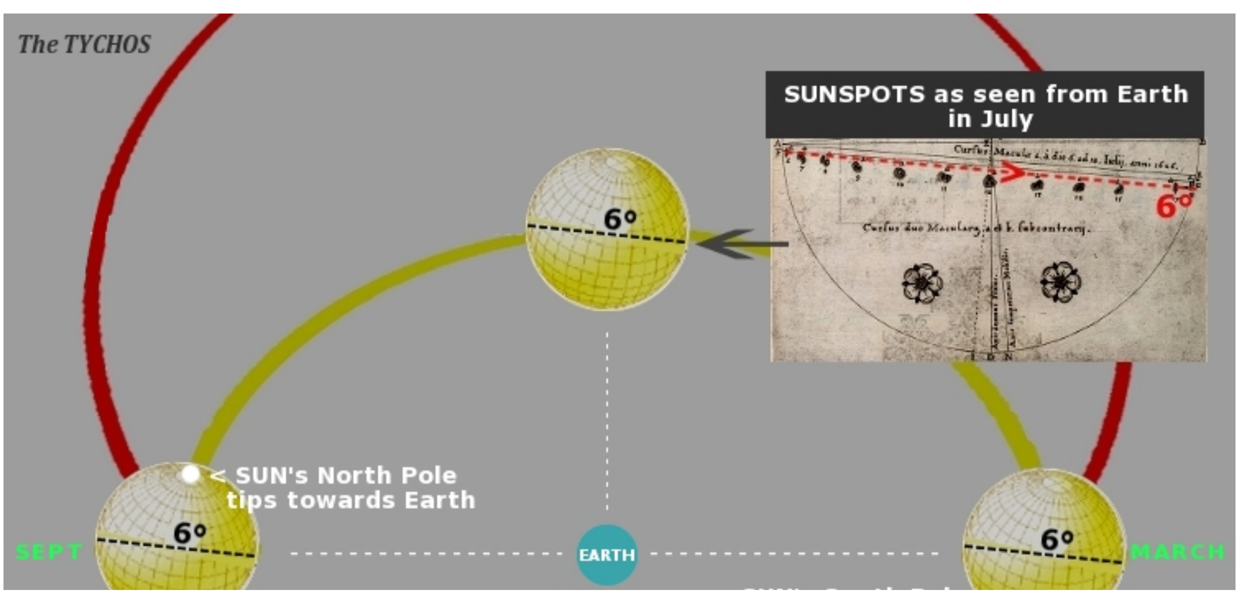
What is observed is that the Sun’s North Pole tips **towards** us in September and **away** from us in March.

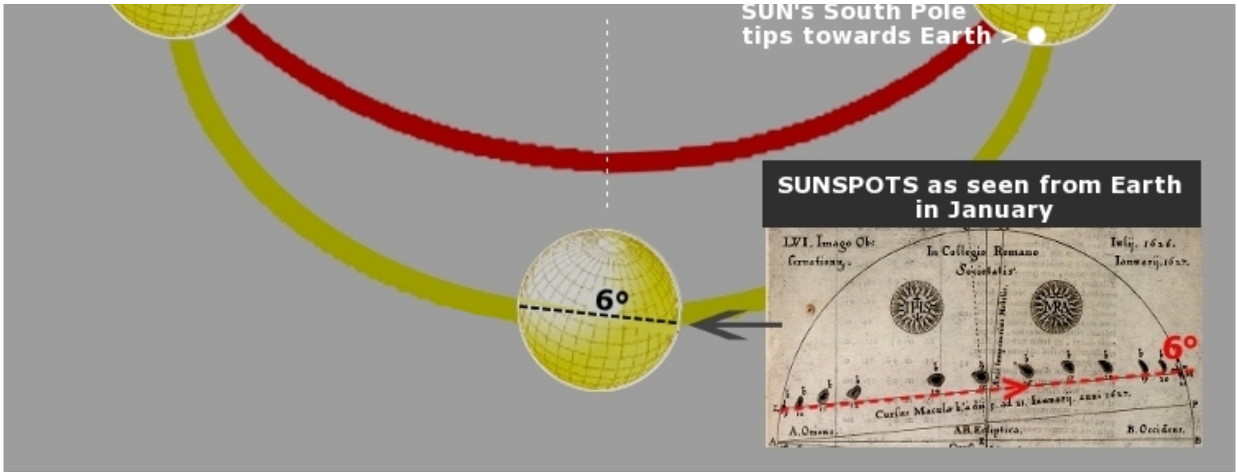
> *“The Sun’s axis tilts almost 7.5 degrees out of perpendicular to Earth’s orbital plane. (The orbital plane of Earth is commonly called the ecliptic.) Therefore, as we orbit the Sun, there’s one day out of the year when the Sun’s North Pole tips most toward Earth. This happens at the end of the first week in September. Six months later, at the end of the first week in March, it’s the Sun’s South Pole that tilts maximumly towards Earth. There are also two days during the year when the Sun’s North and South Poles, as viewed from Earth, don’t tip toward or away from Earth. This happens at the end of the first week in in June, and six months later, at the end of the first week of December.”*

— *The Tilt of the Sun’s Axis* by Bruce McClure (June 2006)

In the TYCHOS model, those observed oscillations of the Sun may be plainly accounted for as follows – with no need for any elusive, yet-to-be-discovered planets. It is indeed remarkable how much of modern science appears to base its assumptions upon postulated, invisible matter — in other words, upon thin air!

In July and January, the sunspots (as documented by Christoph Scheiner) will be inclined as shown in my below diagram. The Sun’s North Pole will tip towards Earth in September and the Sun’s South pole will tip towards Earth in March.



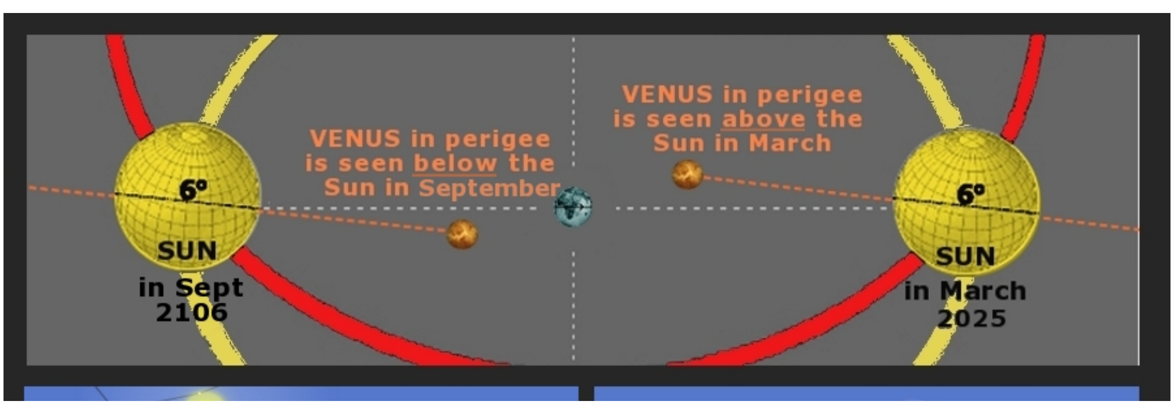


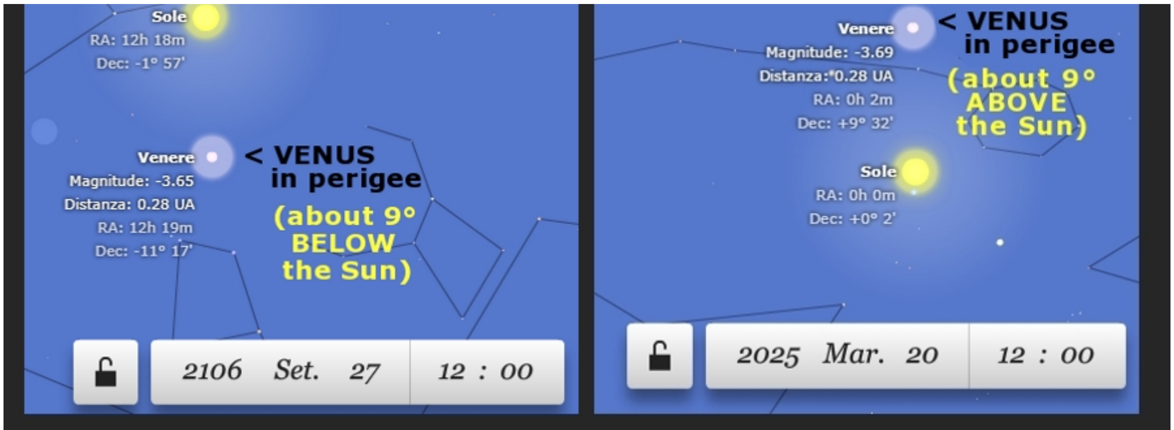
Of course, we should now be curious to find out whether these “visual pole flips” of Mars and the Sun (as viewed from Earth) are in any way symmetrical or synchronized. Indeed, they are! Whenever Mars transits in opposition around a September equinox, Mars shows us more of its South pole, while the Sun shows us more of its North pole; whereas when Mars finds itself in opposition around a March equinox, this is inverted. The Sun and Mars truly appear to have a very special relationship of the “harmoniously-opposed” kind!

But there’s more. Around the September and March equinoxes, Venus and Mercury (our Sun’s two moons, as posited by the TYCHOS model) are observed to transit either “above” or “below” the Sun – that is, in relation to our line of sight. Venus, for instance, is seen passing “below” the Sun in September (by about -9° as it transits in perigee, i.e.; closest to Earth), whereas it is seen passing “above” the Sun (by about +9°) in March. This hefty 18° variation constitutes, all by itself, a spiny problem for the Copernican theory; as you can read in this NASA fact sheet, the inclination of Venus’ orbit in relation to Earth is currently claimed to be no more than 3.4°.

As VENUS transits in perigee in September, we will see VENUS about 9° below the Sun.

As VENUS transits in perigee in March, we will see VENUS about 9° above the Sun.

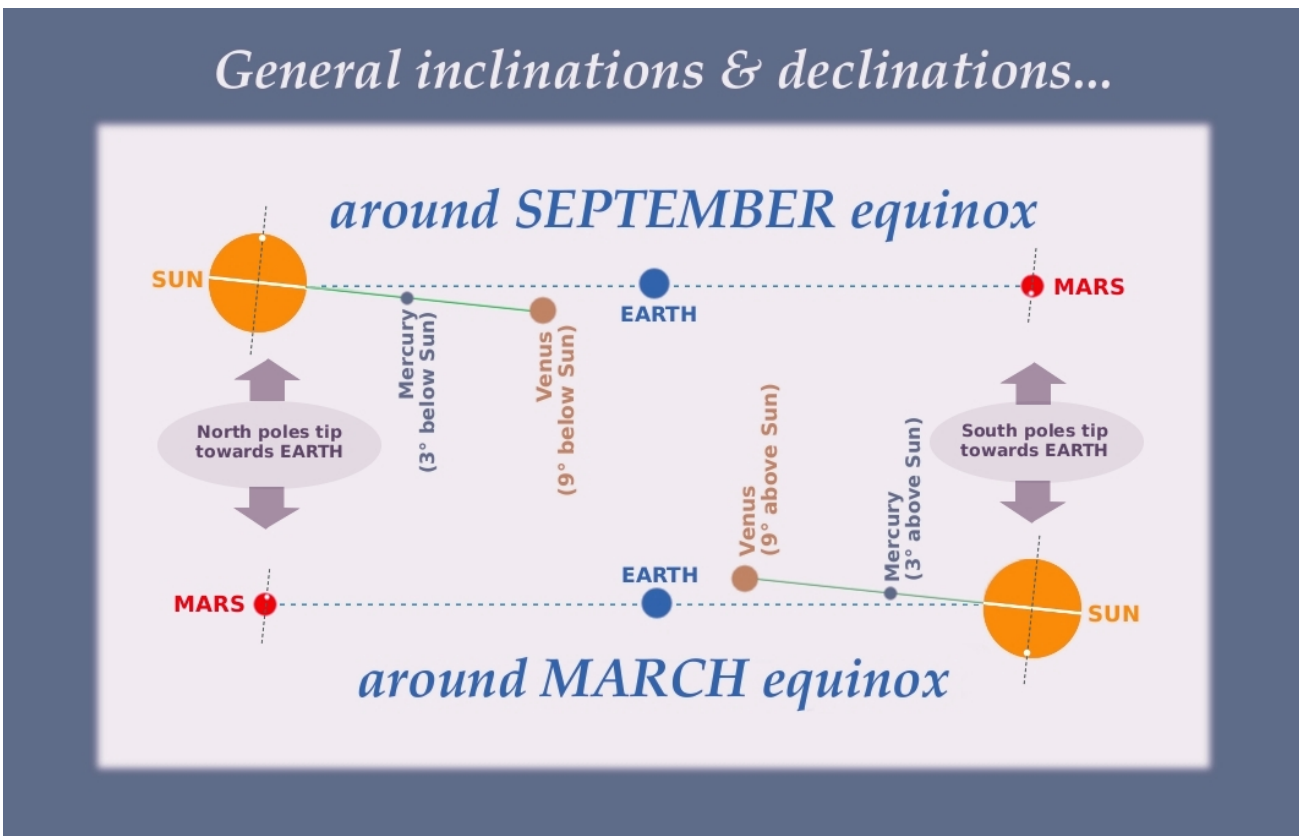




The orbit of VENUS is most likely co-planar with the SUN's celestial equator

As it is, Mercury is **also** seen below and above the Sun in September and March (by ca. -3° and +3° respectively). In synthesis, we may conclude that the observational data empirically supports two core aspects of the TYCHOS model:

> 1: That the Sun and Mars are a binary pair of "cosmic dancers", which even share symmetrical seasonal inclinations.
> 2: That Venus and Mercury are the moons of the Sun, both orbits of which are co-planar with the Sun's celestial equator.



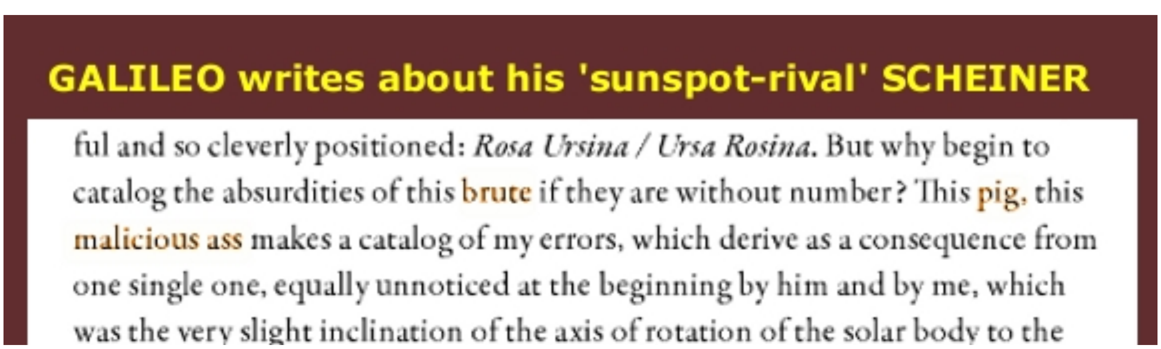
It should be noted that, when Earth's axial tilt is added to the equation, the *combined* tilt angles (as viewed from Earth) of the Sun, according to a recent Australian study, will eventually register a maximum variation of **30.5°**.

> *“The Sun’s tilt causes its poles to nod with respect to a terrestrial observer. Sometimes the north pole is just visible, and sometimes the south pole is visible. This changing angle in a plane toward and away from the observer is termed the B angle, and as expected, it varies from +7 to -7 degrees throughout an Earth year. In the plane of the sky (the plane perpendicular to the observer’s line of sight), the solar axis appears to rotate back and forth throughout the year. The range of this angle, designated the P angle, is from -26 to +26 degrees. We might initially expect a P angle variation of +/- 30.5 degrees (23.5 + 7). However, the relative orientations of the Sun and the Earth at this time do not allow us to perceive this maximum variation, although over many centuries this will change.”*

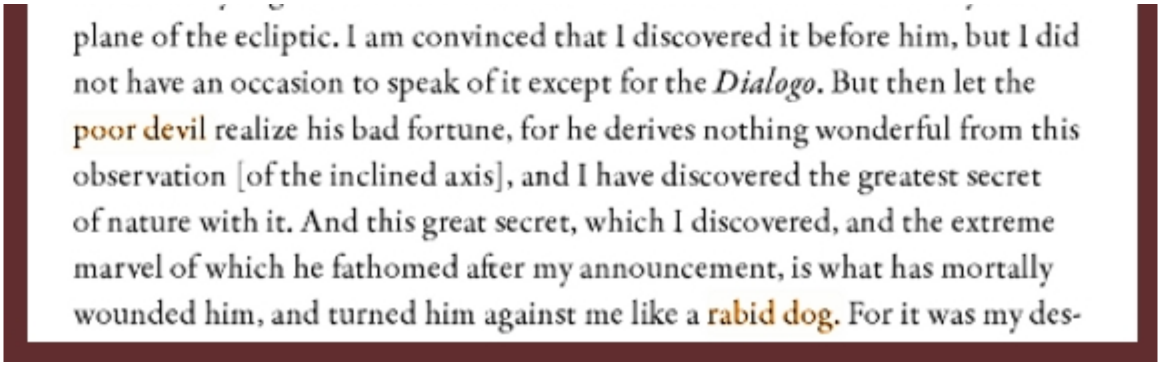
— *The Orientation of the Sun and Earth in Space* by Australian Space Academy (2017)

As a brief anecdotal aside, it is interesting to note that Galileo (a vociferous crusader for the Copernican model) seemingly perceived Cristoph Scheiner’s sunspot observations as a threat to the heliocentric theory. Notoriously, Galileo engaged in fierce verbal battles with a number of astronomers of his time, often claiming priority over any new discoveries made with the aid of the telescope.

As Scheiner (outraged by Galileo’s accusations of plagiarism) decided to move from Ingolstadt to Rome in order to better defend his work, the bitter feud between Galileo and Scheiner turned ugly. You will have to read what that great man of science, Galileo, had to say about his German opponent whom he calls a “brute”, a “pig”, a “malicious ass”, a “poor devil” and a “rabid dog”!


GALILEO writes about his 'sunspot-rival' SCHEINER

ful and so cleverly positioned: *Rosa Ursina / Ursa Rosina*. But why begin to catalog the absurdities of this brute if they are without number? This pig, this malicious ass makes a catalog of my errors, which derive as a consequence from one single one, equally unnoticed at the beginning by him and by me, which was the very slight inclination of the axis of rotation of the solar body to the


plane of the ecliptic. I am convinced that I discovered it before him, but I did not have an occasion to speak of it except for the *Dialogo*. But then let the poor devil realize his bad fortune, for he derives nothing wonderful from this observation [of the inclined axis], and I have discovered the greatest secret of nature with it. And this great secret, which I discovered, and the extreme marvel of which he fathomed after my announcement, is what has mortally wounded him, and turned him against me like a rabid dog. For it was my des-

On Sunspots
Translations of letters by Galileo Galilei and Christoph Scheiner, University of Chicago Press (2010)

You will thus have to forgive me for suspecting that Galileo (for reasons I won't go into here) had ulterior motives other than advancing cosmological knowledge. In any case, his most acclaimed telescopic discoveries (the phases of Venus and the moons of Jupiter) did not contradict in any way the Tychonic model's basic premises. To be sure, Galileo is known to have virtually ignored Tycho Brahe's and Longomontanus' work.

> *"After 1610, when Galileo engaged himself fully in astronomy and cosmology, he showed little direct interest in Tycho's system and none at all in Longomontanus' version of it. […] Moreover, he never mentioned explicitly the Tychonian world system by name."*

— *Galileo in early modern Denmark, 1600-1650* by Helge Kragh

One has to wonder why Galileo Galilei — the man hailed as the "father of the scientific method" — would have been so dismissive of his illustrious colleagues (Brahe and Longomontanus) who, at the time, were perhaps the most highly-regarded astronomers in Europe.

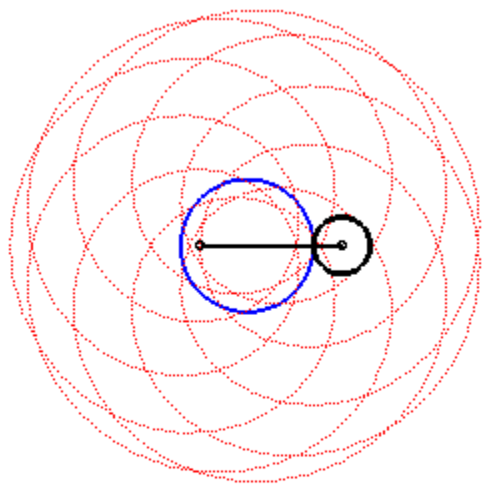
> *"Galileo has been called the 'father of observational astronomy' the 'father of modern physics', the 'father of the scientific method', and even the 'father of science'."*

— Wikipedia entry on "Galileo Galilei"

The Sun’s epitrochoidal oscillation

As I stumbled upon a French website which hosts the below animation, I was pleasantly surprised to read their caption describing the same: *“Le schéma conceptuel montre le mouvement de type épitrocoïdal du Soleil autour du barycentre du système solaire.”*

This translates to: *“This conceptual schematic shows the epitrochoidal motion of the Sun around the barycenter of the solar system”.*



Above — from *Epitrochoid, Epitrochoide* by Robert Ferréol, Jacques Mandonnet (2006)

In other words, the Sun’s subtle motion around our (alleged) “system’s barycenter” follows an epitrochoidal pattern which very much appears to mirror the epitrochoidal motion of Mars around the Sun!

The reason for this oscillation is currently explained as follows:

> *“The center of mass of our solar system is very close to the Sun itself, but not exactly at the Sun’s center (it is actually a little bit outside the radius of the Sun). However, since almost all of the mass within the solar system is contained in the Sun, its motion is only a slight wobble in comparison to the motion of the planets.”*

— *Ask an Astronomer: Does the Sun orbit the Earth as well as the Earth orbiting the Sun?* (July 2015, Cornell University)

It would appear that not everyone agrees that it is the Sun that oscillates around our Solar System's barycenter. According to Wikipedia, what is observed is actually *"the motion of the Solar System's barycenter relative to the Sun"*.

> *"The barycenter (or barycentre) is the center of mass of two or more bodies that are orbiting each other, or the point around which they both orbit. It is an important concept in fields such as astronomy and astrophysics. The distance from a body's center of mass to the barycenter can be calculated as a simple two-body problem. In cases where one of the two objects is considerably more massive than the other (and relatively close), the barycenter will typically be located within the more massive object. Rather than appearing to orbit a common center of mass with the smaller body, the larger will simply be seen to wobble slightly."*

— Wikipedia entry on "Barycenter"

Weirdly, Wikipedia goes on to say that the Sun's oscillation is due to

> *"the combined influences of all the planets, comets, asteroids, etc. of the Solar System"*

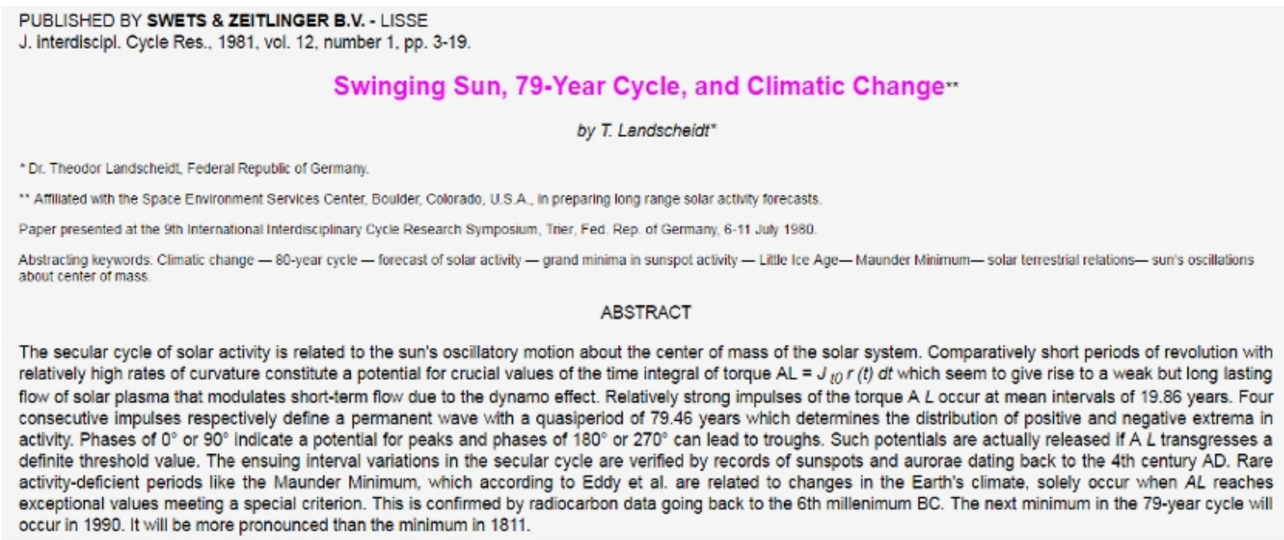
The question is: could it possibly be, instead, that this slight wobble of the Sun is more simply a direct consequence of the influence of its binary companion Mars?

In any event, such oscillations on the part of host stars in binary systems are precisely what our modern-day astronomers look for (using sophisticated spectrometers and assorted state-of-the-art techniques) when trying to determine if a given star may host a smaller binary companion. It therefore seems quite plausible that the Sun's small oscillation around its nucleus is caused by none other than its small binary companion, Mars.

Previous Chapter Next Chapter

Chapter 13 — The Sun's 79-Year cycle

Earlier on we saw how Mars has a distinctive 79-year cycle within which it returns to the same celestial spot. It turns out that, according to modern-day researchers of solar activity, the Sun also has a 79-year cycle! According to Theodor Landscheidt's studies, the cycle of solar activity is related to the sun's oscillatory motion about the center of mass of the solar system.


PUBLISHED BY **SWETS & ZEITLINGER B.V.** - LISSE
J. Interdiscipl. Cycle Res., 1981, vol. 12, number 1, pp. 3-19.

Swinging Sun, 79-Year Cycle, and Climatic Change**

*by T. Landscheidt**

* Dr. Theodor Landscheidt, Federal Republic of Germany.

** Affiliated with the Space Environment Services Center, Boulder, Colorado, U.S.A., in preparing long range solar activity forecasts.

Paper presented at the 9th International Interdisciplinary Cycle Research Symposium, Trier, Fed. Rep. of Germany, 6-11 July 1980.

Abstracting keywords: Climatic change — 80-year cycle — forecast of solar activity — grand minima in sunspot activity — Little Ice Age— Maunder Minimum— solar terrestrial relations— sun's oscillations about center of mass.

ABSTRACT

The secular cycle of solar activity is related to the sun's oscillatory motion about the center of mass of the solar system. Comparatively short periods of revolution with relatively high rates of curvature constitute a potential for crucial values of the time integral of torque AL = $J_{t0}\, r\,(t)\, dt$ which seem to give rise to a weak but long lasting flow of solar plasma that modulates short-term flow due to the dynamo effect. Relatively strong impulses of the torque A *L* occur at mean intervals of 19.86 years. Four consecutive impulses respectively define a permanent wave with a quasiperiod of 79.46 years which determines the distribution of positive and negative extrema in activity. Phases of 0° or 90° indicate a potential for peaks and phases of 180° or 270° can lead to troughs. Such potentials are actually released if A *L* transgresses a definite threshold value. The ensuing interval variations in the secular cycle are verified by records of sunspots and aurorae dating back to the 4th century AD. Rare activity-deficient periods like the Maunder Minimum, which according to Eddy et al. are related to changes in the Earth's climate, solely occur when *AL* reaches exceptional values meeting a special criterion. This is confirmed by radiocarbon data going back to the 6th millenimum BC. The next minimum in the 79-year cycle will occur in 1990. It will be more pronounced than the minimum in 1811.

Above — from *Swinging Sun, 79-Year Cycle, and Climatic Change* by T. Landscheidt from Journal of Interdisciplinary Cycle Research (1981)

Theodor Landscheidt (1927-2004) was a controversial figure within mainstream science circles. This is unsurprising as he remained throughout his lifetime a staunch critic of the highly propagandized "anthropogenic (man-made) global warming" theories promoted by Al Gore, Bill Nye, et al. His Wikipedia page curtly describes him as a "German author, astrologer and amateur climatologist".

Landscheidt is held in the highest esteem by many independent astronomers and climatologists who have noticed that our Earth's climate is correlated to the periodic fluctuations of solar activity, which themselves depend on the Sun's observed oscillations around the "center of mass of the planetary system (CM)" – to use Landscheidt's own words.

Now, as their theory goes, this observed oscillation of the Sun would be caused by the gravitational pull of the larger planets of our system (Jupiter, Saturn, Uranus, Neptune). Some say that even Mercury and Venus may be involved in this collective "solar nudging". Oddly enough, Mars – and Mars only – is never mentioned in their papers, despite Landscheidt's discovery of the Sun's peculiarly synchronistic 79-year periodicity.

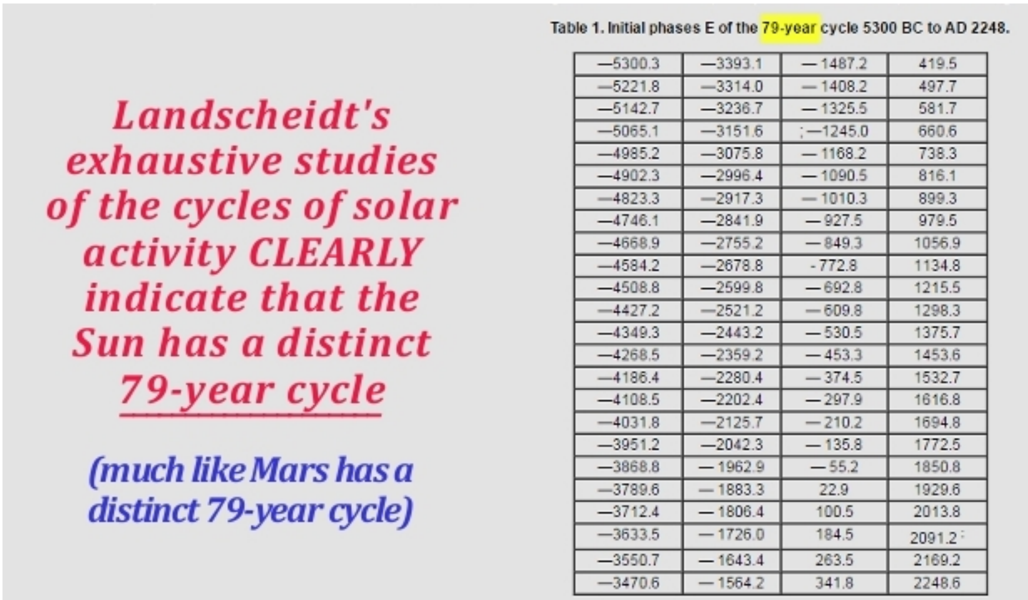


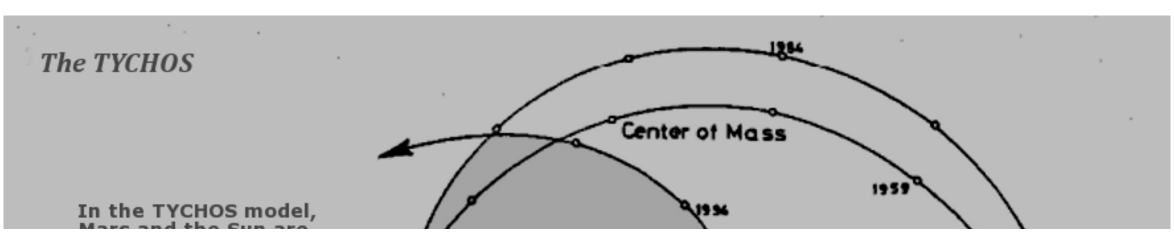
Table 1. Initial phases E of the 79-year cycle 5300 BC to AD 2248.

—5300.3	—3393.1	— 1487.2	419.5
—5221.8	—3314.0	— 1408.2	497.7
—5142.7	—3236.7	— 1325.5	581.7
—5065.1	—3151.6	;—1245.0	660.6
—4985.2	—3075.8	— 1168.2	738.3
—4902.3	—2996.4	— 1090.5	816.1
—4823.3	—2917.3	— 1010.3	899.3
—4746.1	—2841.9	— 927.5	979.5
—4668.9	—2755.2	— 849.3	1056.9
—4584.2	—2678.8	- 772.8	1134.8
—4508.8	—2599.8	— 692.8	1215.5
—4427.2	—2521.2	— 609.8	1298.3
—4349.3	—2443.2	— 530.5	1375.7
—4268.5	—2359.2	— 453.3	1453.6
—4186.4	—2280.4	— 374.5	1532.7
—4108.5	—2202.4	— 297.9	1616.8
—4031.8	—2125.7	— 210.2	1694.8
—3951.2	—2042.3	— 135.8	1772.5
—3868.8	— 1962.9	— 55.2	1850.8
—3789.6	— 1883.3	22.9	1929.6
—3712.4	— 1806.4	100.5	2013.8
—3633.5	— 1726.0	184.5	2091.2
—3550.7	— 1643.4	263.5	2169.2
—3470.6	— 1564.2	341.8	2248.6

Interestingly, Landscheidt also points out in his above-linked study that the Sun's nucleus and CM (center of mass)

> *"can come close together [return to the same place in space] as in 1951 and 1990 [within a ca. 39.5-year period]"*

Landscheidt's study features the below, well-known diagram plotting the Sun's observed oscillation around its own CM. I have borrowed and modified his diagram to highlight the fact that the Sun's CM returns to the same place in approximately 39.5 years. Since the Sun and Mars are locked in a 2:1 orbital ratio, it would stand to reason that the Sun exhibits a 39.5-year period of its barycentric wobble, while Mars exhibits a 79-year (39.5 X 2) orbital cycle. Much as the Sun revolves twice for every Mars revolution, the Sun's center of mass revolves twice for every 79-year cycle of Mars.



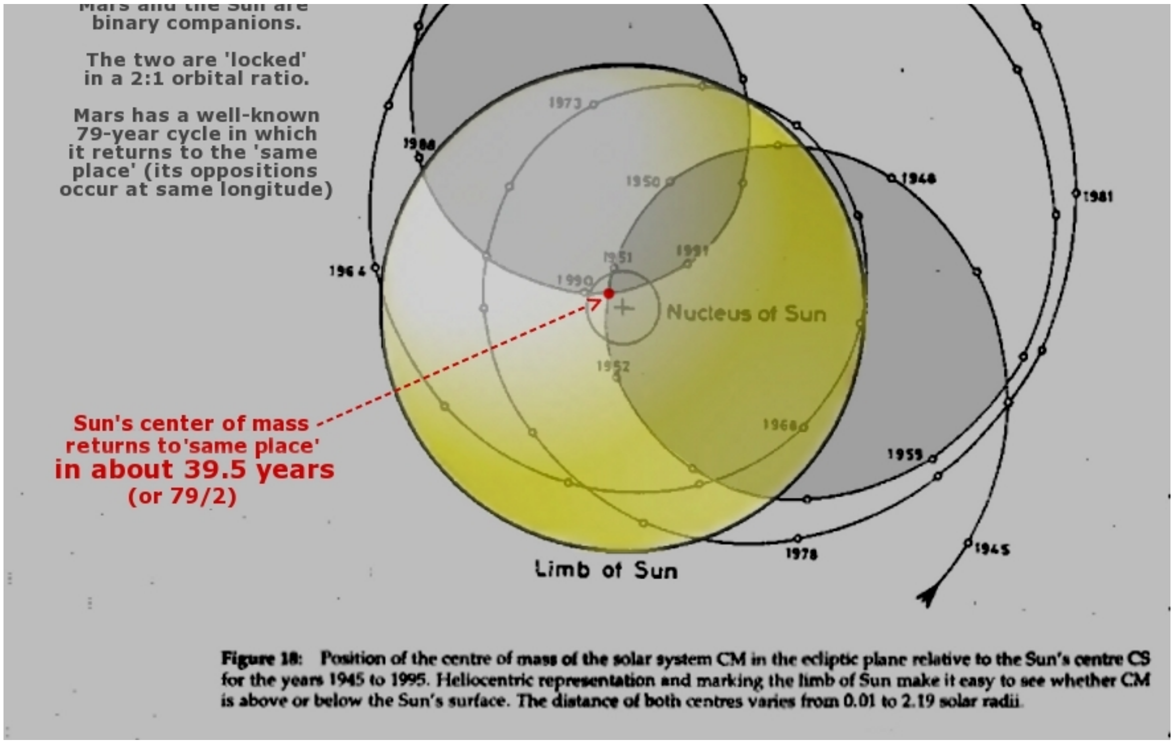


Figure 18: Position of the centre of mass of the solar system CM in the ecliptic plane relative to the Sun's centre CS for the years 1945 to 1995. Heliocentric representation and marking the limb of Sun make it easy to see whether CM is above or below the Sun's surface. The distance of both centres varies from 0.01 to 2.19 solar radii.

Above — graphic from p. 44, *Sun-Earth-Man: a Mesh of Cosmic Oscillations* by Theodor Landscheidt (1989)

Landscheidt's caption for the graphic reads (my bolds):

> *"Master cycle of the solar system. Small circles indicate the position of the center of mass of the planetary system (CM) in the ecliptic plane relative to the Sun's center (cross) for the years 1945 to 1995. The Sun's center and CM [Center of Mass] can come close together, as in 1951 and 1990 [ed- i.e. ca. 39.5 years] or reach a distance of more than two solar radii."*

— *The Golden Section: A Cosmic Principle* by Theodor Landscheidt (1993)

Both Landscheidt's 79-year solar cycle and the apparent 39.5-year periodicity of the Sun's wobble around its CM would go to support the TYCHOS model's main contention that the Sun and Mars are a binary duo.

Other independent authors in addition to Landscheidt have also detected a peculiar "80-y / 40-y" periodicity (an approximation of the TYCHOS' 79-y / 39.5-y periodicity) in relation to the Sun's barycentric dynamics and what is described as "the solar angular momentum inversions".

> *"We apply our results in a novel theory of Sun-planets interaction that it is sensitive to Sun barycentric dynamics and found a very important effect on the Sun´s capability of storing hypothetical reservoirs of potential energy that could be released by internal flows and might be related to the solar cycle. This process (which lasts for ca. 80 yr) begins about 40 years before the solar angular momentum inversions, i.e., before Maunder Minimum, Dalton Minimum, and before the present extended minimum."*

— *Dynamical Characterization of the Last Prolonged Solar Minima*
by Rodolfo Gustavo Cionco and Rosa Hilda Compagnucci
Wolff and Patrone (2010)

Indeed, tell-tale clues pointing to a Sun-Mars binary system can be found across a wide range of cosmological studies. We shall now see how even our Main Asteroid Belt is an indication of the binary nature of our Solar System.

Previous Chapter Next Chapter

Chapter 14 — Our Asteroid belts — tangible evidence of our Sun-Mars binary system

Consider starting with this briefing on our next topic:
Wikipedia entry on "Asteroid belt"

The very existence of our so-called Main Asteroid Belt (and the more distant Kuiper belt) also lend support to the notion of the Sun and Mars being binary companions. The Main Asteroid Belt is located in the celestial region between Mars and Jupiter. Here's how it is conventionally illustrated:

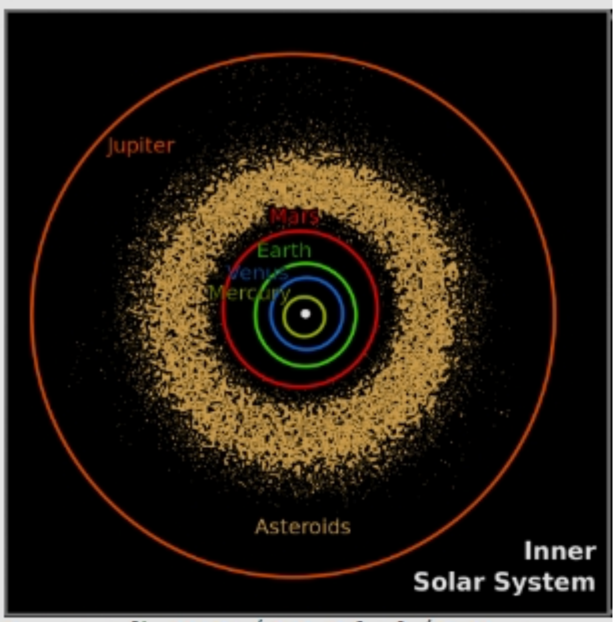


Image credit: NASA / JPL-Caltech / R. Hurt.

Above — A dense belt of dust / debris revolving between Mars and Jupiter from Wikimedia commons

No one really knows why and how this belt of dust and debris came to be in the first place. Over the centuries, explanations have been tried. For example, *"The asteroid belt is made of fragments of a much larger planet that once occupied the Mars-Jupiter region, this planet having suffered an internal explosion or a cometary impact many* *million years ago".*

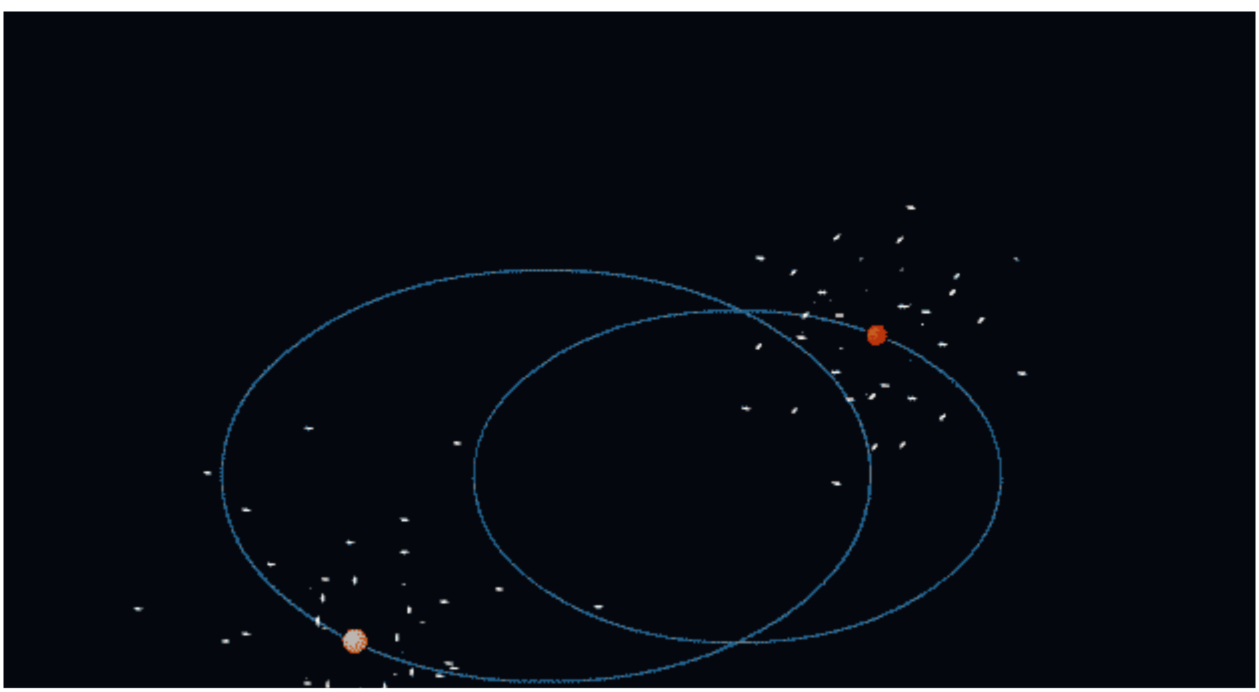
Another theory goes like this:

> *"Why does our solar system have an Asteroid Belt? One theory that astronomers have is that 4.6 billion years ago, when our solar system was being formed, a tenth planet tried to form between Mars and Jupiter. However, Jupiter's gravitational forces were too strong, so the material was unable to form a planet."*

— *Asteroid Belt*, University of Michigan Student Astronomical Society Astrophysics inreach at Cornell University (2006)

Clearly, both of these theories are nothing more than unproven conjectures. They are, after all, diametrically opposed: the first speculates that a planet did form in that region and then exploded. The second contends that no planet could ever have formed there due to the gravitational forces of Jupiter. Both fall short of describing any plausible cause and effect process that would account for the Main Asteroid Belt's formation, nor why our Main Asteroid Belt would have settled precisely between the orbits of Mars and Jupiter.

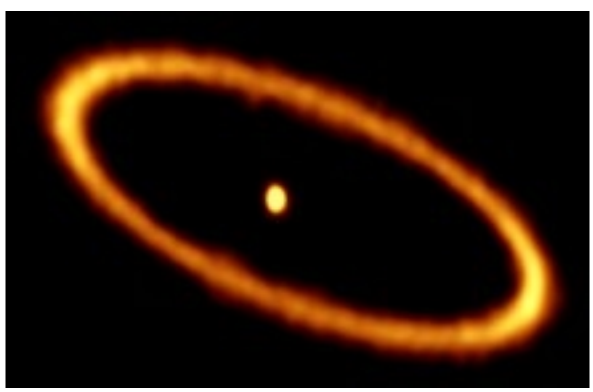
On the other hand, asteroid belts are naturally to be expected around binary systems as illustrated by this animated graphic to be found at the Binary Research Institute's website.



Above — an image from *Sheer Edge* by BRI

As two binary companions periodically cross paths along their intersecting orbits, fields of rocks, particles and debris will be ejected as they collide, to be flung into a wider, circumbinary orbit. In the case of our Sun-Mars system, it should therefore be naturally expected that our main asteroid belt should be located as is observed: just outside Mars's orbit, in the celestial region between Mars and Jupiter.

Understandably, since asteroid belts consist of very small particles, they are particularly hard to detect. Nonetheless, more and more so-called "debris discs" are continually being discovered and, sure enough, virtually all of them are found around binary systems suspected of containing one or more planets. Most notably, circumbinary debris discs have been observed around systems such as Fomalhaut, Vega, Tau Ceti, Epsilon Eridani, Beta Pictoris and Copernicus (*a.k.a.* "55 Cancri") – all of which are high on the lists of "exoplanet hunters", those modern-day astronomers specializing in the detection of possibly habitable planets outside of our solar system.



Above — "Debris disc" around binary system Fomalhaut, from Wikipedia

> *"The discovery of an asteroid belt-like band of debris around Vega makes the star similar to another observed star called Fomalhaut. The data are consistent with both stars having inner*

> *warm belts and outer cool belts separated by a gap. This architecture is similar to the asteroid and Kuiper belts in our solar system. [...] The gap between the inner and outer debris belts for Vega and Fomalhaut also proportionally corresponds to the distance between our Sun's asteroid and Kuiper belts. This distance works out to a ratio of about 1:10 with the outer belt 10 times farther away from its host star than the inner belt. As for the large gap between the two belts, it is likely there are several undetected planets, Jupiter-sized or smaller, creating a dust-free zone between the two belts."*

— *Telescopes find evidence for asteroid belt around Vega* by Jet Propulsion Laboratory (2013)

In other words, today we have empirical evidence of binary systems surrounded by both an inner and an outer asteroid belt. This is just like our own Main Asteroid belt and Kuiper belt. Even the distance between the two similar belts is proportionally similar to that of our own!

For what it's worth, the general consensus in our world's scientific arena appears to be that water was brought to Earth by asteroids. No one really knows for certain, but it is fascinating to read what is currently being theorized:

> *"FOLLOW THE WATER : More and more research suggests that asteroids delivered at least some of Earth's water. Scientists can track the origin of Earth's water by looking at the ratio of two isotopes of hydrogen, or versions of hydrogen with a different number of neutrons, that occur in nature. One is ordinary hydrogen, which has just a proton in the nucleus, and the other is deuterium, also known as 'heavy' hydrogen, which has a proton and a neutron. The ratio of deuterium to hydrogen in Earth's oceans seems to closely match that of asteroids, which are often rich in water and other elements such as carbon nitrogen, rather than comets. (Whereas asteroids are small rocky bodies that orbit the sun, comets are icy bodies sometimes called dirty snowballs that release gas and dust and are thought to be leftovers from the*

> *solar system's formation.) Scientists have also discovered opals in meteorites that originated among asteroids (they are likely pieces knocked off of asteroids). Since opals need water to form, this finding was another indication of water coming from space rocks. These two pieces of evidence would favor an asteroid origin."*

— *Where Did Earth's Water Come From?* by Jesse Emspak ("Live Science", 2016)

Now here's the funny thing: "exoplanet-hunting" astrophysicists render all sorts of computer simulations in order to assess the probability of the presence of water on planets in the Habitable Zone ("HZ") of any given star system. Their studies have concluded, in essence, that binary systems have a far higher probability (of several orders of magnitude) to contain planets harboring liquid water. This is because in a so-called single star system (such as our solar system is believed to be) there would be far less instability and fewer perturbations causing asteroids to be flung off course, to deliver their water to any given planets.

> *"Of course, this leaves the question of whether water transport via asteroids is a viable mechanism for supplying a single star planet system (like our own Earth) with liquid water. There are currently still several competing hypotheses as to how our planet obtained its water supply, but these sorts of simulations should shed light on the feasibility of water transport through impacting bodies."*

— *Flinging Asteroids into the Habitable Zone* by Anson Lam (June 23, 2015)

The above article references: *Asteroid flux towards circumprimary habitable zones in binary star systems: I. Statistical overview* by D. Bancelin, E. Pilat-Lohinger, S. Eggl, T.I. Maindl, C. Schäfer, R. Speith, R. Dvorak (June 29, 2015).

It follows that, if these academic studies are anything to go by, and if our Earth were part of a single star system, the probability of water existing on our planet would be extremely low. Yet, here we are, with about 71% of our lovely blue planet drenched in water!

In conclusion: it is today a known, observed and verified fact that asteroid belts are a distinctive attribute of binary systems. Moreover, the presence of oceanic amounts of water on Earth may indicate that we live, in all likelihood, within a binary system.

Hence, the very existence of our Main Asteroid Belt (at its peculiar location between the orbits of Mars and Jupiter) certainly appears to lend support to the fundamental premises of the TYCHOS model.

Previous Chapter Next Chapter

Chapter 15 — Our orbitally-resonant system “regulated” by our Moon

In the TYCHOS model, all the celestial bodies in our system — including the Sun and its moons — are moving synchronously together, which I attribute to a yet-unexplained orbital resonance. This peculiar and wonderful discovery is even more fascinating when it is noted that the common unit is our Moon’s true orbital period of 29.22 days.

The very fact that our little satellite – the Moon – appears to be some sort of “central driveshaft” of our entire system should, all by itself, undo the Copernican theory. It makes no conceivable sense that our Moon – which in the heliocentric model spins around Earth on its own course corrected by nothing but gravity, while the two of them supposedly revolve around their own separate orbital slots – would have such a central role in our system. Instead, if we envision our Moon as a body revolving around Earth at the center of our Sun-Mars binary system’s barycenter, then the central role of our Moon becomes a decidedly less mysterious affair.

In order to understand this spectacular discovery, please take note of these significant numbers. Our Moon, Mercury, Venus and Mars exhibit an orbital resonance pattern of:

1 : 4 : 20 : 25

1 :	Average orbital period of Moon: **29.22 days** (29.22 X **1**) – or 0.08 solar years
4 :	Average orbital period of Mercury: 116.88 days (29.22 X **4**) — or 0.32 solar years
20 :	Average orbital period of Venus: 584.4 days (29.22 X **20**) – or 1.6 solar years
25 :	Average orbital period of Mars: 730.5 days (29.22 X **25**) – or 2 solar years

This was not noticed or discovered until now, when the TYCHOS system logically "revealed" the synchronicity by sheer observation and reanalysis of the available astronomical data that I have laid out for you in this text.

As I began to account for these remarkably synchronous orbital periods, more amazing coincidences jumped out at me as if waiting to be marveled at.

For example, the average orbital period of the Sun is 365.25 days (29.22 X **12.5**) — 1 solar year

Note that: 1 + 4 + 20 + 25 = 50

Divide 50 by 4 (the number of ratios) to achieve what we may call the "average resonance" of our system and you arrive at **12.5** – the number of moon orbits that equals a solar year.

Indeed, this lunar orbital resonance rule also applies to all of our "outer" planets:

150 :	Average orbital period of Jupiter: 4383 days (29.22 X **150**) – or 12 solar years
375 :	Average orbital period of Saturn: 10,957.5days (29.22 X **375**) – or 30 solar years
1050 :	Average orbital period of Uranus: 30,681 days (29.22 X **1050**) – or 84 solar years
2062.5 :	Average orbital period of Neptune: 60,266.25 days (29.22 X **2062.5**) – or 165 solar years
3100 :	Average orbital period of Pluto: 90,582 days (29.22 X **3100**) – or 248 solar years

As we shall see, the only reason why this perfect clockwork (featuring all of our system's celestial bodies revolving at exact multiples of the Moon's true mean orbital period) has gone unnoticed by astronomers throughout the ages is, essentially, due to Earth's previously unimagined "snail-paced" motion around its own orbit. Of course, unless one is aware of this motion, all earthly determinations of the orbital periods of our system's celestial bodies will be ever-so-slightly in error. However, as it logically puts all the pieces together, the TYCHOS model gently unveils our universe's breathtaking cosmic harmony.

Previous Chapter Next Chapter

Chapter 16 — Computing the 25344-year "Great Year" in the TYCHOS

So, does the TYCHOS model stand up to scrutiny, all the way to the famed ca. 25,000-26,000 year period known as the "precession of the equinoxes" *a.k.a.* "The Great Year"? Let us first verify whether the TYCHOS model can adequately explain the celestial mechanics of our nearby planets, moons and their geometrical spatial interactions over a full, so-called "Great Year".

We know that Mars has a distinct 32-year cycle, returning to almost the same celestial place in 32 years, along with Venus, Mercury and our Moon. However, every 32 years, Mars is observed to advance (or "process") by a tiny amount. On average this amount is by ca. 10.909 minutes of RA (Right Ascension) as longer samples of multiple 32-year periods reveal. For instance, in 352 years (32y X 11), Mars will advance by 120 min. of RA.

$$120 / 11 = 10.\overline{90} \text{ minutes}$$

We may envision and define this processional motion as the secular ("long term") processional drift of Mars's orbital motion around our system.

Our full, 360° celestial sphere is divided in 1440 minutes. Since 1440 equals 360 X 4, Mars processes every 32 years by:

$$10.\overline{90} / 4 = 2.\overline{72}°$$

So, how many 32-year-periods will the orbital "rose" pattern of Mars need in order to complete a "full processional lapping" of itself?

$$360° / 2.\overline{72} = 132$$

132 X 32 years = **4224** years (or 1,542,816 days)

Mars will employ 4224 years to complete one full, 360° lapping of its own orbital path. Let's now see how many of their own orbits that the Sun, Mars, Venus, Mercury and the Moon will complete in 4224 years:

MARS	1,542,816 days / 730.5	= 2112 orbits
SUN	1,542,816 days / 365.25	= 4224 orbits
VENUS	1,542,816 days / 584.4	= 2640 orbits
MERCURY	1,542,816 days / 116.88	= 13200 orbits
JUPITER	1,542,816 days / 4383	= 352 orbits
MOON	1,542,816 days / 29.22	= 52800 orbits

As previously mentioned, the Copernically-estimated period of the so-called "precession of the equinoxes" is 25,771 years. This is the time period currently reckoned by contemporary heliocentric theory for Earth to complete its 360° equinoctial precession (*a.k.a.* "The Great Year"). So let us try and multiply our 4224-year value by 6 and see how it goes.

Why exactly by 6? I will address this further on, in Chapter 20. For now, let's see what we obtain:

4224 years X 6 = **25344** years / or 9,256,896 days

Which will correspond to:

9,256,896 days = 12672 Mars orbits (of 730.5 days)

9,256,896 days = 25344 Sun orbits (of 365.25 days)

9,256,896 days = 79200 Mercury orbits (of 116.88 days)

9,256,896 days = 15840 Venus orbits (of 584.4 days)

9,256,896 days = 2112 Jupiter orbits (of 4383 days)

9,256,896 days = 316800 Moon orbits (of 29.22 days)

Since Mars advances by 120 min. every 352 years, in 25,344 years (which equals 352 X 72) Mars will thus advance by:

120 min. X 72 = 8640 min.

Note that 8640 min. = 1440 min. X 6 (of course, 1440 min. represents our full, 360° celestial sphere)

In other words, Mars will "lap" the Sun **6 times,** every **25344 years**.

If we consider that 25344 years represents a full 360° equinoctial precession, we should now be curious to find out how long it takes for Earth's equinoctial axis to rotate (in relation to the stars) by just 1°. Here we go:

25344 / 360 = 70.4 solar years

We see that **70.4** solar years (or 25713.6 days) equals precisely:

33 <u>synodic</u> periods of Mars (779.2 days X 33 = 25713.6 days)

44 Venus orbits (584.4 days X 44 = 25713.6 days)

220 Mercury orbits (116.88 days X 220 = 25713.6 days)

880 Moon orbits (29.22 days X 880 = 25713.6 days)

It is interesting to note that in Babylonian astronomy, the "sar" cycle was an important period of 3600 years, which, when multiplied by 7.04 gets us the Tychos Great Year (TGY) length of 25344. Let us also note that 704 years (70.4 X 10) is equivalent to:

1/3rd of 2112 years

1/6th of 4224 years

1/36th of 25344 years

We can now compute Earth's "equinoctial procession rate" as of the TYCHOS system. If Earth's equinoxes process by 1° every 70.4 years, then every century (100 years) they process by:

$$100 / 70.4 = 1.420\overline{45}°$$
or
$$5113.\overline{63} \text{ arc seconds}$$

In 25344 years, there are 253.44 centuries. In fact, 253.44 X $1.420\overline{45}$° = 360°

Hence, our annual “precession rate of Earth’s equinoxes” is:

5113.6363 / 100 = $51.1\overline{36}$ arc seconds*

Note that $51.1\overline{36}$ X 25344 equals exactly 1,296,000 arc seconds (which, of course, is equivalent to one full 360° circle).

Therefore, in several ways, we arrive at the conclusion that the Great Year is a cyclical “return” for not just Earth but the entire system.

In the following chapters, we shall see that this $51.1\overline{36}$” value is an all-important parameter of the TYCHOS model, since it reflects the amount by which Earth moves each year as it slowly revolves around its 25,344-year “PVP” orbit at the tranquil speed of 1 mph.

Henceforth I will refer to these $51.1\overline{36}$” arc seconds as our “Annual Constant of Precession” (or “ACP”).

NOTE: Official astronomical estimates have the stars’ annual precession rate at 50.29 arcsecs and their Great Year duration at 25771 solar years. Both these values are about 1.68% “off” the TYCHOS-computed values of $51.1\overline{36}$ arcsecs and 25344 solar years. The cause of this discrepancy is duly addressed and illustrated in Chapter 24.

Chapter 17 — Our Cosmic Clockwork and the “16 factor”

In 16 solar years (or 5844 days):

The SUN
completes **16** orbits (1 solar revolution = 365.25 days)

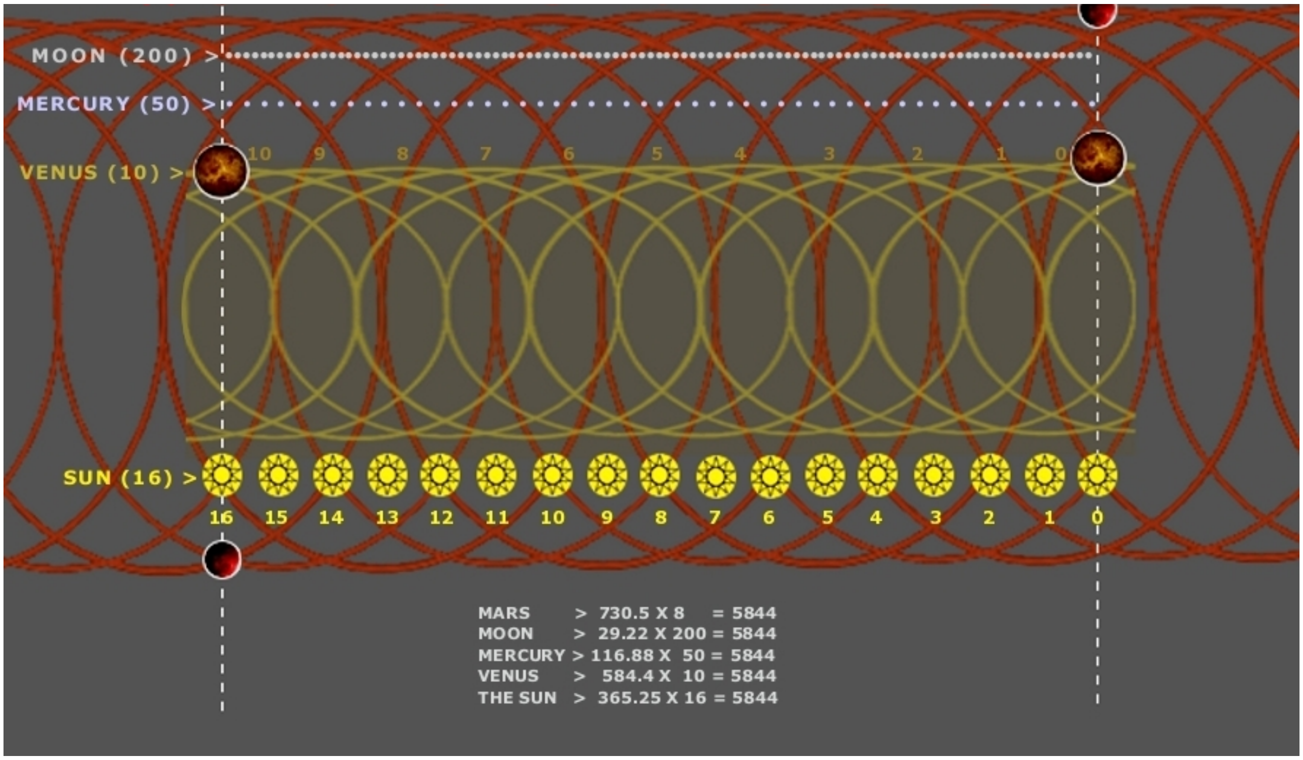
MARS
completes **8** orbits (1 Mars revolution = 730.5 solar days)

VENUS
completes **10** synodic periods (1 Venus synodic period = 584.4 solar days)

MERCURY
completes **50** synodic periods (1 Mercury synodic period = 116.88 solar days)

Our MOON
completes **200** orbits around Earth (1 Moon TMSP = 29.22 solar days)

The below schematic plots the relative revolution periods (over a 16-year time span) of the Sun, Mars, Mercury, Venus and our Moon. Note that the orbital periods of our system’s celestial bodies are all exact multiples of the Moon’s “True Mean Synodic Period” (The TMSP of 29.22 days) a most significant period which will be elucidated in more detail further on.



This diagram is, of course, not showing any actual planetary motions / trajectories; it is only a conceptual way of illustrating the relative orbital ratios of the celestial bodies composing our "cosmic clockwork".

I have chosen this 16-year time span to illustrate our system's relative motions for a reason: it would appear that the 16 factor is, for some reason, a pervasive feature of our system.

For instance, Mars completes a full "aphelion-to-perihelion" revolution around our system in 16 years (and in another 16 years, it returns almost exactly to its original position). Our Moon completes one Saros cycle every 16 full moon cycles as well.

The ubiquitous 16 factor extends as far as the very long time scales used in geology. Without going into geological considerations (which is beyond the present scope of this treatise), the peculiar time period of 405,000 (+/- 500y) years is being widely used in geochronology, as it is held to be a particularly steady and significant "geological metronome" of sorts. Note the following examples.

> *"Long term calculations of Earth's orbital eccentricity show that the component averaging 405,000 years is very steady and can be used to date geological formations for the last 23 million years".*

— from a discussion on geological cycles at the Thunderbolts.info forum

> *"Only a few modeled planetary motions are stable enough for use as a metronome, for example, the 405-kyr orbital eccentricity cycle arising from the interaction of the secular frequencies g2-g5. Model stability studies by Laskar et al. (2004) suggest that the uncertainty of the ATS using this term alone will be at most only 0.1% at 100 Ma, and 0.2% at 250 Ma."*

— *Precision and Accuracy of the ATS*, Earth Time (2006)

> *"Milankovitch cycles identified in sedimentary successions are being used to formulate an 'Astronomical Time Scale' (ATS) for the geologic record, with efforts well underway for the Cenozoic and Mesozoic eras. Back through time, however, ATS resolving power declines due to uncertainties in the orbital solutions and Earth precession model. Prior to 50 Ma, only the modeled 405-kyr orbital eccentricity cycle retains high accuracy, leading to the idea for a '405-kyr metronome' to define the ATS for all geologic time. Radioisotope geochronology now offers a 2 sigma dating precision of 0.1%, which for Paleozoic time equates to an uncertainty on the order of 0.3 to 0.5 myr, i.e., comparable to the 405-kyr metronome resolution."*

— *A Survey of Paleozoic Cyclostratigraphy presentation* by Linda A. Hinnov, George Mason University for The Geological Society of America (GSA) Conference 2017

Further reading on the 405,000 year geological cycle may be found in papers such as:

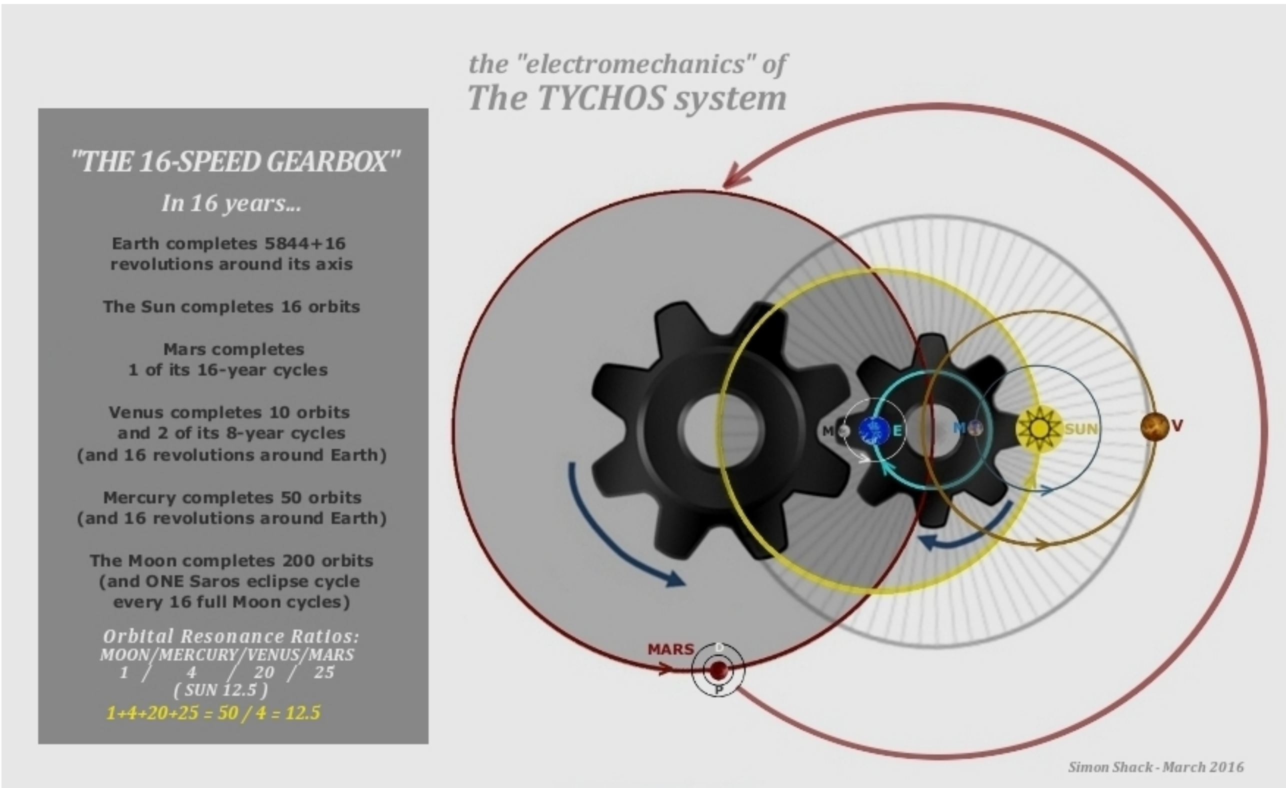
Time-calibrated Milankovitch cycles for the late Permian by Huaichun Wu, Shihong Zhang, Linda A. Hinnov, Ganqing Jiang, Qinglai Feng, Haiyan Li & Tianshui Yang (13 September 2013) for Nature Communications volume 4

Hunting for the 405-kyr eccentricity cycle phase at the Cretaceous-Paleogene boundary in the Aïn Settara section (Kalaat Senan, central Tunisia) by Michel Hennebert (May 21, 2012)

In any case, if we divide 405,500 (the higher bound of that mean value) by the number of years in our TYCHOS Great Year we obtain:

405,500 / 25,344 ≈ 15.9998 (or practically **16**!)

Here follows a conceptual graphic of the TYCHOS system I made while musing over the “mechanics” of our binary system:



Needless to say, the two cogs in my above graphic are just a figurative “thought exercise”. The big cog may represent, if you will, the combined magnetic fields of Sun and Mars exerting a “magnetic torque” on the smaller cog (Earth’s own magnetic field of opposed polarity), thus perhaps being responsible for Earth revolving in a clockwise/opposed direction to that of its companions. This is just a speculative electromagnetic musing of mine as to what may possibly go to explain Earth’s peculiar retrograde orbital motion.

In past decades, astronomers hunting for Earth-like exoplanets have discovered several planets nestled within binary systems featuring retrograde orbits – meaning that they revolve in the opposite direction of their host star.

> *“Astronomers have discovered nine new transiting exoplanets. Surprisingly, six out of a larger sample of 27 were found to be*

> *orbiting in the opposite direction to the rotation of their host star — the exact reverse of what is seen in our own solar system. […'\]The new results really challenge the conventional wisdom that planets should always orbit in the same direction as their stars spin,' says Andrew Cameron of the University of St Andrews, who presented the new results at the RAS National Astronomy Meeting (NAM2010) in Glasgow this week."*

— *Turning planetary theory upside down: Nine new exoplanets found, some with retrograde orbits* by ESO (2010)

These discoveries led the science community to a massive rethink of their models of planetary formation:

> *"In just two decades, we have gone from knowing one planetary system (our own) to thousands, with 3268 exoplanets now known. This has driven a massive rethink of our models of planetary formation. […] Then came another set of shocking discoveries. Rather than moving in the same plane as their host star's equator, some Hot Jupiters turned out to have highly tilted orbits. Some even move on retrograde orbits, in the opposite direction to their star's rotation."*

— *Stars with planets on strange orbits: what's going on?* by Brett Addison and Jonti Horner (2016)

Thus, Earth's "retrograde" clockwise orbital motion is not overly exceptional, since it has been empirically observed that several other binary systems feature bodies revolving in the opposed orbital direction of their host stars.

We shall now take a close look at what is generally known as the "precession of the equinoxes" and move on from there to illustrate Earth's PVP ("Polaris-Vega-Polaris") orbit, the name I have given to my proposed, snail-paced 25344-year orbit of planet Earth.

Previous Chapter Next Chapter

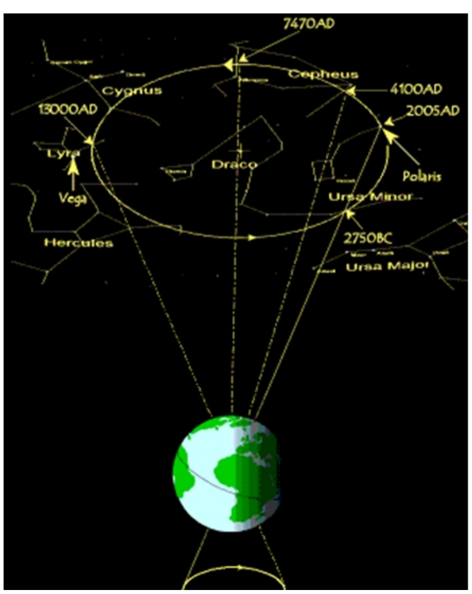
Chapter 18 — Requiem for the “Lunisolar Wobble” theory

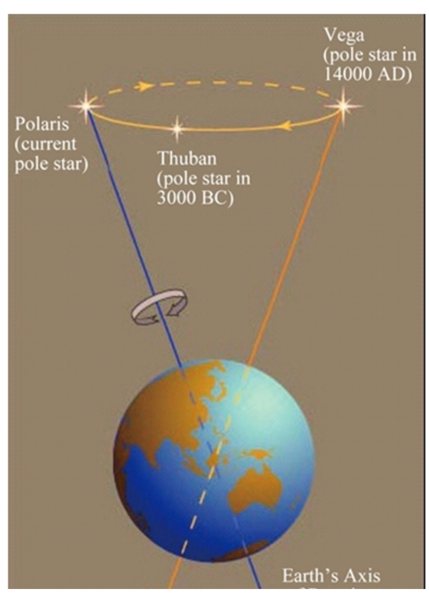
Does Earth’s polar axis wobble? Is Earth’s so-called “Third Motion” a tenable theory? Not a chance in Heaven. Let us see why.

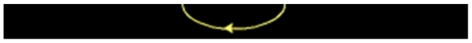
According to the Copernican “Lunisolar” theory, Earth’s “equinoctial precession” is caused by a slow clockwise wobble of Earth’s polar axis, completing one full 360° “reverse” rotation in about 26,000 years or so.

A “retrograde / clockwise wobble”? That’s right. We are told that Earth’s polar axis wobbles very slowly, over centuries, and that this spin proceeds in the opposed direction of Earth’s daily rotation and revolution. Supposedly, this reverse rotation of Earth would be caused by assorted *“gravitational forces generated by the Moon and the Sun (hence “Luni/Solar”) and the other planets in our Solar System”*.

Over time, this axial wobble would, as the theory goes, gradually shift our visual orientation towards our Pole Stars. To be sure, the so-called Lunisolar theory is still today firmly upheld by academia as an established scientific fact. This is in spite of the numerous, glaring problems afflicting its fundamental tenets (as conclusively demonstrated in later years by a number of independent authors).







Conventional illustrations of the so-called "Lunisolar wobble"

Above left — *Precession of the Equinoxes*
by Roy Taylor (December 1, 2008)

Above right — *Orbital Spin: A New Hypothesis to Explain Precession of Equinox—The Third Motion of Earth*
by Rama Chandra Murthy Mothe (2014)

This is also known as the "Third Motion of Earth" – the other two being its 24-hour counter-clockwise rotation around its axis and its ostensible revolution around the Sun. This presumed wobble is directly contradicted by observation. Yet, it always was an essential prerequisite for the Copernican theory's very survival, since it was meant to account for the fact that the stars are observed to precess (or "drift Eastwards" in relation to Earth's equinoctial axis) by about 50 arcseconds per year.

However, this Copernican excuse simply doesn't hold up to close scrutiny. The so-called "Precession Paradox" is best summarized in this fine paper by Walter Cruttenden, whose Binary Research Institute has done sterling work at demonstrating, point-by-point, the untenable tenets of the so-called "Lunisolar" theory:

> *"Precession only occurs relative to objects outside the solar system – the Earth does not precess or change orientation relative to objects within the solar system."*

— p.8, *Comparison of Precession Theories: An Argument for the Binary Mode* by Walter Cruttenden (August 12, 2003)

Cruttenden (and a number of other independent authors) have struck a mortal blow to the Lunisolar theory. It has, by now, been thoroughly demonstrated that the so-called "Third Motion of Earth" cannot possibly account for the observed equinoctial precession in relation to the starry background. Hence, as incredible as it may seem, the famed "precession of the equinoxes" remains to this day a wide-open question: it is a cosmic mystery still awaiting for a rational, scientific explanation.

Here follow some quotes and links to papers exposing the insurmountable problems with the Lunisolar wobble theory.

> *"Lunisolar wobble required the pole to move by about one degree every 71.5 years based on the current precession rate, hence the pole should have moved about 6 degrees since the Gregorian Calendar change (420 years ago), thereby causing the equinox to drift about 5.9 days. This has not happened; the equinox is stable in time after making leap adjustments."*

— *Understanding Precession of the Equinox* by Walter Cruttenden and Vince Dayes (2001)

> *"When Earth spins on its axis in West to East direction (Anti clockwise) it is natural that North Pole of the axis moves in the same direction. It is how North Pole can describe a circle of precession about star Polaris in a clockwise direction opposite to the natural rotation of North Pole of the axis conspicuously that remains unexplained. The hypothesis of Earth's wobble does not explain above contradiction. Hence, the hypothetical proposition that the retrograde motion of North Pole is due to Earth's wobble is not credible."*

— *Orbital Spin: A New Hypothesis to Explain Precession of Equinox—The Third Motion of Earth* by Rama Chandra Murthy Mothe (2014)

> *"If the slow wobble of Earth's axis causes the precession of the equinoxes, it is a product of shifting perspective and should affect everything we view from Earth. Some astronomers argue that objects within our solar system do not appear to precess. Only objects outside of the solar system do. If this is the case, then the Earth's wobble cannot be the cause of precessional movement."*

— p.40, *Our Sun: Biography of a Star* by Christopher Cooper (2013)

> *"The Earth's changing orientation to inertial space (as required by any binary orbit of our Sun), can be seen as Precession of the Equinox. This fact has been masked by the illusion called the*

> *lunisolar explanation for precession."*

— [*Understanding Precession of the Equinox: Evidence our Sun is part of a Long Cycle Binary Star System*] by Walter Cruttenden and Vince Dayes (2003)

> *"In summary, a number of independent groups, all studying the same problem of lunisolar mechanics have concluded that precession is most likely caused by something other than a local wobbling of the Earth."*

— p.2, *Comparison of Precession Theories: An Argument for the Binary Mode* by Walter Cruttenden (August 12, 2003)

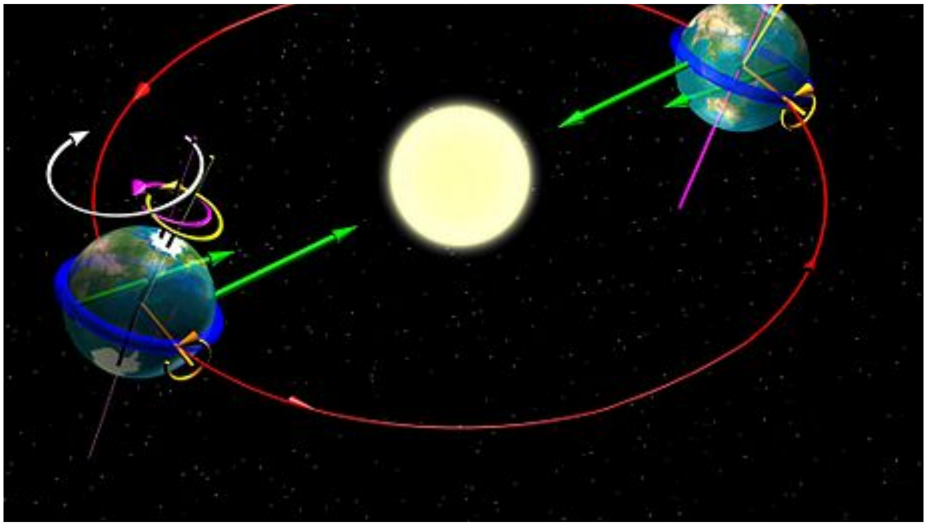
Tycho Brahe rightly predicted that the "triple motion" of Earth, as proposed by Copernicus, would be refuted.

> *"The Copernican system, [Tycho Brahe] proclaimed, with its 'triple motion of the earth will be unquestionably refuted, not simply theologically and physically, but even mathematically, even though Copernicus hoped that he had proposed to mathematicians sufficiently mathematical statements to which they could not object'."*

— *Tycho Brahe's critique of Copernicus and the Copernican system* by Ann Blair, Journal of the History of Ideas 51(3): 355-377 (1990)

It is ironic that Copernicus is often hailed as the man who "simplified" and "elegantly resolved" the complex riddle of our cosmic motions, while the models of Ptolemy and Brahe were dismissed as *too complex* just because, according to some critics, they required too many different motions of our solar system's bodies.

Here is a graphic (from this Italian Wikipedia page) illustrating those "elegant" earthly motions that the Copernican theory requires:



Note that the white clockwise arrows represent the so-called “Lunisolar precession”, while the other arrows represent all the other motions piled onto Earth to explain (or avoid explaining?) the true motions of our system. Enough to make you dizzy, is it not? One can only wonder why the Copernican “Lunisolar” theory was accepted by the world’s scientific community in the first place, and how it can possibly have remained unquestioned and unchallenged for so many centuries.

Most people will be familiar with the old Occam’s-razor-inspired adage that states that *“the simplest explanation for some phenomenon is more likely to be accurate than more complicated explanations.”* Evidently, such elementary wisdom was lost on the proponents of Copernicus’s heliocentric theory. Indeed, the idea of Earth slowly wobbling around its polar axis in the opposed direction of its very rotation doesn’t conform to any physical phenomenon known to humankind.

As we shall see, the TYCHOS model requires no more than two terrestrial motions:

1. Earth’s (“anticlockwise”) daily rotation around its polar axis

2. Earth’s (“clockwise”) 1 mph-motion around its “PVP” orbit

Previous Chapter

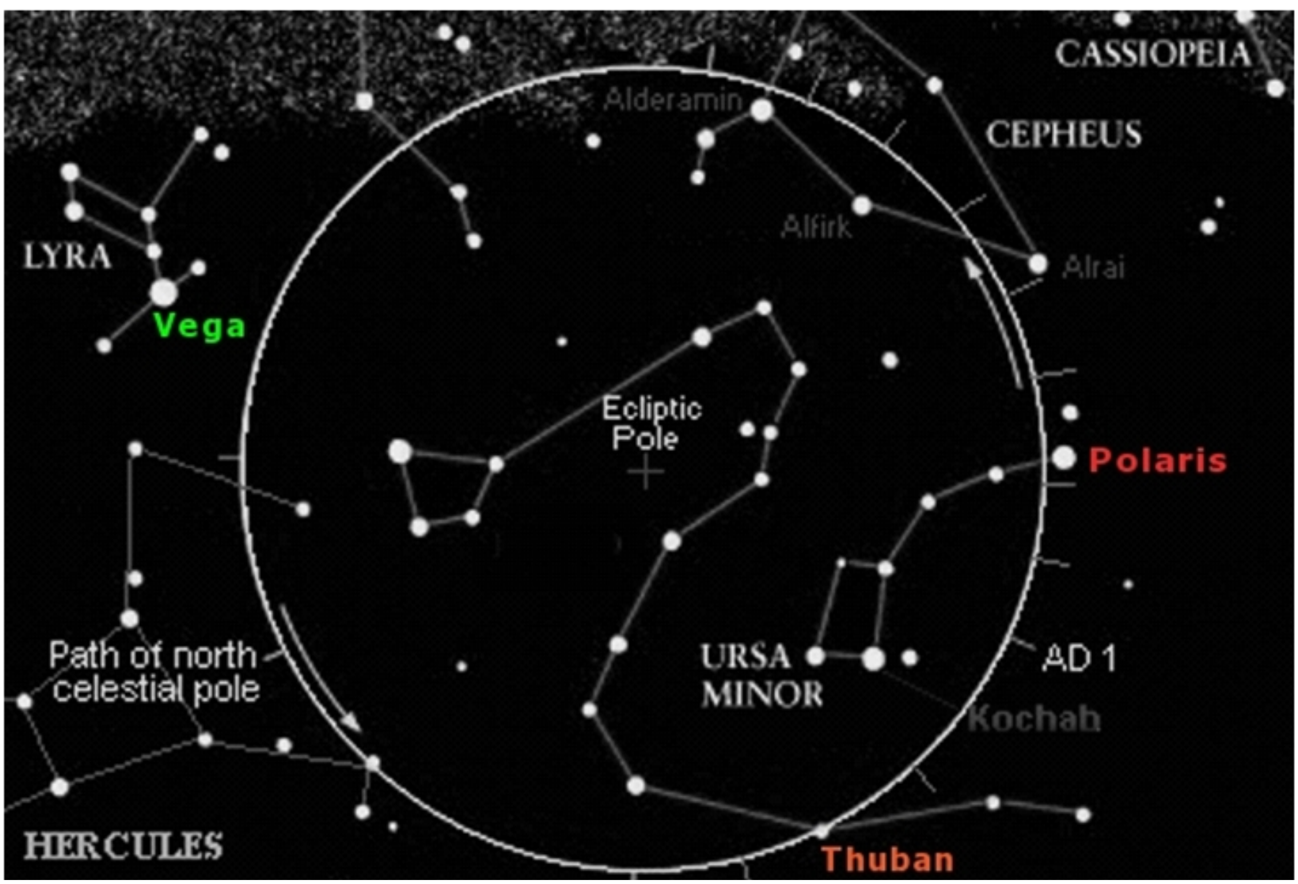
Next Chapter

Chapter 19 — Earth's Polaris-Vega-Polaris (PVP) orbit

We shall now proceed to see how the TYCHOS model can account for the "precession of the equinoxes".

If, as posited by the TYCHOS, Earth does not wobble around its polar axis, it follows that we need to explain how and why our Pole Stars keep changing over the centuries. The binary star Thuban, for instance, was our "North star" roughly 4800 years ago. About 10,800 years from now, the binary star Vega will become our "North star". In our current epoch, the triple-binary star Polaris is our "North star".

Here is a classic illustration (well-known to astronomers) plotting the circular motion responsible for our "North Stars" to change over time, thought by some to be caused by that "Lunisolar wobble". Note that, if viewed from above our North Pole, this circular motion proceeds in a clockwise direction.

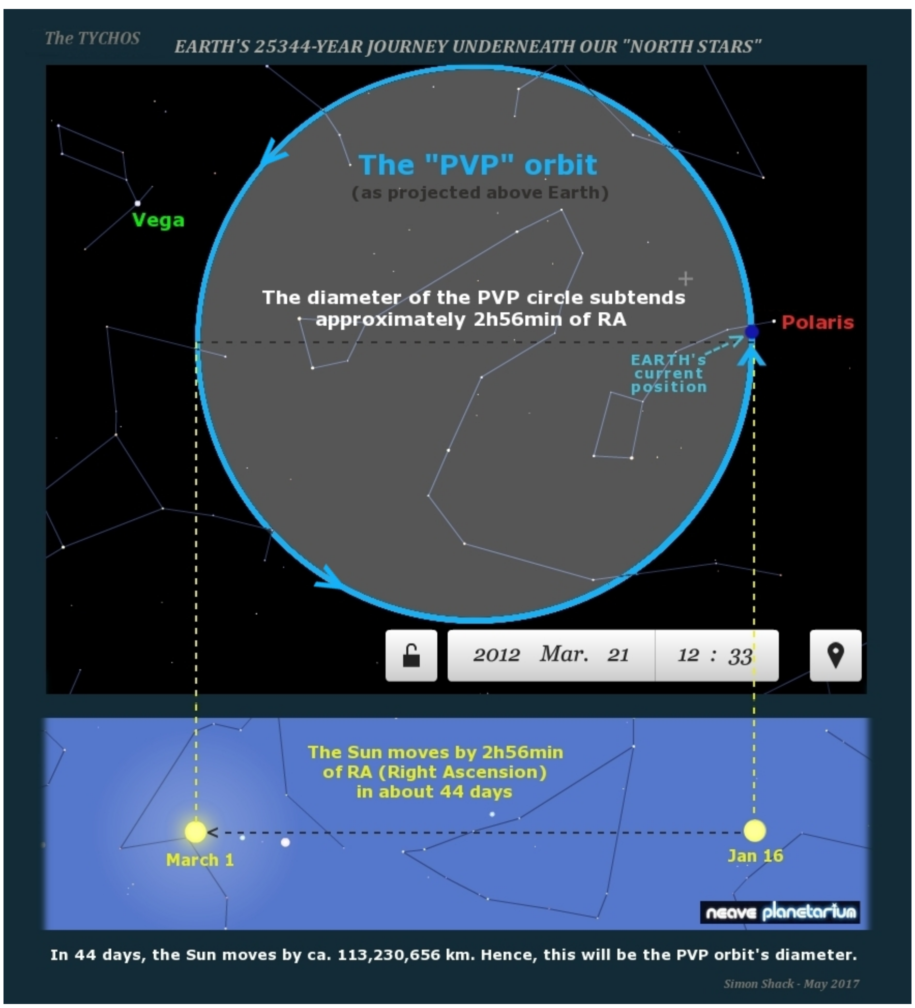


Above — from *Professor Mahoney's Astronomy Website* by Robert Mahoney (2016)

Now, if Earth doesn't wobble, could it instead be *physically* moving clockwise (as seen from our North stars) below the circular path which extends from Polaris to Vega, and back again to Polaris? Surely, this wouldn't be too much of a fanciful proposition; after all, everything else moves in a circular orbit.

Let us put this proposition to the test and see if we can find out at what speed the Earth would travel (as it completes this 360° journey) around a circle which I have called **the PVP orbit (Polaris-Vega-Polaris)**. To do so, we will first need to estimate the diameter of our orbit. My next graphic illustrates the methodology behind my determination of this diameter.

The PVP orbit — Earth's path below our North Stars



Perusing the NEAVE Planetarium, we can see that the Sun (as it moves around our 360° celestial sphere) covers a distance subtending 2 hours 56 minutes of RA (Right Ascension) in 44 days or 1056 hours. We can therefore perform a simple calculation to establish the diameter of our PVP orbit. Assuming the Sun travels at 107,226 km/h, in 1056 hours the Sun would cover the distance of:

107,226 km/h X 1056h = **113,230,656 km**
The diameter of our PVP orbit

The circumference of Earth's orbit from these reliable figures will be:

113,230,656 km X π ≈ **355,724,597 km**
The circumference of our PVP orbit

There are 8766 hours in 365.25 days. Therefore, 25344 years will add up to:

25344 X 8766 hours = **222,165,504 hours**

Now that we know how many hours that Earth will need to cover the distance of 355,724,597 km (the PVP orbit's circumference), we may compute Earth's orbital speed:

355,724,597 km / 222,165,504 hours ≈ **1.601169** km/h or approximately **1 mph** !
(1 mph = 1.609344 km)

That's right: **1 mph. Or about 1.6 km/h.** This is Earth's proposed orbital speed in the TYCHOS model.

"By Jove! Could our dear old Mother Earth be tranquilly strolling around at window-shopping pace?"

My very first thoughts – soon after computing Earth's languid speed around its PVP orbit – was the following: has all of life on Earth, perhaps, been facilitated by this sluggish, snail-paced motion of our planet? Could this exceptional slowness graced to Earth (almost, one imagines, "stuck" at the barycenter of the Sun-Mars binary system) be a key prerequisite, along with water, photosynthesis, etc., for biological life as we know it to blossom on *any* given planet? Moreover, isn't this serene situation enjoyed by our planet rather reminiscent of a ship gently circling around the calm zone in the eye of a cyclone? And do not the slow winds in the eye of a storm tend to circle in the opposed direction of the cyclone itself, much like Earth would do in the TYCHOS model?

For now though, let's leave my philosophical musings aside and proceed to put our posited orbital speed of Earth (1.6 km/h or 1 mph) to the test — in methodical fashion. As we proceed one step at the time, we shall see that Earth's 1-mph-motion around its PVP orbit effectively resolves, one by one, all of the extant mysteries (or "known unknowns") of our neighboring cosmos (*a.k.a.* our Solar System).

Those familiar with the infamous Michelson-Morley experiment, billed as the most failed scientific experiment of all time, may begin to sense that the TYCHOS model might yet vindicate the same. The experiment's objective was to try and measure Earth's velocity across space (or through the "aether", a universal medium in which all things are situated in absolute space). Of course, the expected speed of Earth was something in the region of 107,000 km/h, yet nothing of the sort was found. Instead, to everyone's surprise, Michelson (et al) only detected some minuscule "near-zero" (or perhaps even "negative") velocity. Here is what we may read in astronomy literature:

> The relative velocity of the earth to the ether again seemed to be zero, in conflict with Lorentz's theory. By this time, Michelson had become more cautious in interpreting his data and even thought of the possibility that the solar system as a whole might have moved in the opposite direction to the earth; therefore he decided to repeat the experiment 'at intervals of three months and thus avoid all uncertainty'.[3] Michelson, in his second paper, does not talk any more about 'necessary conclusions' and 'direct contradictions'. He only thinks that from his experiment 'it appears, from all that precedes, *reasonably certain* that if there be any relative motion between the earth and the luminiferous ether, it must be *small*; quite small enough entirely to refute *Fresnel*'s explanation of aberration'.[4] Thus in this paper Michelson still claims to have refuted Fresnel's theory (and also Lor-

Above — Extract from p.74, *The Methodology of Scientific Research Programmes: Philosophical Papers Volume 1 (Book 1)* by Imre Lakatos, Cambridge University Press (November 28, 1980)

As you can see, not only did Michelson conclude that Earth's speed had to be quite small, but he even *"thought of the possibility that the solar system as a whole might have moved in the opposite direction to the Earth"*. In hindsight, both of those assertions would seem to be congruent with the TYCHOS model 's proposed, snail-paced 1-mph motion of Earth, as it moves in the "opposite" direction of our solar system. In any event, the many successive similar interferometer experiments performed by numerous other scientists all failed to detect speeds anywhere near the presumed orbital speed of Earth (107,226 km/h or 30 km/sec). The speeds detected, if any, were deemed to be so small as to be "negligible" and were thus dismissed as probable instrument errors. Otherwise, they were deemed to be null or, in any event, completely invalid as proof for Earth's supposed hypersonic speed.

Now, if Earth moves at the leisurely speed of 1.601169 km/h, in 365.25 days (i.e. 8766 hours), it will travel by:

1.601169 km/h X 8766 hours ≈ **14,035.847 km**
or roughly 14,036 km (the annual distance covered by Earth)

Note this **estimate** (used in subsequent chapters) will be accurate enough to prove the accuracy of the TYCHOS model.

Relative Sizes of Earth and Sun Orbits

Earth's orbital PVP circumference is approximately 2.6X smaller than the Sun's orbit circumference. More exactly:

939,943,910 km / 355,724,597 km ≈ **2.642336** X smaller

We can now verify how many orbits the Sun should complete as Earth completes one "PVP" orbit. In the TYCHOS, of course, it is the Sun that travels at the orbital speed of 107.226 km/h. Dividing the Sun's orbital speed with the orbital speed of Earth, we get this value for a "factor":

107,226 km/h / 1.601169 km/h ≈ 66,967.3

Ergo, the Sun travels circa **66,967.3 X** faster than Earth.

Now, supposing that the Sun were circling around Earth's smaller PVP orbit, it would complete ca. 66,967.3 orbits in the same time that Earth (moving at 1.6 km/h – or 1 mph) would complete a single orbit. However, since the Sun isn't circling Earth's PVP orbit, but around its own solar orbit (which is 2.642336 X larger), we divide this factor with the Earth-Sun orbital size difference – so as to reconfirm the number of solar orbits that the Sun will complete when Earth completes a single orbit:

$$66{,}967.3 / 2.642336 \approx 25{,}344$$

Ergo, as Earth completes 1 orbit in the PVP, the Sun will complete 25344 solar orbits.

Note that we have now found the 25344-year value for the Great Year via a wholly separate avenue than that of our previous method, which was a reasoned induction based on the cycles of Mars, Venus, Mercury and the Moon, and their orbital resonances.

Some SUN data (as of the TYCHOS model):

The Sun employs ca. 365.25 days to complete one revolution around its orbit.

In circa 365.22 days, it “meets up” again with Earth which has then moved forward by 14,036 km.

The Sun completes 25344 solar orbits in 25344 years.

Circumference of Sun’s orbit:

$$\text{Ø } 299{,}193{,}439 \text{ X } \pi \approx 939{,}943{,}910 \text{ km}$$

Orbital speed: 107,226.09057723020762035135751768 km/h

Estimated daily distance:

$$107{,}226.0906 \text{ km/h X } 24\text{h} \approx 2{,}573{,}426 \text{ km}$$

Estimated annual distance:

$$107{,}226.0906 \text{ km/h X } 8766 \text{ h} \approx 939{,}943{,}910 \text{ km}$$

Some EARTH data (as of the TYCHOS model):

Earth employs 25344 years to complete one revolution around its PVP orbit.

It is located at the (slowly rotating) barycentre of the Sun/Mars binary system.

Circumference of Earth's orbit:

Ø 113,230,656 X π ≈ 355,724,597 km

Estimated orbital speed: 1.601169 km/h (or 0.9949197 mph – *i.e.;* nearly 1 mph)

Estimated daily distance:

1.601169 km X 24 h ≈ 38.428 km

Estimated annual distance:

1.601169 km/h X 8766 h ≈ 14,036 km

Ratio of EARTH's orbital speed versus SUN's orbital speed :

1.601169 km/h is no more than **0.00149326%** of 107,226 km/h

I will henceforth refer to this **0.00149326** value as our **PVP CONSTANT**.

The Importance of the PVP Constant

As we will see further on, this PVP CONSTANT will prove invaluable as we proceed, putting the TYCHOS model to the test. We now have a value constituting a relative speed ratio between the Sun and Earth. Thus, we may finally put to rest that age-old dilemma: *"orbital speed in relation to what object / frame of reference?"*

We can now work with an empirically testable Sun-Earth velocity ratio. To be sure, that is not the same as stating (as current theory does) that, *"The Sun hurtles around* *the galaxy at 800.000 km/h, along with all of our system's planets – while Earth revolves around the Sun at 107.226 km/h."* in the absence of any observational indication in support of such hypersonic speeds. One may well say that these outlandish orbital speeds upheld by Copernican theorists have been an offense to human intelligence all along, since this would mean our entire system travels in excess of 7 billion km each year while the stars hardly appear to move at all.

Previous Chapter Next Chapter

Chapter 20 — Verifying Earth’s proposed orbital diameter

At this point, you might be asking if the proposed diameter of Earth’s PVP orbit (113.2 Mkm) is in any way verifiable. Do we have any supportive data or indications that might help corroborate this value? So far, you have only read my position that the 113.2 Mkm figure is based on Earth’s assumed, physical circular motion underneath our slowly alternating North stars.

I will use some well-known relative astronomical distances in order to verify whether they may provide any sort of indications in support of my posited diameter.

Note: Further on, I will expound on my consideration that the currently accepted distances between the celestial bodies of our own system are essentially correct, while the claimed stellar distances are not.

To begin, please visualize the following dimensions.

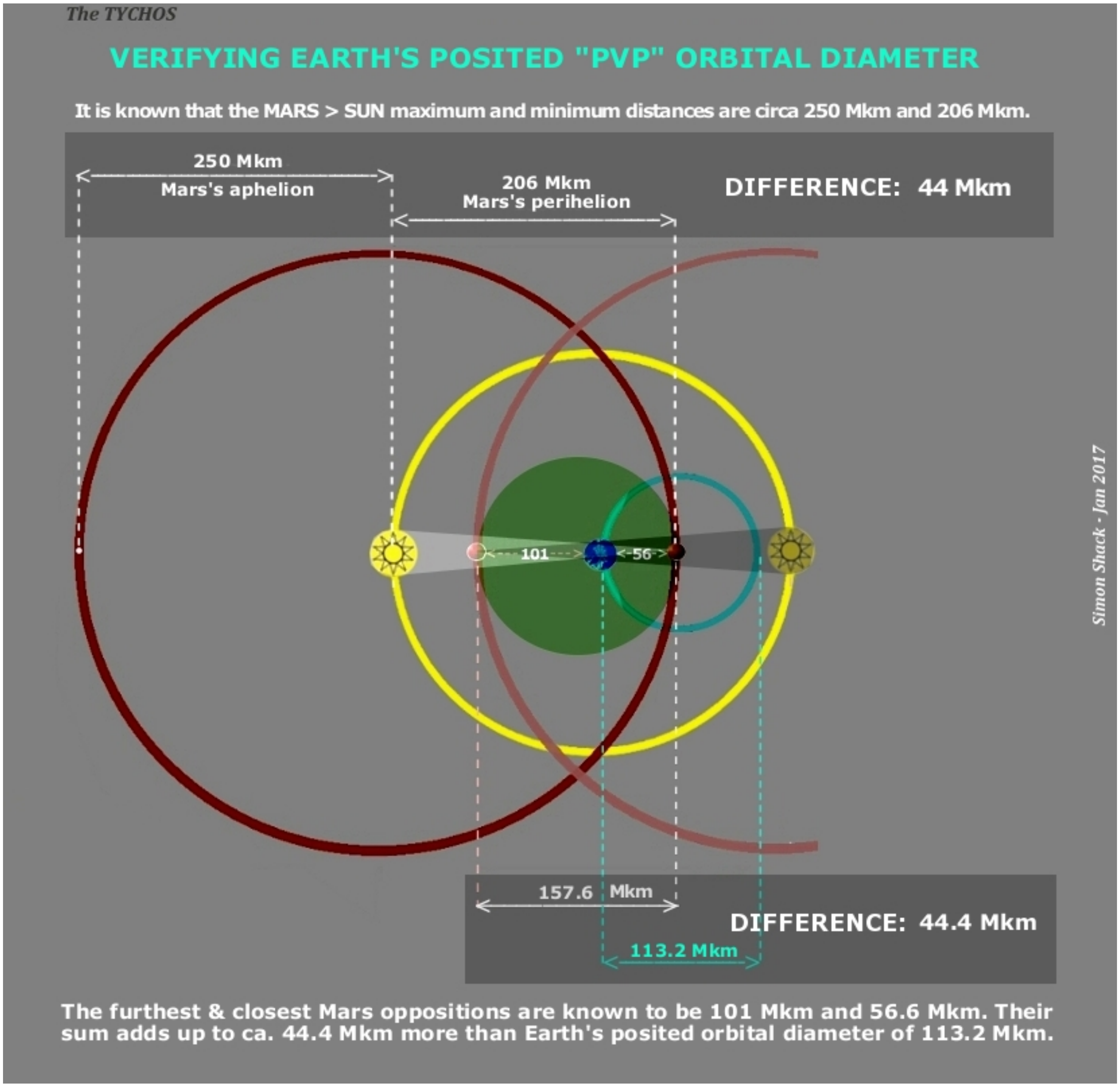
First, the difference between Mars’s aphelion and perihelion is calculated:

250 Mkm – 206 Mkm = 44 Mkm

Secondly, the difference between Mars’s (combined) furthest & closest oppositions and the PVP orbit:

157.6Mkm – 113.2 Mkm = 44.4 Mkm

In other words, the known and widely accepted Mars-to-Sun & Mars-to-Earth distances appear to be telling us – by virtue of their observed dimensions – that the unknown value we are looking for (the diameter of Earth’s orbit) can be found to be a very plausible 113.2 Mkm. Here is an illustration to help you visualize the significance of and results of this calculation.



Moreover, with the help of the above graphic, we may now make some further interesting considerations.

Remember: my postulated diameter of the PVP orbit is more precisely 113.2**3** Million kilometers.

If we divide this value by 2, we get:

113.23 / 2 = **56.615 Mkm**

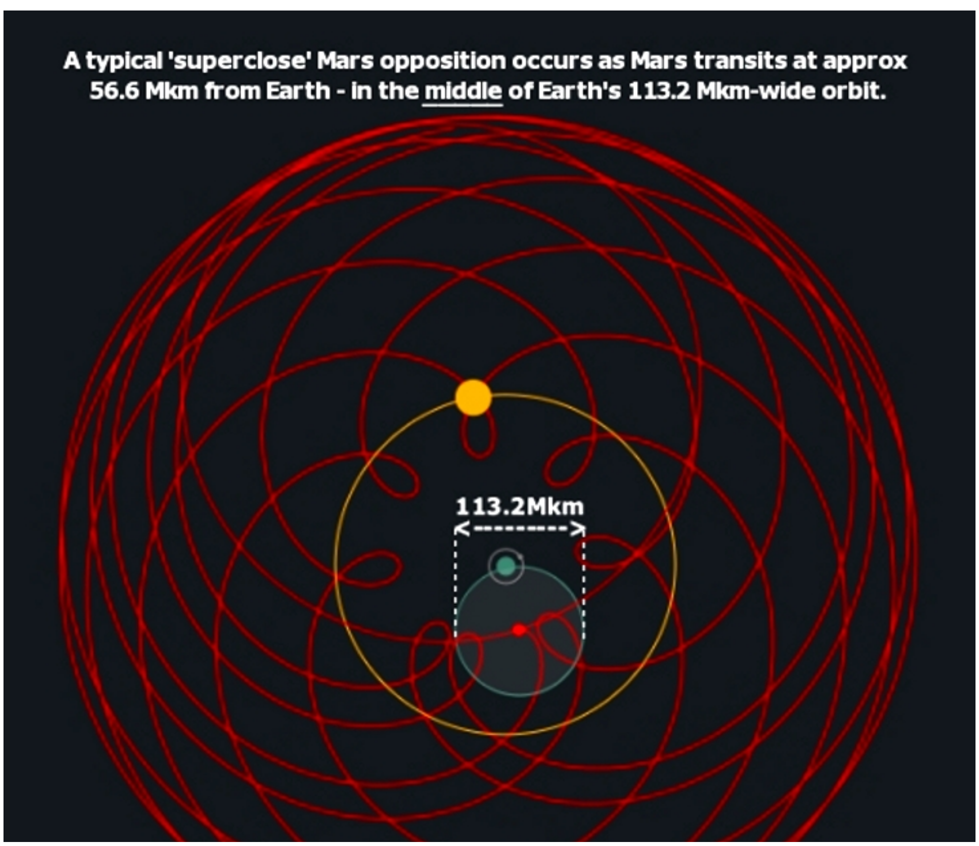
As we saw earlier on, Mars will transit at its closest distance from Earth – in so-called “opposition” – every 15 or 17 years (see the “79 years of Mars” chart in Chapter 6). If we take the five closest Mars transits in 79 years (between the year 1956 and the year 2035) to obtain a mean, here is what we find:

1956 Sep 10	:	56.56 Mkm
1971 Aug 10	:	56.20 Mkm
2003 Aug 28	:	55.76 Mkm
2018 July 27	:	57.59 Mkm
2035 Sep 15	:	56.91 Mkm

The average closest Mars opposition transit in the above 79-year sample:

283.02 Mkm / 5 = **56.604 Mkm**

This 56.604 value is, you may agree, close to 56.615 Mkm. So why is this significant? Well, it clearly seems to indicate that the closest Mars oppositions occur, on average, "smack in the middle" (within mere thousands of kilometers) of Earth's 113.23 Mkm-wide PVP orbit. **Mars regularly transits through the secular center of our system.** To a hypothetical observer hovering above our North Pole, this center will only become apparent over the course of 25344 years (or one Great Year).



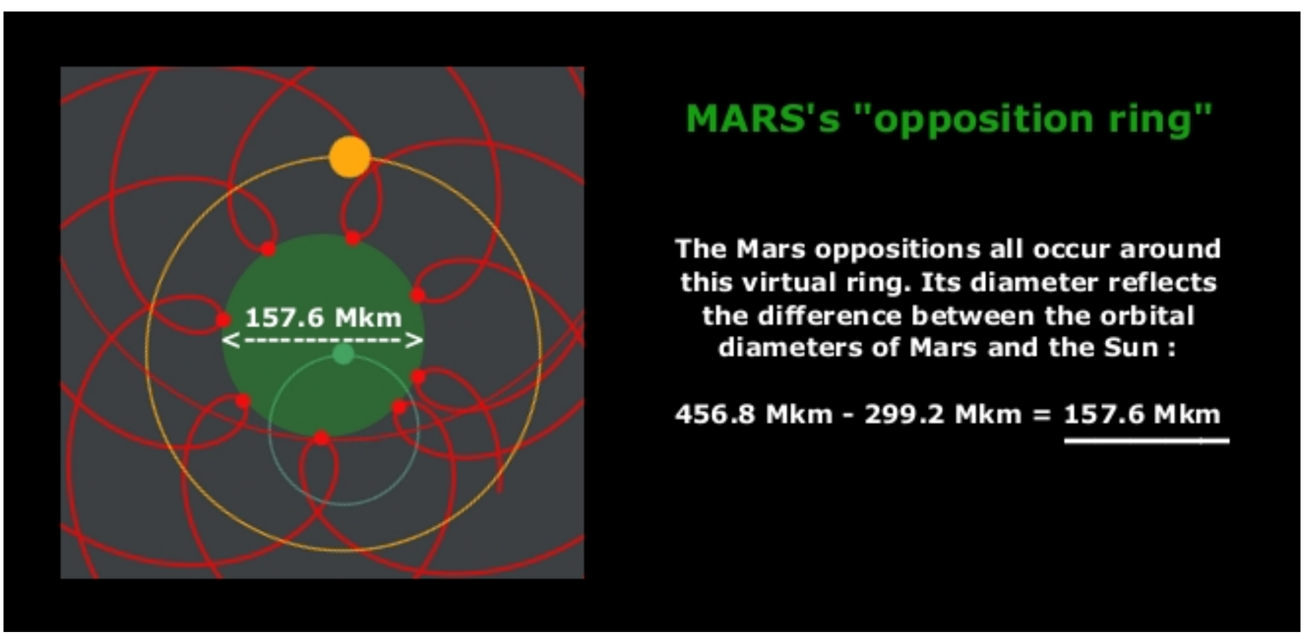
In other words, if you ask me, *"What does Earth circle around? What exactly is at the very center of our system?"*, my answer would be: **"Nothing! Except Mars likes to pay it a visit now and then."** Having said that, it would probably still be correct to state that Earth is located at or near the barycenter of our system. Further study is needed with respect to this particular issue.

The Wondrous "6" Factor

As we saw in Chapter 6 the average diameter of Mars's "opposition ring" (157.6 Mkm) reflects the difference between the diameters of the respective orbits of Mars and the Sun.

456.8 Mkm – 299.2 Mkm = 157.6 Mkm.

Note that the difference between Earth's orbit (113.2 Mkm) and Mars's "opposition ring" (157.6 Mkm) is approx. 44.4 Mkm. The observed difference between Mars's closer and further oppositions (56.6Mkm versus 101 Mkm) is also, on average, approximately 44.4 Mkm.



Once more, however, the *very closest* Mars can get to Earth is about 55.7 Mkm (as it did on August 28, 2003) and the furthest oppositions occur at about 101 Mkm. Thus, one may also say that Mars's "opposition ring" has a slightly smaller diameter of 156.7 Mkm (55.7 + 101 ≈ 156.7).

Now, if we divide the Sun's orbital circumference by **6**, we wondrously obtain:

939,943,910km / **6** ≈ **156,657,318 km** (or very nearly 156.7 Mkm).

Ergo, the Sun's orbital circumference is near-exactly **6** X the diameter of Mars's "opposition ring"! Our system seems to be resonating "around" very whole numbers.

The Sun covers the distance of 156,657,318 km in **60.875** days which is, in fact, 1/**6th** of 365.25 days.

365.25 / 60.875 = **6**

And this factor reappears in a number of curious ways. As we also saw earlier, our entire solar system rotates by 1° every 70.4 years (70.4 X 360 ≈ 25344 y) and Mars needs 4224 years (*i.e.;* 704 years X **6**) to complete one "lapping" of its own orbit.

The Sun needs **6 times** as much time to do so:
4224 X **6** = 25344.

This is confirmed by the empirically-observable fact that Mars's orbit processes around the system by $12.\overline{\mathbf{27}}$ min. of RA every 36 years.

25344 y = 36 y X 704

This means that Mars's orbit will process, in one Great Year, by:

$12.\overline{27}$ min. X 704 ≈ 8640 min.
or
6 X 1440 min. (*i.e.;* 6 times our celestial sphere!)

In Chapter 16, we also saw that Mars advances by $2.\overline{72}$° every 32 years. This translates to $9818.\overline{18}$ arcseconds per 32 years, or $306.\overline{81}$ arcseconds **each year**. If we now divide this value by **6**, we obtain:

$$306.\overline{81} \,/\, \mathbf{6} = 51.1\overline{36}$$

Note that this value is our all-important **Annual Constant of Precession** (henceforth, ACP).

Ergo, Mars’s **procession rate** is exactly **6 X** that of the Sun. But there’s more.

MARS VS. MOON

The orbital diameter of Mars (456,800,000km) is almost precisely 600 X the orbital diameter of our Moon (763,095 km):

$$456{,}800{,}000 \text{ km} \,/\, 600 = 761{,}333.\overline{33} \text{ km}$$

The difference is only about 1762 km, which is approximately 1/2 of the diameter of the Moon itself (3476 km).

MARS VS. JUPITER

One orbit of Mars is completed in two years. One Jupiter orbit is completed in 6X two years (12 years).

Curiously, even Kepler was fascinated by this recurrent hexagonal leitmotiv to be found in nature.

> *“’There must be a cause why snowflakes have the shape of a six-cornered starlet,’ Kepler wrote in De nive sexangula. ‘It cannot be chance. Why always six?’”*

— *In retrospect: On the Six-Cornered Snowflake by Philip Ball* (21 December 2011) for *Nature* 480, 455

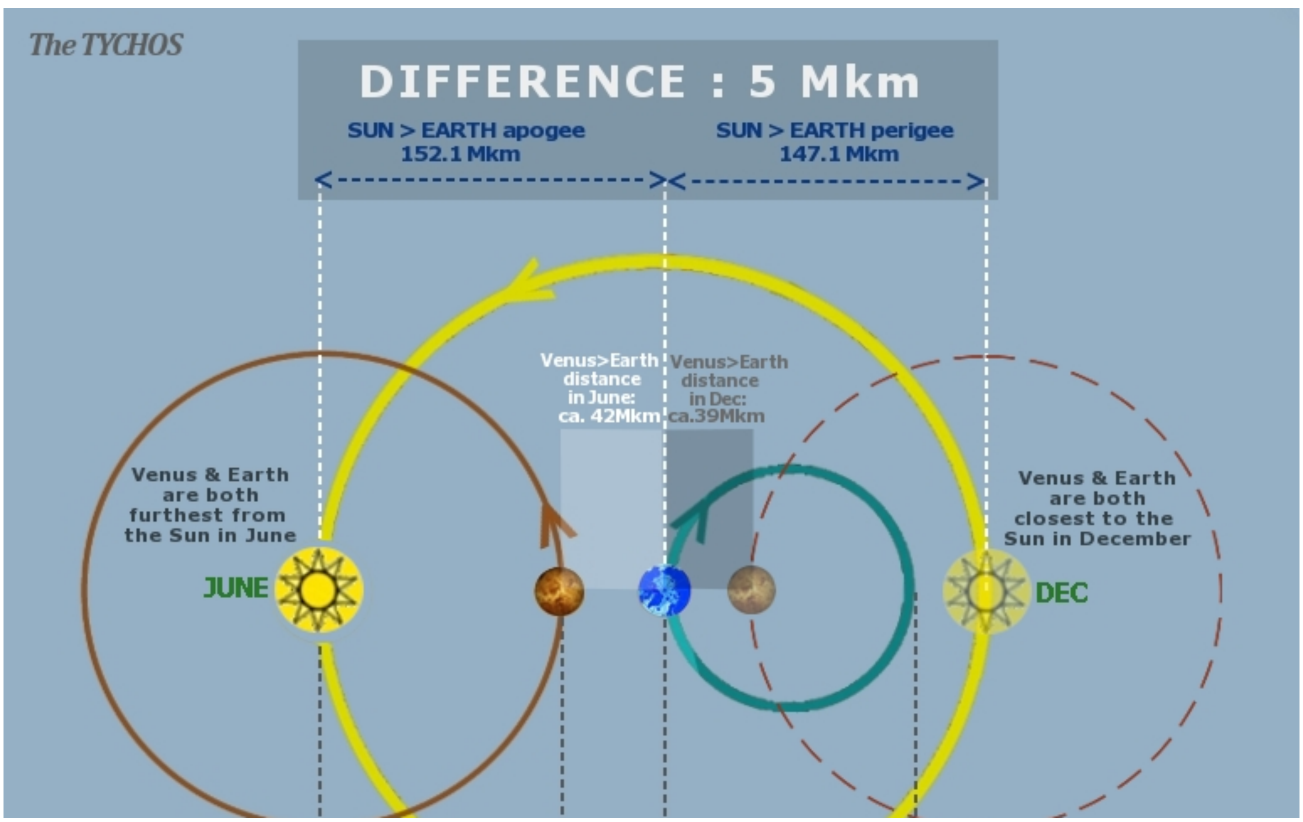
Might a contributing factor also be the total of the internal angles of a hexagon is 720° (2 X 360°) thus reflecting the fact that we live in a binary system ruled by the Sun and Mars, whose circular motions interact at a 2:1 ratio? You may read some interesting things about hexagons in their Wikipedia entry.

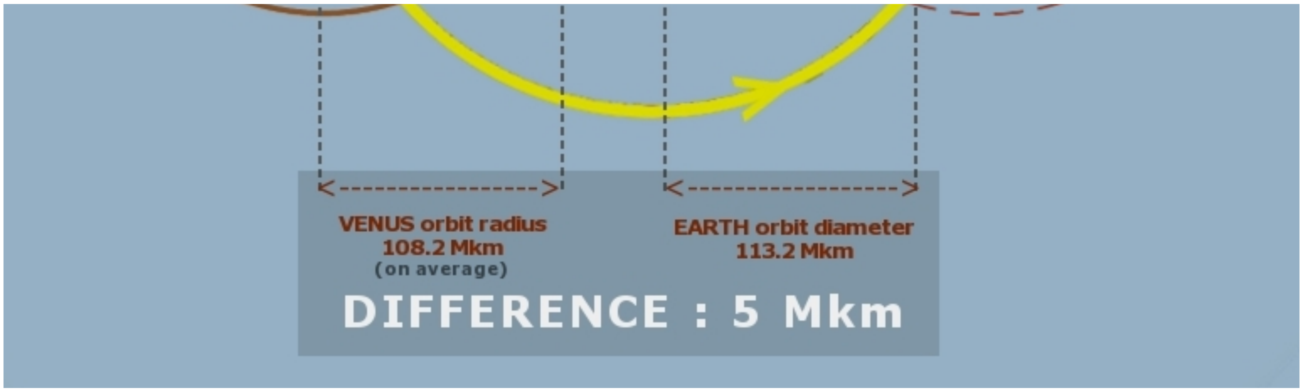
We may note that molecular structures also theoretically group up in numbers, and there may be some common principles between the micro and macro worlds, which the TYCHOS system helps to unlock or shed light upon. I will leave the complex topic there for now, with hope that it inspires future research, and continue with the description of our cosmos.

Venus also supports Earth's proposed 113.2 Mkm orbit

We shall now see that Venus provides us with further indications, not only in support of our posited 113.2-Mkm-diameter of Earth's PVP orbit — but also of Venus being a moon of the Sun. Let me describe what exactly my below graphic illustrates:

> The difference between the known Earth-to-Sun maximum and minimum distances (152.1 Mkm versus 147.1 Mkm) is **5 Mkm**.
>
> The difference between 108.2 Mkm (the radius of Venus' orbit) and 113.2 Mkm (my postulated Ø of Earth's orbit) is also **5 Mkm**.





Thus, we see that this well-known 5 Mkm difference between the Sun's apogee and perigee (152.1 Mkm versus 147.1 Mkm) reflects the difference between Venus's mean orbital radius (108.2 Mkm) and Earth's posited orbital diameter in the TYCHOS (113.2 Mkm).

All in all, we may now be reasonably satisfied with our estimated value of our Earth's orbit. It appears to be proportionally and relatively congruent with the known orbital dimensions of the Sun, Mars and Venus *in addition to* their observed positional fluctuations. Surely, for all of these mutually-consonant distances to be entirely coincidental would be beyond extraordinary. It is therefore plausible that Earth's orbital diameter is 113,230,000 km as posited by the TYCHOS model.

Previous Chapter Next Chapter

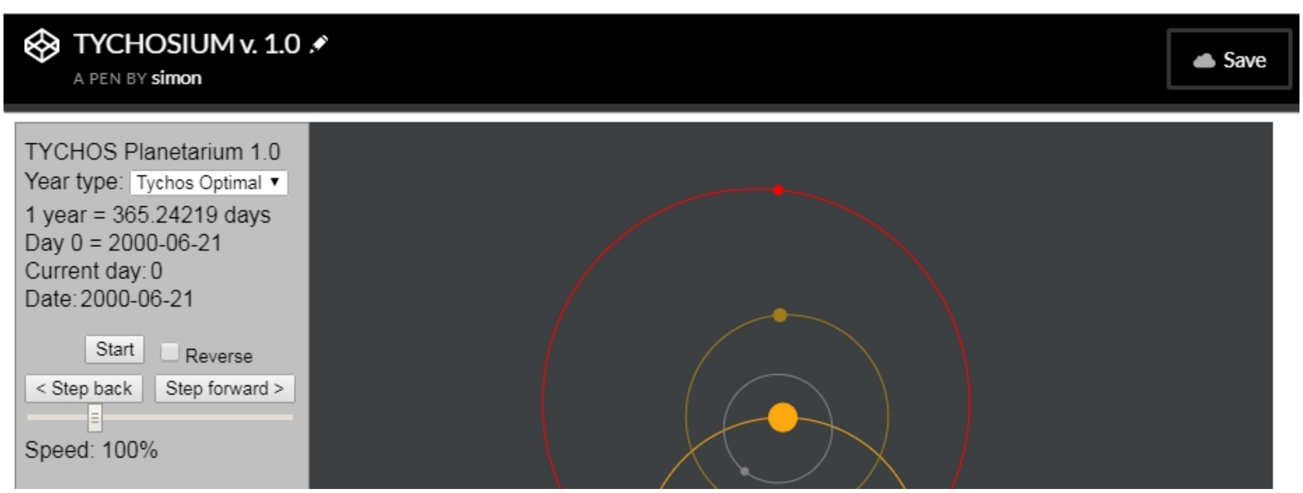
Chapter 21 — About the TYCHOS Planetarium — or "Tychosium"

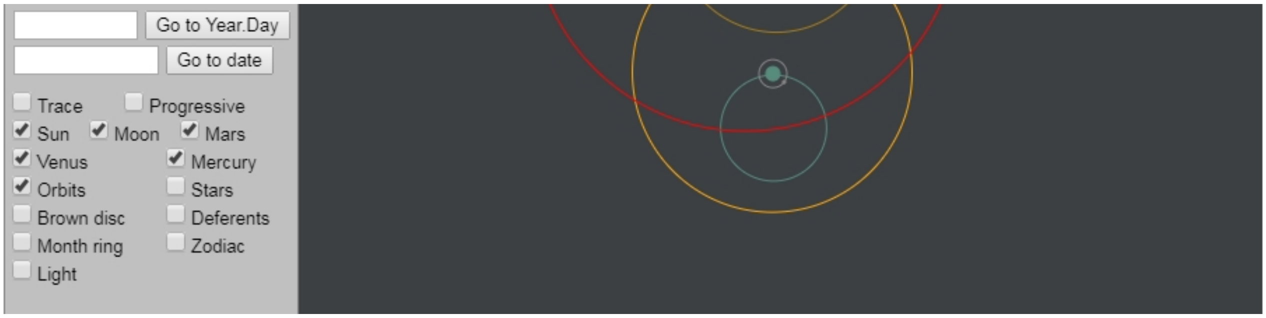
I vividly encourage everyone to peruse and get familiar with the TYCHOSIUM 3D interactive planetarium. It can safely be asserted that it is currently the ***only*** existing planetarium fully consistent with astronomical observations and physical reality.

View the Tychosium 3-D

The interactive TYCHOS PLANETARIUM — henceforth, the **"Tychosium"** — was conceived around the TYCHOS model's principles in mid-2017 and gradually came to life by the end of that year. It is a joint effort by yours truly and Patrik Holmqvist, a Swedish IT programmer I had the good fortune to meet in the summer of 2017. We are both satisfied that the Tychosium 2-D that resulted from our collaboration represents the most accurate digital simulator ever devised of our "Solar System" which, as the TYCHOS model has determined, is a binary system similar to most (or perhaps ALL) of our surrounding star systems. The Tychosium 2-D conforms to all our known and verifiable real-world principles of physics, optics and geometry known on Earth, unlike those proposed by the otherworldly and unphysical Copernican model.

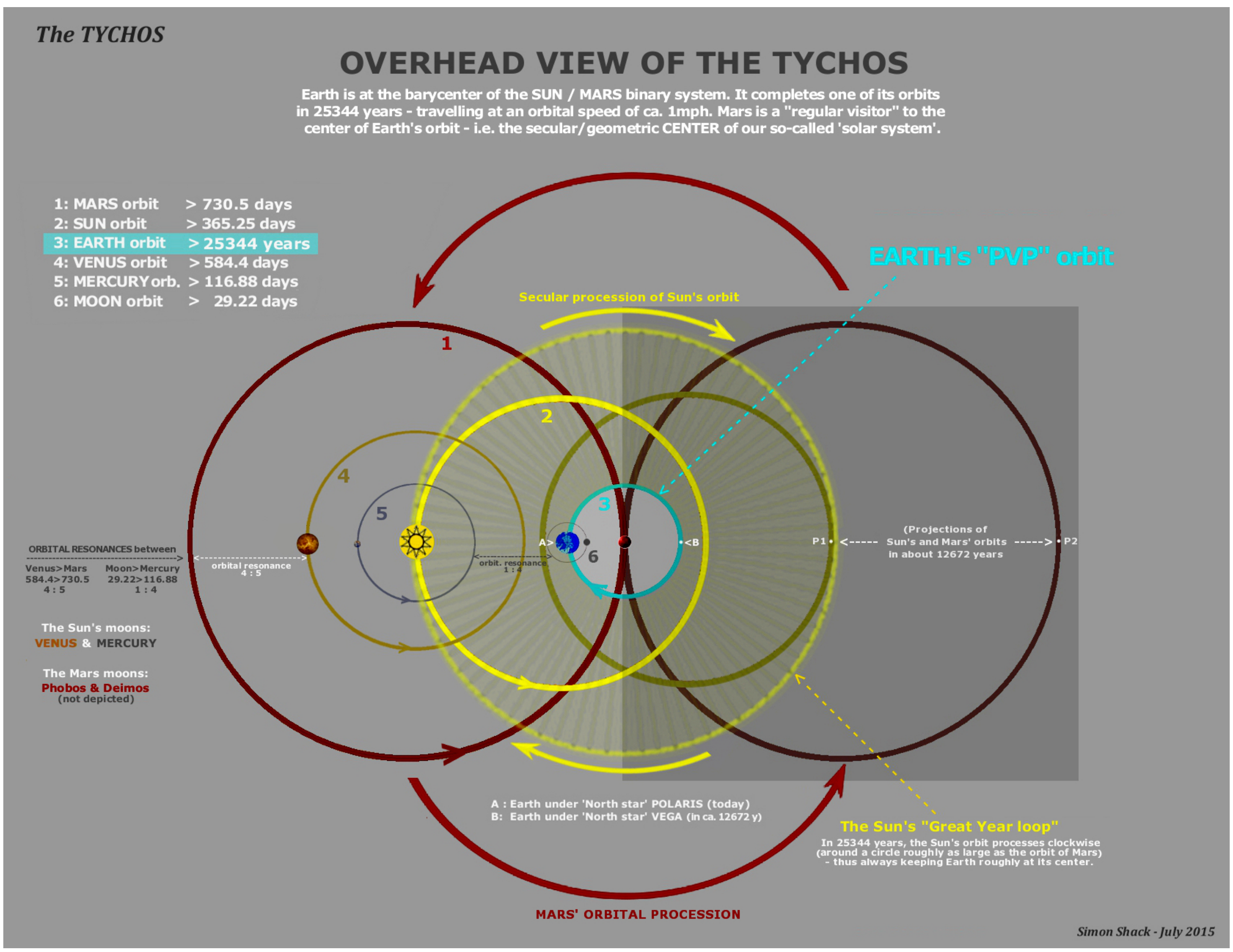
Here is a screenshot of the first working version of the Tychosium 2-D which was completed in early 2018:





Please [click here](#) to interact with the program

Back in 2015, as I attempted to visualize the basic orbital structure of my nascent TYCHOS model, I tentatively composed the below graphic as a way of clarifying for myself how exactly our system's bodies would interact over a Great Year of 25344 years. The early, tentative graphic has nonetheless held the test of time and cross-verification, well beyond my wildest expectations.



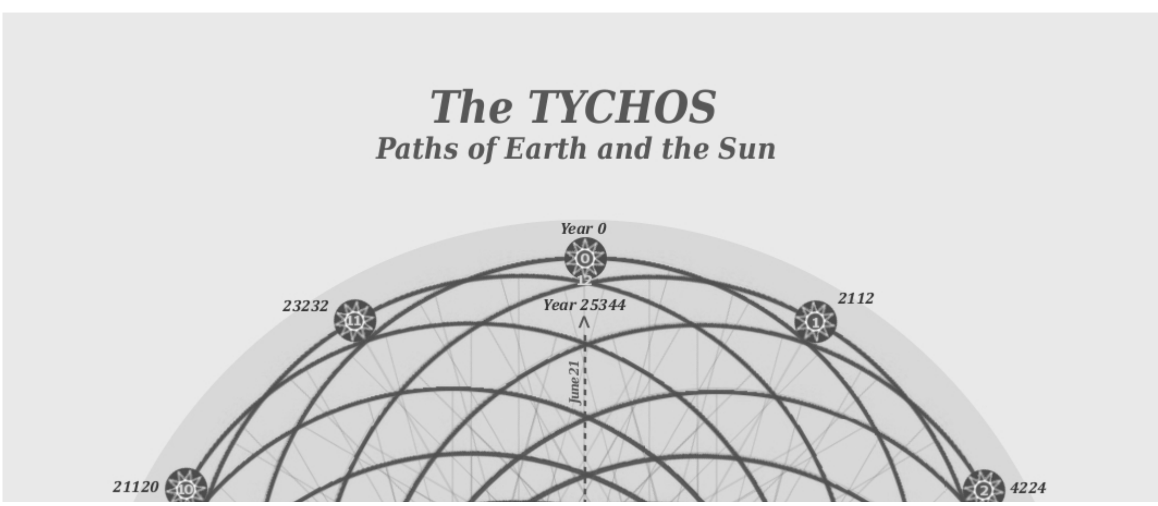
To come to terms with the notion of what I call the "secular / geometric center of our system", one must envision the full processional motion of our entire system over

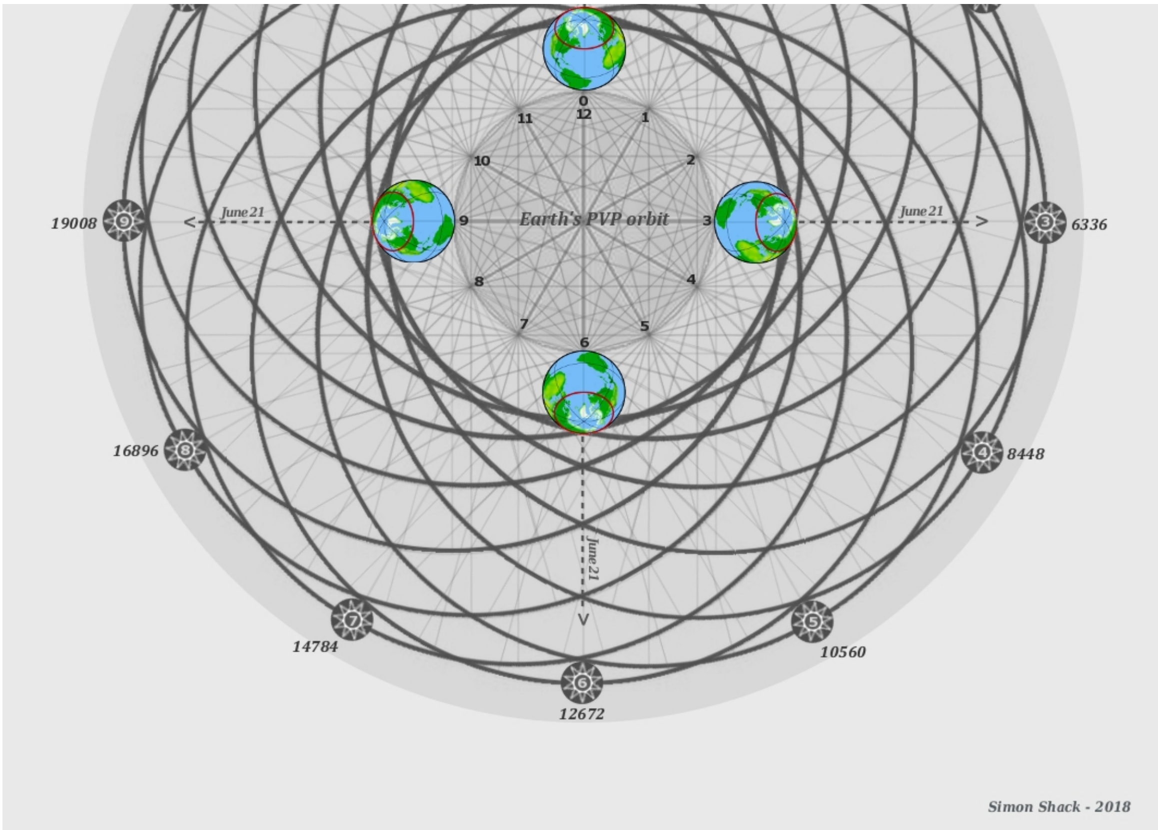
25344 years (*i.e.;* one Great Year). We see that, in the TYCHOS, Mars periodically transits (during its closest oppositions) at about 56.6 Mkm from Earth (*i.e.;* "smack in the middle" of Earth's 113.2-Mkm-wide PVP orbit). This means that Earth doesn't revolve around any physical celestial body — but only around this "virtual secular center" regularly visited by Mars.

As I made the above graphic ("Overhead view of the Tychos") in July 2015, I remember daydreaming about what I feared would be a far too ambitious project: to construct an interactive motion graphics planetarium which would faithfully simulate the entire TYCHOS system. Yet, to my delight, the Tychosium has now became a reality thanks to Patrik's invaluable help, ingenuity and programming skills. It is essential to realize that the planetary data used to create the Tychosium (orbital speeds, dimensions, periods, etc.) is in full agreement with long-established astronomical observations.

Utmost care has been taken to respect all available values and tables perfected and verified over the centuries. In other words, the Tychosium represents a proof of concept of the TYCHOS model, since past and future planetary positions are in full accordance with observation. Most significantly, it is incontestably superior to any existing planetarium showing an overhead view of our system (*e.g.;* the Scope planetarium). This, because its geometry correctly predicts all planetary conjunctions with the stars, unlike the utterly nonsensical Earth-planet-stars "alignments" proposed by the unphysical Copernican cosmic geometry (see Chapter 7).

THE BEAUTIFUL PATHS TRACED BY EARTH AND THE SUN AS THEY COMPLETE ONE GREAT YEAR





Previous Chapter Next Chapter

Chapter 22 — Earth’s 1 mph motion explains the “Equinoctial Precession”

Earlier on, we saw that Earth’s PVP orbit is 2.642336 X smaller than the Sun’s orbit. We shall now see how Earth’s 1-mph-motion can, all by itself, account for the famed “precession of the equinoxes”, currently estimated to last for circa 25 to 26 thousand years.

Each year, Earth travels 14,035.85 km. If we multiply this value by 2.642336 (so as to radially project this distance onto the Sun’s larger orbit) we obtain:

$$14{,}035.847 \text{ X } 2.642336 \approx 37{,}087.424 \text{ km}$$

Remember that, in the TYCHOS, Earth’s orbital speed is a mere 0.00149326% of that of the Sun. Since Earth’s orbit is 2.642336X smaller than the Sun’s orbit, we will therefore have to multiply our PVP Constant (0.00149326) by 2.642336 in order to obtain the solar orbit’s radial (or circle-sectional) equivalence of Earth’s motion vis-à-vis Sun’s orbit.

Here is what we obtain:

$$\mathbf{0.00149326\%} \text{ X } 2.642336 \approx \mathbf{0.0039457\%}$$

Note that $51.1\overline{36}$ arc seconds (our ACP) equals:

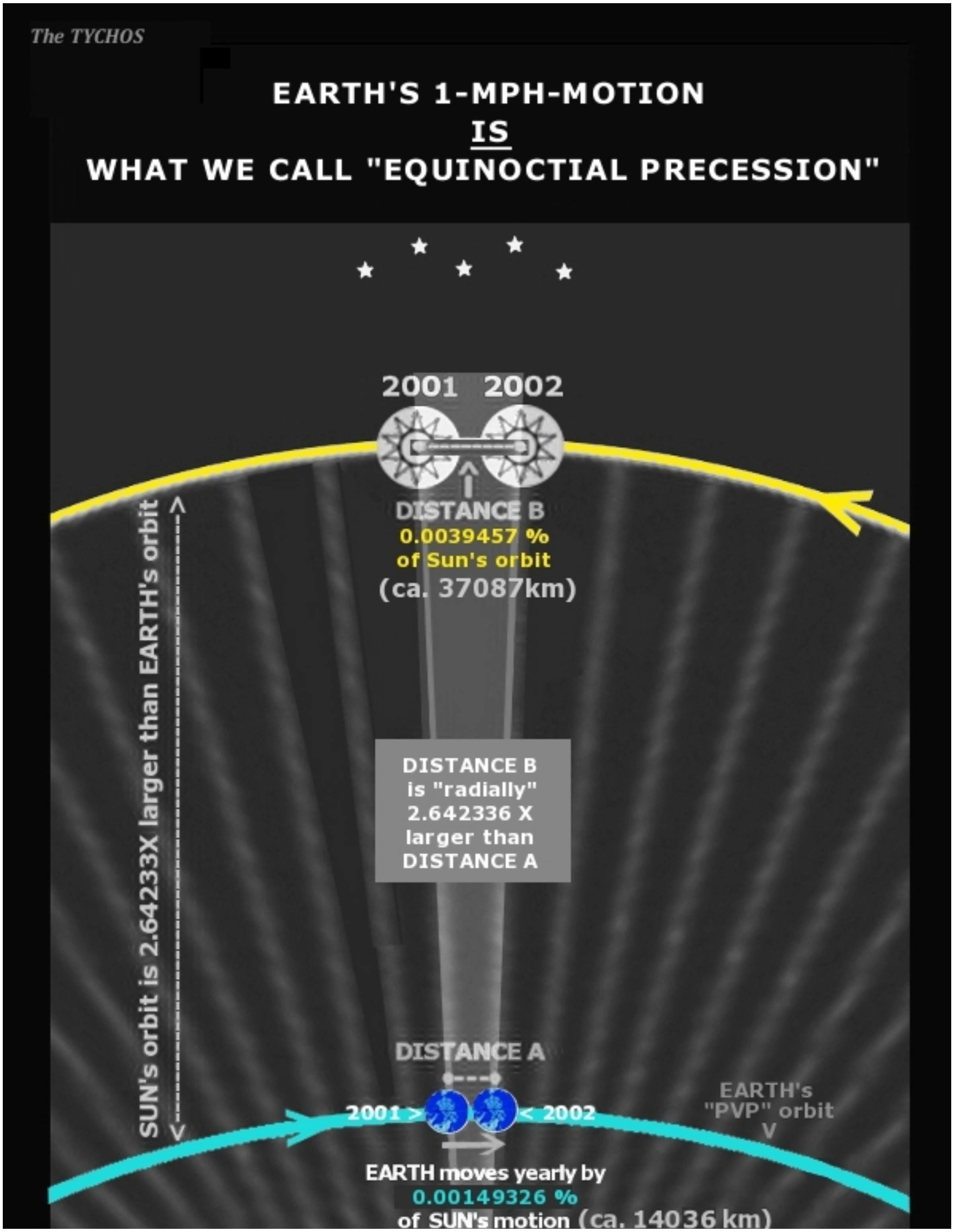
$$51.1\overline{36} = \mathbf{0.00394\overline{570}\%} \text{ of } 1{,}296{,}000 \text{ arcseconds } (\textit{i.e.;}\ \mathbf{0.00394\overline{570}\%} \text{ of } 360°)$$

In fact, **$0.00394\overline{570}$%** X 25344 (the number of years in a TYCHOS Great Year) = $99.\overline{999}$%

And **$0.00394\overline{570}$%** of 9,256,896 days (*i.e.;* the number of days in one TGY) ≈ **365.25** days.

Ergo, in one year, the Sun covers **$0.00394\overline{570}$%** of its full 25344-year long TGY journey (of 25344 X 939,943,910 km).

In one year, planet Earth, traveling at about 1.6 km/h, will cover a distance that equals **0.00394570%** of the PVP orbit's circumference of 355,724,597 km. From one year to the next, the Earth and the Sun will thus meet up at a slightly "earlier" point of the Sun's orbit by an annual angular amount corresponding to roughly a **0.0039457% "slice"** of the solar orbit's circumference: 37,087.424 km



Hence, it logically follows that the so-called "equinoctial precession" (the observed lateral drift which constantly shifts the Earth-to-Sun-to-Stars alignment) is a ***direct consequence*** of Earth's clockwise 1 mph-motion around its PVP orbit.

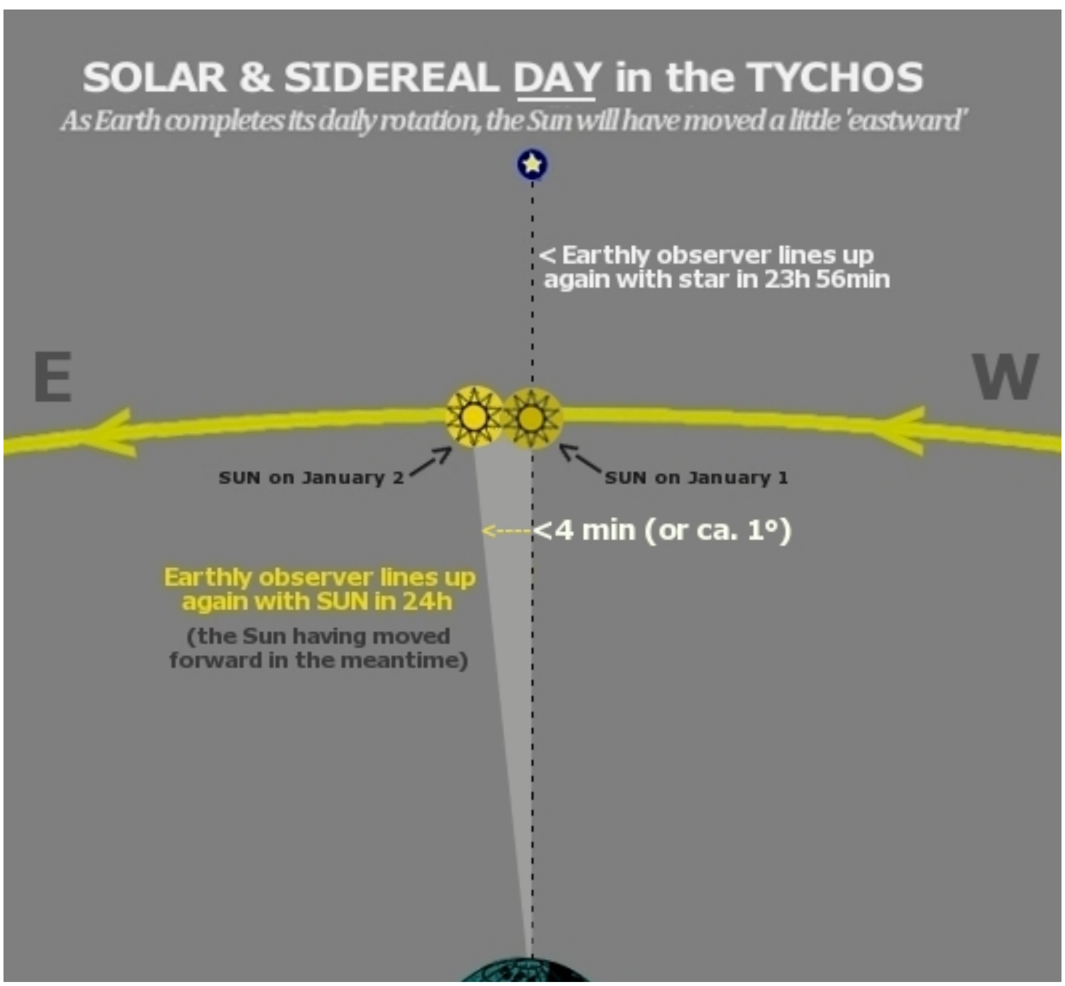
Further on, we shall see how our current Gregorian calendar count tries to compensate for this inconvenient offset. This will ultimately (over millennia) generate some serious problems with regards to the seasonal Earth-Sun-Stars alignments. In its attempt to compensate for Earth's slow yet inexorable motion around its orbit, the Gregorian calendar's less-than-ideal year count will cause our system (in 25,344 years of 365.24219 days) to end up "upside-down" in relation to the stars. This will, given due time, "invert" the seasons. It is a wrong way to track time, and should be thrown out.

Previous Chapter Next Chapter

Chapter 23 — The “Solar Day” versus the “Sidereal Day”

We shall now verify how the TYCHOS model fares with regards to the solar & sidereal periods. The TYCHOS model can readily explain and visualize (with simple, intuitive graphics) our solar & sidereal days and years. As we will see further on, the same cannot be said or done with regards to the proposed Copernican explanations for these two fundamental solar periods.

In the TYCHOS, the solar day is accounted for and explained as follows. After one revolution around its axis, Earth realigns with a given star in 1436 minutes (or 23 hours 56 minutes). However, during that time, the Sun has moved along “Eastwards” in relation to the stars. Hence, an earthly observer will have to wait another 4 minutes (or more precisely, 3.93 minutes on average) to realign with the Sun.

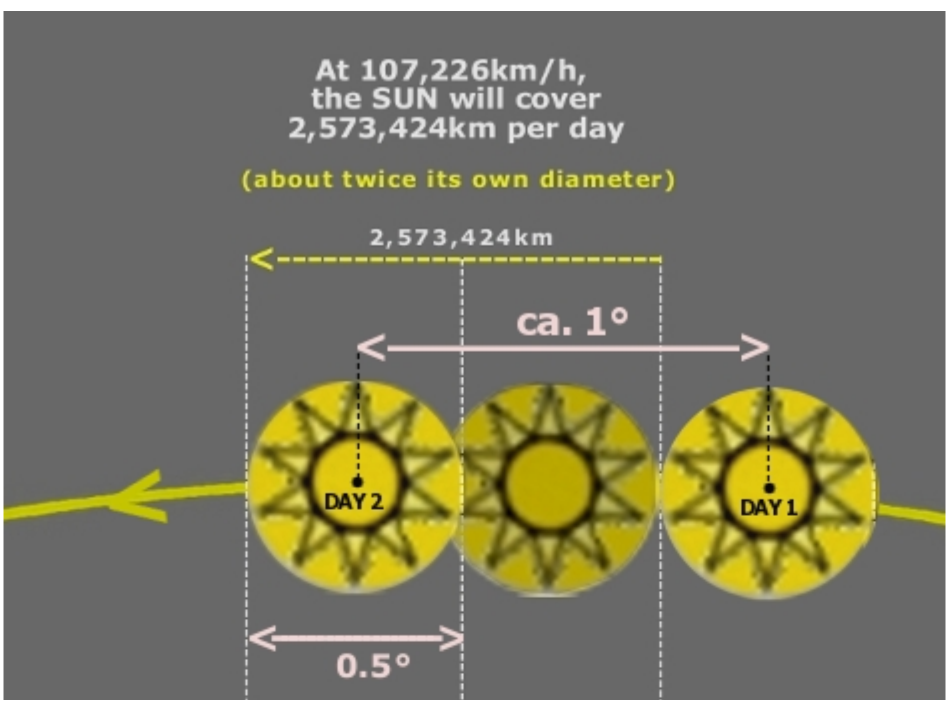


You may agree that the TYCHOS model accounts for the solar & sidereal days in the simplest imaginable manner. As we shall see further on, the Copernican theory's explanation for the solar and sidereal days is not only complicated; it is inherently unphysical, along with the heliocentric model in general.

Wiktionary's definition of "unphysical": Not supported by, or contrary to, the laws of physics.

The Sun Moves by About One Degree (or 4 minutes of RA) Every Day

This fact alone strongly suggests that it is indeed the Sun (and not Earth) that moves each day by 2,573,426 km (see Chapter 21 Sun data). As it is, this value equals approximately 2X the Sun's diameter of 1,391,400 km. Since the Sun's apparent size in the sky subtends approx. 0.5°, it makes perfect optical sense that its observed displacement from one day to the next amounts to about twice its visible diameter — that is, approximately 1°.



Let us now verify if the notion that the Sun orbits around Earth (and not vice versa) can be further confirmed.

The Sun's diameter is 1,392,000 km. Each day it travels for 2,573,426 km or **1.848726 X** its own diameter.

2,573,426 / 1,392,000 ≈ **1.848726**

The Sun's orbital circumference is 939,943,910 km. Thus, the number of Suns that could hypothetically be lined up side-by-side around its own orbit would be:

939,943,910 km / 1,392,000 km ≈ **675.247**

If we divide this value by 365.25 (and so we should since this is the number of days making up our current count of 1 solar year), we obtain:

675.247 / 365.25 d ≈ **1.848726**

These values are naturally just reconfirmations of the known speed of the Sun around its known orbital size, checked "forwards and backwards" to demonstrate that it all fits together well.

To those who still think that Earth orbits around the Sun (and not vice versa), I suggest that the time has come to reconsider. Let us presently see how much the Sun moves as it drifts by 1 arcsecond, as seen from Earth. As we divide the Sun's orbit circumference (939,943,910km) by 1,296,000 arcseconds (360°) we obtain:

939,943,910 / 1,296,000 ≈ 725.265 km

Long after I performed the above, very simple calculation, I was pleased to read on Wikipedia's "Angular diameter" entry that

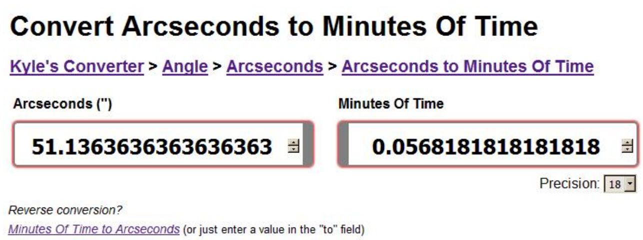
> *"an object of diameter 725.27 km at a distance of 1 AU [average Earth > Sun distance] will have an angular diameter of one arcsecond"*

Let's compute how many kilometers of the Sun's orbital circumference will be subtended in our ACP of 51.136 arc seconds:

$51.1\overline{36}$ X 725.265 km ≈ **37,087.4**33km

This is excellent confirmation of our estimate of **37,087.4**24 km for the annual radial offset of the Sun's position (caused by Earth's yearly 14,035.847-km-motion) against the starry background. As we calculated in the previous chapter, our estimate is about 0.0039457% of the Sun's orbital circumference.

One could also put it this way: since $51.1\overline{36}$" is $0.056\overline{81}$ minutes of time



Above — source: www.kylesconverter.com

We find that: $0.056\overline{81}$ min. X 25344 = **1440 min.** (360°)

Remember, we measure our celestial sphere by means of a spherical ruler divided in 1440 minutes or 24 hours.

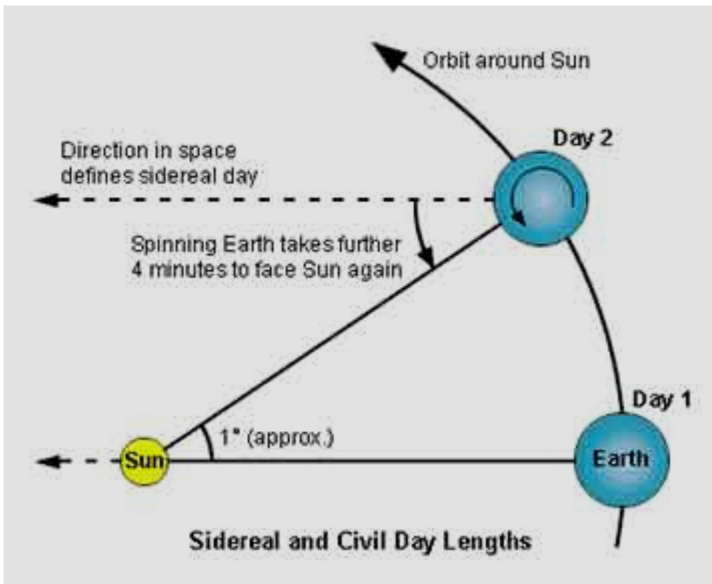
Once more, it would seem that our 25344-year reckoning of the Great Year holds up quite nicely.

On the other hand, let us unpack how the solar & sidereal days are explained by the Copernican heliocentric theory.

Solar versus Sidereal Day as of Heliocentric theory

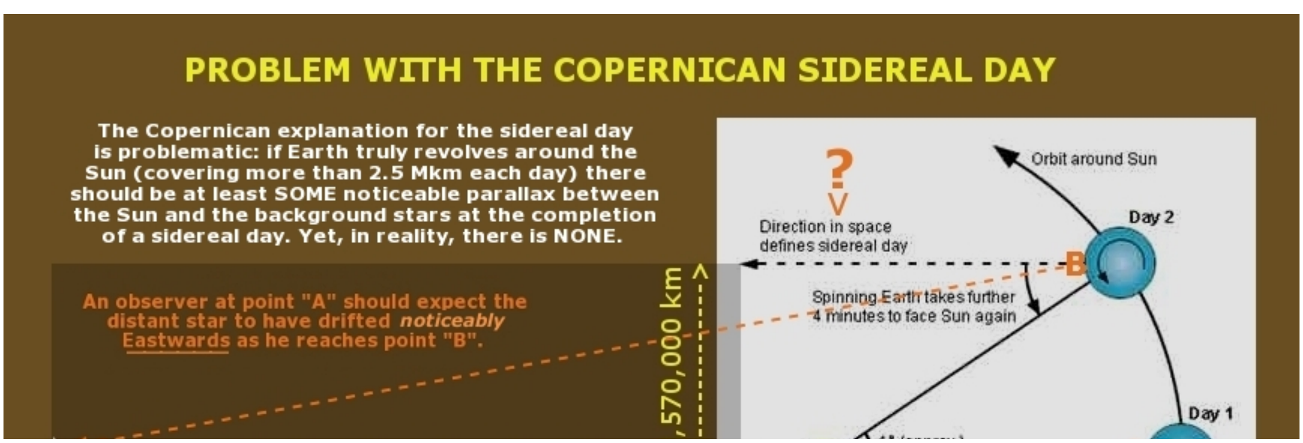
Here follows a classic diagram illustrating the proposed Copernican explanation for the different lengths of the solar and sidereal day. Keep in mind that Earth is supposedly traveling for over 2.5 Million km every day (!) while no parallax whatsoever between the Sun and the stars is observed. This would be measured at the completion of one sidereal day, and yet this parallax is absent. Once again, the Copernican explanation for this undeniable fact is that *“the stars are almost unimaginably distant”*. However, as we take a closer look, this proposed explication doesn’t make physical / optical sense.

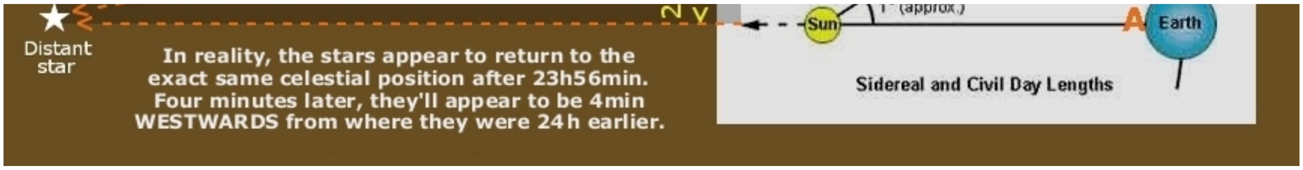
Here’s how the occurrence of the sidereal day and solar day (or “civil day”) is conventionally illustrated.



Above — source: *The Solar and Sidereal Days* by “A-star Maths/Physics Tuition/Tests /Notes”

In the above graphic, Earth is supposed to have moved 2.5 Mkm between the positions of “Day 1” and “Day 2”. Let us examine what this classic Copernican diagram is trying to say, quite carefully.





To think that Earth would be moving by over 2.5 Million km each day without the background stars drifting by any noticeable amount besides these last 4 minutes of earthly rotation has to be among the most surreal aspects of the Copernican model.

To put this problem into due perspective, let´s see how the sidereal and solar day unfold in the below 3-frame sequence.

The Sidereal vs. Solar Day (23 hrs 56 min. versus 24 hrs 00 min.) as depicted by the NEAVE planetarium

The following description is what is observed, in reality, from one day to the next:

> In 23h 56m, an earthly observer will line up again with the same given star. At such a point and time, the Sun will already have moved Eastwards by approx. 4 minutes of RA. Four minutes later, we see the stars drifting by 4 min. of RA Westwards.
>
> Ergo, the **entire amount** of our daily, Westward stellar drift will appear (to an earthly observer) to occur in the last 4 minutes of earthly rotation. In other words, Earth might just as well be stationary while only rotating around its axis. Many astronomers in ancient times understandably believed this to be true. This wasn't because they were stupid, but because this is what matches careful and patient observation of the behavior of the heavens.

Of course, the TYCHOS model submits that Earth moves by a mere 38.4 km per day, which is hardly a noticeable amount of lateral displacement to the naked eye! Those 4 min. of RA are the consequence of Earth having rotated by 360° in 23 hours 56 minutes, thus needing another 4 minutes to line up again with the Sun. Meanwhile, the Sun has been moving Eastwards by approx. 4 minutes of RA.

But the Copernican theory would have you believe that Earth is moving each day by 2.5 Million kilometers with no amount of the observed, daily 4-minute stellar drift that can be optically attributed to this distance. It is as if the Earth's rotation is the only thing that changes the star positions, but Earth's (supposed) 2.5-Mkm daily displacement has no effect.

In the TYCHOS model, Earth moves daily by about 38.4 km. It lines up again with the same star (in one "sidereal day"). Earth's circumference being 40,075 km, we are therefore rotating (360°) each day by 40,075 km + 38.4 km = 40,113.4 km.

Earth's rotational speed in relation to the "fixed stars" would therefore be 40,113.4 / 1436 minutes ≈ 27.93 km/min. or 1676 km/h. Note also that, curiously, 1676 km/h equals approximately 100X the rotational speed of our Moon around its axis (16.56 km/h) and circa 1000X Earth's orbital speed of 1.6 km/h.

Previous Chapter Next Chapter

Chapter 24 — The “Solar Year” versus the “Sidereal Year”

We will now see how Earth’s 1-mph-motion accounts for the 20.41-min. difference between the solar (*a.k.a.* tropical) year and the sidereal year. You may have asked yourself (rightfully) this good & fair question: *“Why-oh-why is the sidereal day shorter (by 4 min.) than the solar day, whereas the sidereal year is 20.41 min. longer than the solar year?”*

The Copernican model offers yet another incredibly convoluted “explanation” for this major conundrum. If you are not familiar with it, you may read all about it in Wikipedia type sources, but here is a compilation of example data from an Arizona State University professor of philosophy (Michael J. White).

In any case, here is a most pertinent question (highlighting this particular riddle) raised by the Binary Research Institute:

> *“Sidereal vs. Solar Time: Why is the delta (time difference) between a sidereal and solar day attributed to the curvature of the Earth’s orbit (around the Sun), but the delta between a sidereal ‘year’ and solar year is attributed to precession? […] The burden of proof lies with those who support the current lunisolar precession theory which requires a different explanation for the two deltas.”*

— *Understanding Precession of the Equinox: Evidence our Sun may be part of a long cycle binary system* by Walter Cruttenden and Vince Dayes (2003)

Let us first take a look at these 20.41 min. which, in fact, represent the time difference between a solar and a sidereal year.

Average duration of a solar (or “tropical”) year:

365.24219 days or 525,948.753 minutes (by the Gregorian calendar's year count)

Average duration of a sidereal year:

365.256363 days or 525,969.163 minutes (as of empirical observation)

Ergo, a discrepancy of 20.41 minutes – or a difference of 0.00388%

We see that 20.41 min. is **0.00388%** of 525,960 min. (*i.e.;* 365.25 days). And in fact, the currently-observed amount of annual "equinoctial precession" (50.29 arc seconds) amounts to **0.00388%** of 1,296,000 arcseconds (remember: 1,296,000″ arcseconds = a full 360° circle). Hence, those 20.41 minutes are, manifestly, a *direct consequence* of the so-called equinoctial precession.

Earlier on, we determined that our ACP (Annual Constant of Precession) amounts to:

$51.1\overline{36}$ arc seconds-per-year
i.e.; a value **1.68%** larger than the currently-observable precession rate of 50.29″.

Note that the modern, academic estimate of the duration of one full 360° equinoctial precession (*i.e.;* one Great Year) is ca. 25,770 years. This is, in fact, about 1.68% longer than the TYCHOS reckoning of 25344 solar years.

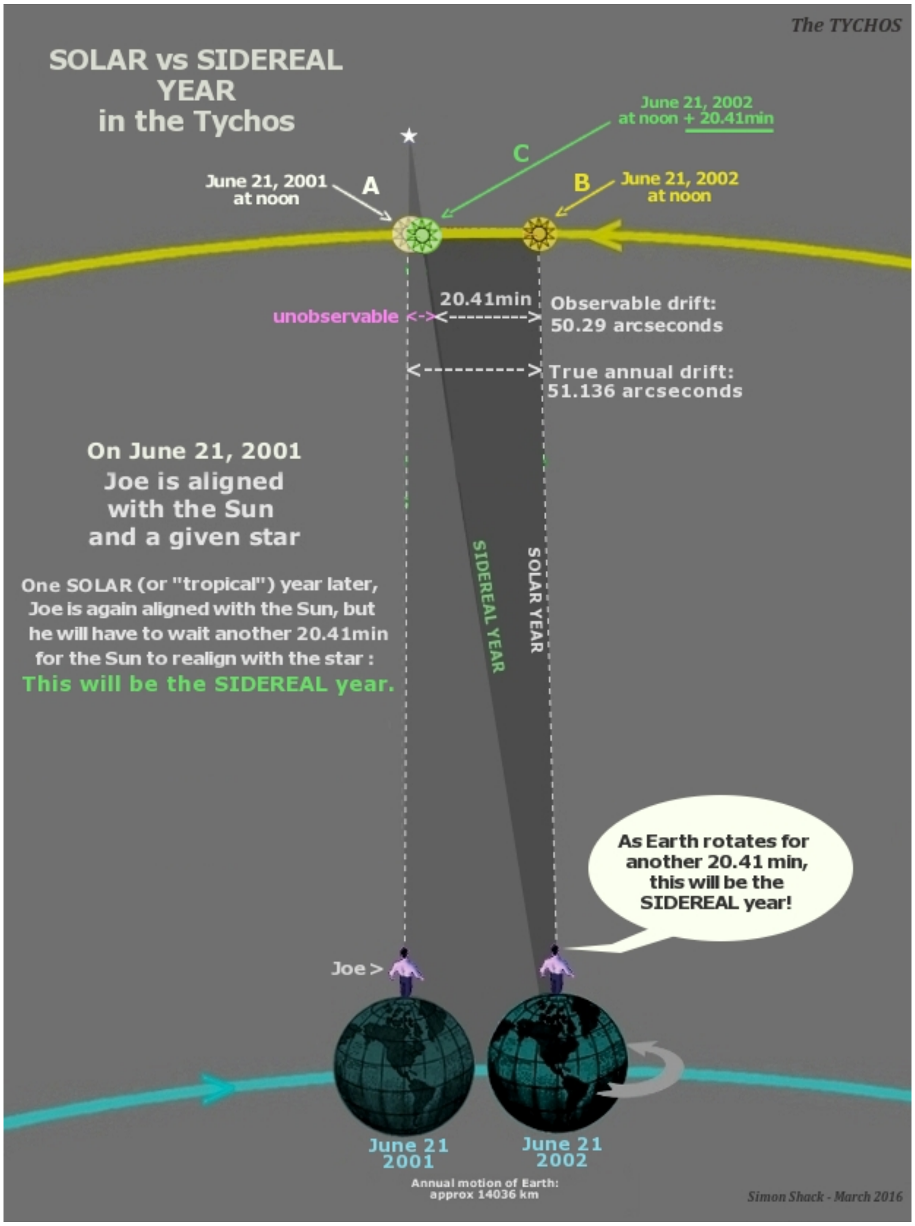
Please see the Wikipedia entry on "Axial precession".

My next graphic should help visualizing why a small portion (about 1.68% in our epoch) of the equinoctial precession will always remain **unobservable** from Earth. The reason for this "hidden" angle of precessional drift (which increases over time) is something that, yet again, can be demonstrably attributed to Earth's yearly 14,035.847-km motion.

The Sun's orbit's "radial equivalence" of Earth's yearly 14,035.847-km motion is 37,087 km (as we found in Chapter 22).

In 20.41 min. (or 0.3401667 hours), the Sun — traveling at 107,226 km/h — will cover about 36,475 km, *i.e.;* about **1.68%** less than 37,087.424 km.

It thus becomes plainly evident what causes this 20.41-min. difference between the solar and sidereal year: it simply represents the extra time needed for the Sun (as viewed from Earth) to line up again with a given star, after the completion of a solar year. These 20.41 minutes will effectively reset the Earth-Sun-Stars alignment which, in actuality, has been offset by Earth's yearly motion.



Let me describe in due detail the above graphic by using the solar positions marked A, B and C:

> As Joe, our earthly observer, moves from A to B (*i.e.;* from June 21, 2001 to June 21, 2002) he will have experienced a "**Solar** year". Since Earth (traveling at 1 mph) has, in that time period, moved along by 14,035.847 km, Joe will "meet up" with the Sun at an earlier point (compared to the previous year) of the solar orbit. As the Sun's orbit is 2.642336X larger than Earth's PVP orbit, Joe's lateral displacement will be proportionally

> equivalent to a 37,087.424-km-section of the solar orbit (14,035.847 km X 2.642336 ≈ 37,087 km). This is the distance between A and B, as of the above graphic.
>
> This small angular offset (with respect to the Sun-Stars alignment) that Earth's motion causes will then quickly be “regained” by the Sun's speedy motion. In only 20.41 minutes, the Sun will once again line up (at point “C”) with the same star that it faced one year earlier. Traveling at 107,226 km/h, in 20.41 minutes the Sun covers 36,474 km (the distance between B and C) which is 1.68% less than 37,087.424 km.
>
> Note that our earthbound Joe will not realize the *full* extent of the *true* annual stellar precession; a small portion of it (currently ca. 1.68%) will remain unobservable to him. This, because Joe is unaware of Earth's 1-mph-motion and he therefore (wrongly) believes that Earth has returned at the same physical place as the previous year. Joe will thus conclude that the annual stellar precession rate amounts to 50.29” instead of the true constant rate of $51.1\overline{36}$” per year (our ACP).

The TYCHOS model thus explains why the **sidereal year** is, in all logic, longer than the **solar year**.

Note that, as viewed under Earth's rotational frame of reference, in 20.41 min. Earth will ROTATE by 18,369” arcseconds. This, because 1 min. of our daily 1440-min. rotation corresponds to 900 arcseconds (1,296,000”/ 1440 = 900”). Hence, 20.41 X 900 = 18,369”. If we now divide this value by 365.25, we obtain:

18,369”/ 365.25 = 50.29” (the currently observed annual “equinoctial precession”).

Thus, the ratio between the observed ***stellar precession*** (Sun vs. stars) and Earth's rotational motion is, as would be expected, circa 1 : 365.25.

Later on (in Chapter 30) we shall see why the rate of increase of the equinoctial precession is observed to grow over the centuries — due to the less-than-optimal year count of our current Gregorian calendar, which lets the Sun drift too much Eastwards over time.

About the “anomalistic year”

Astronomy describes the so-called “anomalistic year” as follows (the below is from Wikipedia).

> *“The anomalistic year is usually defined as the time between perihelion passages. Its average duration is 365.259636 days (or 365 d 6 h 13 min. 52.6 s – at the epoch J2011.0).”*

The oddly-named “anomalistic year” (the period in which the Sun returns to its closest or furthest point from Earth) lasts on average for 365.259636 days. Incidentally, this is approx. 4.7 minutes more than the sidereal year of 365.256363 days. It is defined as “the time interval between perihelion passages”.

In the TYCHOS, a more aptly-worded description would be “the time interval between the Sun’s perigee transits”. In our current epoch, the Sun’s perigee transit occurs around January 3.

In short, the “anomalistic year” is defined from Sun’s perigee procession, and lasts for about 4.7 minutes longer than a sidereal year. We see that in the course of 4.7 minutes a given point on Earth’s equator will rotate (within the terrestrial rotational reference frame) by 4230”. This is because 1 minute of our celestial sphere of 1440 min. (24 hours) corresponds to 900 arcseconds.

Thence, 4.7 min. X 900” = **4230**” (arcseconds)

Now, let us imagine two hypothetical signposts (“A” and “S”) being moved around Earth’s equator year by year with the following parameters.

> Signpost “A” is kept pointing towards the celestial spot of each year’s passage of the Anomalistic year.
>
> Signpost “S” is kept pointing towards the celestial spot of each year’s passage of the Sidereal year.
>
> Since signpost “S” is conceptually always being kept oriented towards a given fixed star (in this thought exercise we disregard Earth’s daily rotations around its axis), it will complete 1 revolution around Earth’s equator

in 25344 years.

On the other hand, signpost “A” will be moved each year by an extra 4230” (arcseconds) in relation to signpost “S”.

In the TYCHOS Great Year (25344) signpost “A” will have revolved around Earth by 4230” X 25344 = 107,205,120”

107,205,120” / 1,296,000” (*i.e.;* 360°) = **82.72**

Therefore, “A” will complete 82.72 full revolutions in 25344 years, making the spin ratio between signpost “A” and “S”

82.72 : 1

Since we know that signpost “A” moved by 4230” annually, we can now find out by how much signpost “S” was moving annually:

4230” / 82.72 = $51.1\overline{36}$ arcseconds-per-year

Hence, the so-called “anomalistic” year (which is observed to be 4.7 min. longer than the sidereal year) further corroborates our Annual Constant of Precession of $51.1\overline{36}$ arc seconds (representing Earth’s 1-mph-motion as posited by the TYCHOS model).

We may further confirm our ACP by using the value of 11.75” arcseconds, which (as described in old astronomy books) is the observed annual amount of precession of the Sun’s apogee measured from Earth:

> *“On the anomalistic year: the year called the anomalistic year is sometimes used by astronomers, and is the time from the sun’s leaving its apogee till it returns to it. Now, the progressive motion of the apogee in a year is 11”.75, and hence the anomalistic must be longer than the sidereal year, by the time the sun takes in moving over 11”.75 of longitude at its apogee.”*

— p.48, *The Elements of Astronomy: Designed for the Use of Students in the University* by Samuel Vince (1811)

In 25344 years, the Sun’s apogee will thus precess by:

25344 X 11.75” = 297,792” arcseconds (*i.e.;* less than 1/4th of a full circle).

To complete a full 360° precession around our system the Sun’s apogee will therefore need:

1,296,000” / 297,792” ≈ 4.352030947775628626 69

4.352030947775628626 69 X 25344 ≈ **110,297.87 years***

And once again, we can find our ACP by multiplying this factor of 4.352030947775628626 69 by 11.75” :

4.352030947775628626 69 X 11.75” ≈ $\mathbf{51.1\overline{36}}$
or
1,296,000” / 297,792” X 11.75” = $51.1\overline{36}$”

*Here is an odd comment about this period, from a less accurate perspective:

> *“The perihelion of the earth’s orbit, and of all the planets, is moving around the sun, and completes its revolution in 111,000 years.”*

— p.131, *Foot Steps of the Ancient Great Glacier of North America: A Long Lost Document of a Revolution in 19th Century Geological Theory* by Harold W. Borns Jr. and Kirk Allen Maasch (2015)

Note the underlying absurdity of the above sentence. Why would the perihelion of Earth ”**and** of all the planets” share such a period, and return to a respective perihelion in unison? It is obviously the motion of the Sun’s orbit that has this periodicity and not the other way around.

Previous Chapter Next Chapter

Chapter 25 — The "geospatial" motives for the existence of our "Leap Day"

The "Leap Day" — February 29 — What is it for?

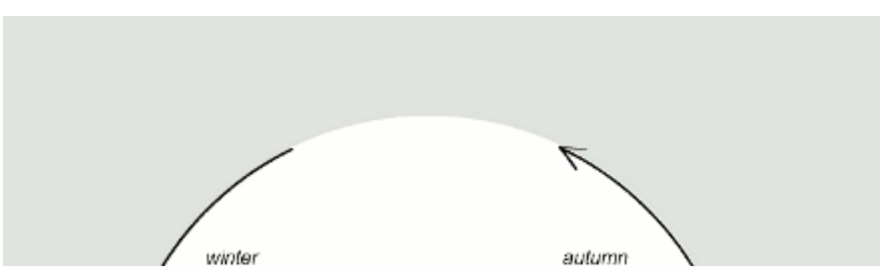
You may have asked yourself at some stage in your life, *"How can our calendar possibly have an **integer** value of 365 days (or 366 days on a leap year) whereas, on the other hand, we are told that one year lasts ca. 365.25 days or 365 days and 6 hours?"*

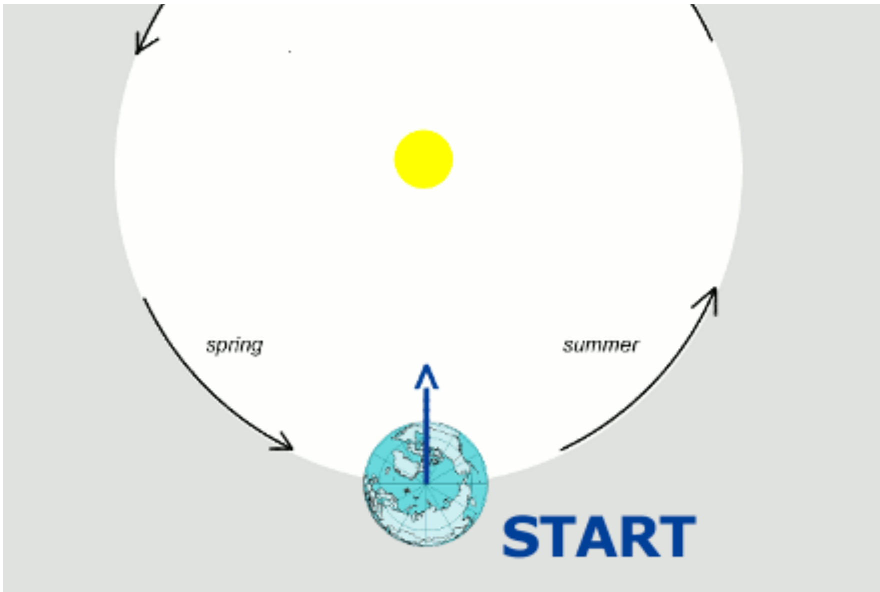
Does this mean that, from one year to the next, Earth ends up skewed by 1/4 of a rotation, or 90°?

Of course not. Yet, everyone knows that we add 1 day every 4 years in order to get a 4-year-sequence of 365 + 365 + 365 + 366 = 1461/4 = 365.25 (or more precisely, 365.24219, as some leap years are being periodically skipped). Please read this explanation of "February 29" from Wikipedia.

> *"In the Gregorian calendar, years that are divisible by 100, but not by 400, do not contain a leap day. Thus, 1700, 1800, and 1900 did not contain a leap day; neither will 2100, 2200, and 2300. Conversely, 1600 and 2000 did and 2400 will."*

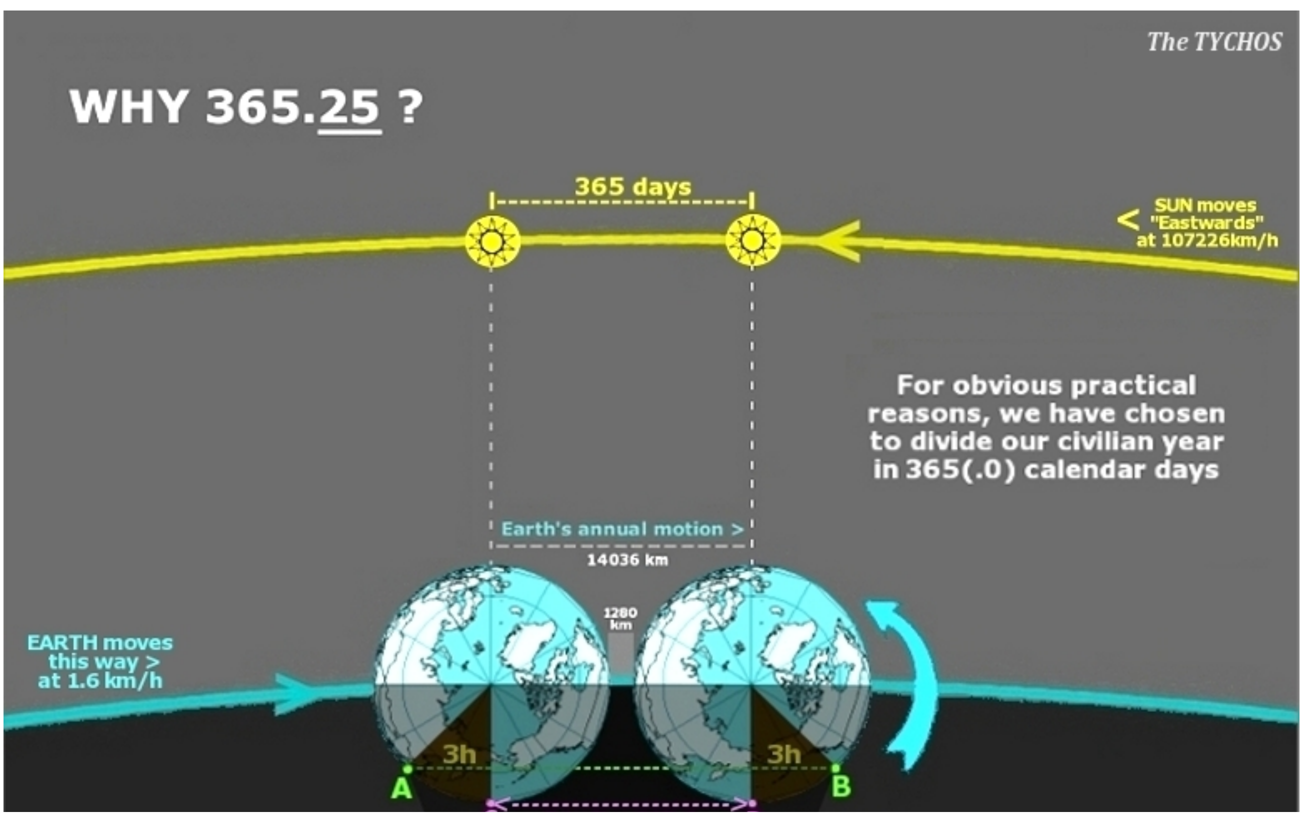
My below sequence shows ad absurdum the implication of the well-known notion that "a year actually lasts for 365.25 days".





Obviously, we do not end up skewed by 6 hours at the completion of a year. Thus, we may legitimately ask ourselves, *“Where do these 6 hours come from?”* Can the Copernican model account for them, and can the reason for their existence be visually illustrated in a heliocentric Copernican graphic? The short answer to this question is: No.

On the other hand, the TYCHOS model can illustrate the probable motive for astronomers to have stipulated that a year lasts for about 6 hours (or ¼ of a day) more than 365 integer days.



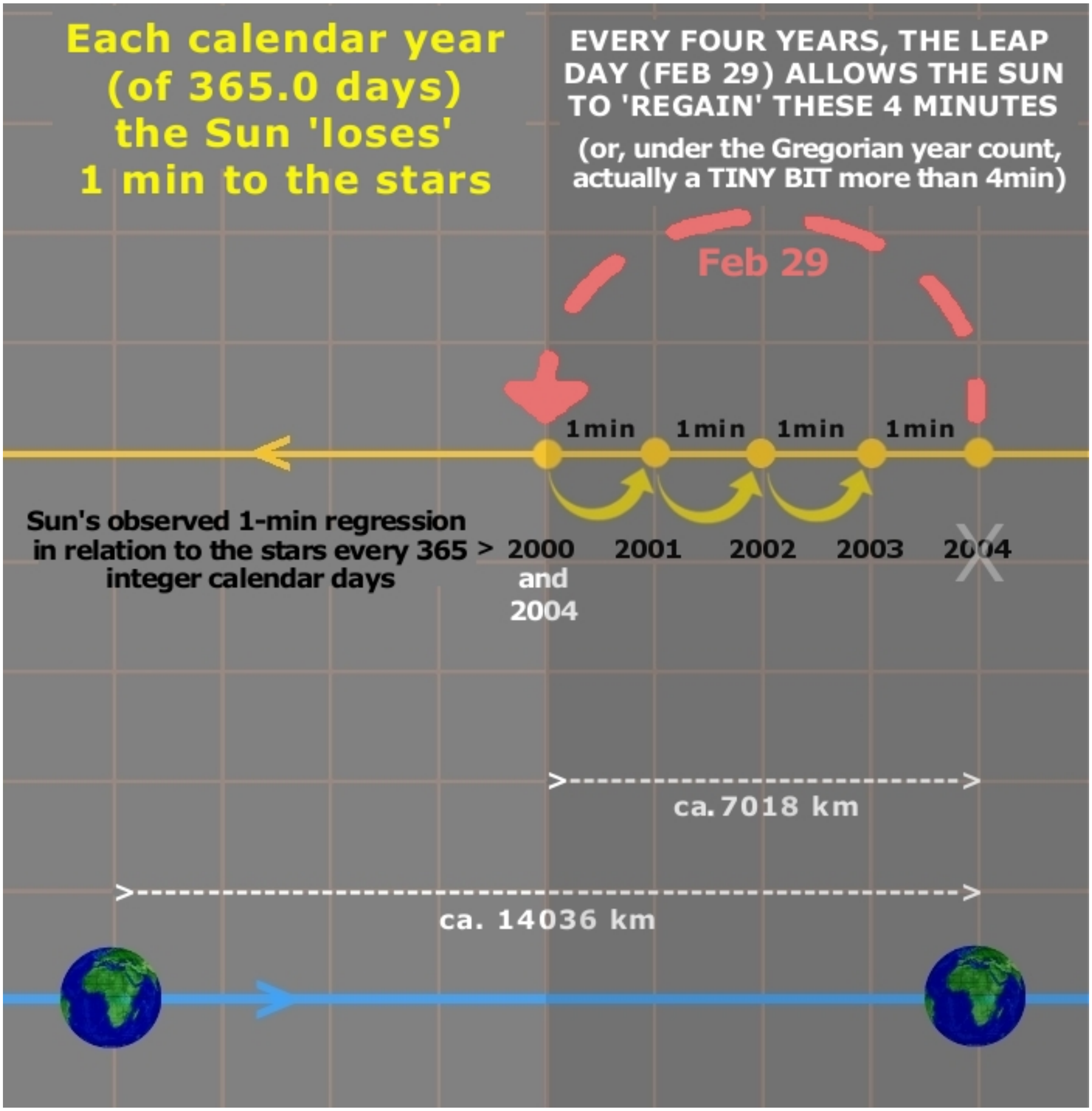
Astronomers have observed over the centuries that the **maximal** annual displacement of a given star on the ecliptic (currently 50.29” arcseconds per year) occurs between point “A” and point “B” (as marked in my above graphic). So, every year, 6 hours are considered to be “lost in space”. Therefore, they have concluded that “one sidereal year lasts for 365.25 days” (or more precisely 365.25636 days).

However, we may also read in Wikipedia’s entry on the “Sothic cycle”:

> *“The Sidereal year of 365.25636 days is only valid for stars on the ecliptic (the apparent path of the sun across the sky).”*

Now, every calendar year (of 365 days), we see the Sun “slipping backwards” against the starry background by about 1 minute of RA. Every four years, this adds up to about 4 minutes of “lost ground” on the part of the Sun. 4 minutes is just about the same amount of RA that the Sun advances by each day (more precisely, 3.93 minutes). Therefore, by (the Gregorian calendar’s) convention, one extra leap day, February 29, is added to make up for the Sun’s lost ground.

As viewed under the TYCHOS model, this makes perfect sense. Since the Sun travels at 107,226 km/h, in 3.93 minutes it will cover a distance of approximately **7023** km which is about half the distance traveled by Earth annually (approximately 14,035.847 km). This means that, every 4 years, the Gregorian calendar’s leap-day-gimmick allows the Sun to “regain” about *half of its accumulated offset* caused by Earth’s motion.



Now, here's the thing – This forward leap (of 7023 km) conceded to the Sun every four years by our current Gregorian year-count is a tiny bit too long. It will therefore slowly, over time, let the Sun drift too far Eastwards (*i.e.;* in the *opposed direction* of Earth's motion). This will eventually (in 25344 years) cause the Sun to end up on the opposed side of Earth at the wrong time of the calendar, thus flipping our seasons upside down. I will illustrate this in more detail in Chapter 32.

What should be mentioned before we get on is that, due to the currently imperfect yardstick with which we have defined the duration of one ***day*** (as tuned with our "atomic" clocks) and thus of one ***year*** we cannot divide our great year in 25344 exact slices of 365 integer days.

That is to say, our current Gregorian calendar's definition of one solar year (365.24219 days) is **a bit too long** to keep the Earth and the Sun synced throughout their respective 25344-year journeys. Whereas using an integer 365-day year count (by our current definition of a day) would be **a little too short**. We shall soon see why our years should ideally last for a "middle-of-the-road" value of 365.22057 days. This will ensure that the Sun never "slips" out of sync with Earth during the course of its 25344-year journey around its PVP orbit.

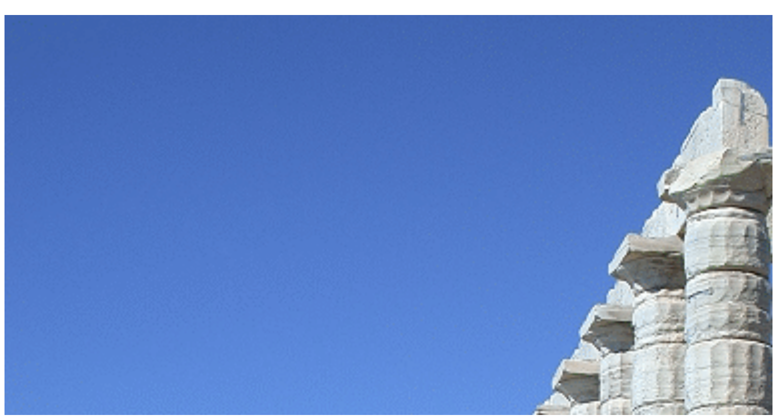
Previous Chapter Next Chapter

Chapter 26 — The Analemma and the Equation of Time

Or — How the TYCHOS provides a "timely" explanation for our drunken clocks

Everyone has heard of the proverbial broken clock "which will nonetheless show the correct time twice a day". However, not everyone knows that our earthly clocks are, strictly speaking, almost never on time. In fact, our clocks only agree with the Sun's midday zenith 4 times a year. The remaining part of the year, our clocks will drunkenly be slipping in-and-out of sync with the Sun by as many as +16 minutes or -14 minutes, depending on the season or time of year!

Any patient photographer can empirically verify this fact by setting up a tripod and snapping pictures of the Sun at noon (say, every ten days or so) for a full year. What will be obtained is a vertically-elongated, "8"-shaped pattern (wider at the lower end) well-known to astronomers. The name given to this shape is the Analemma.

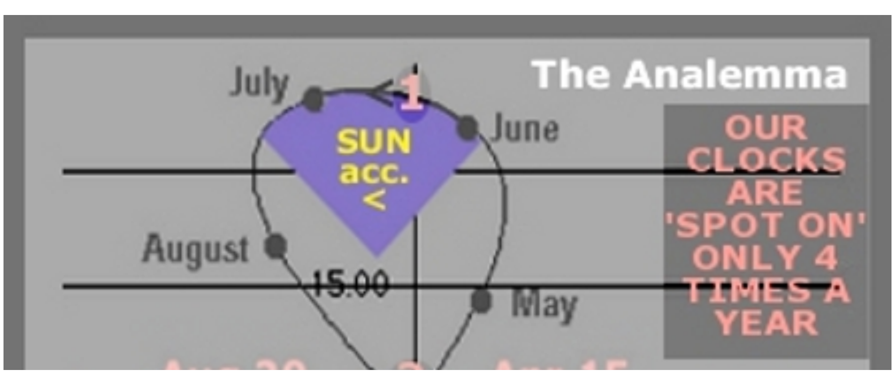


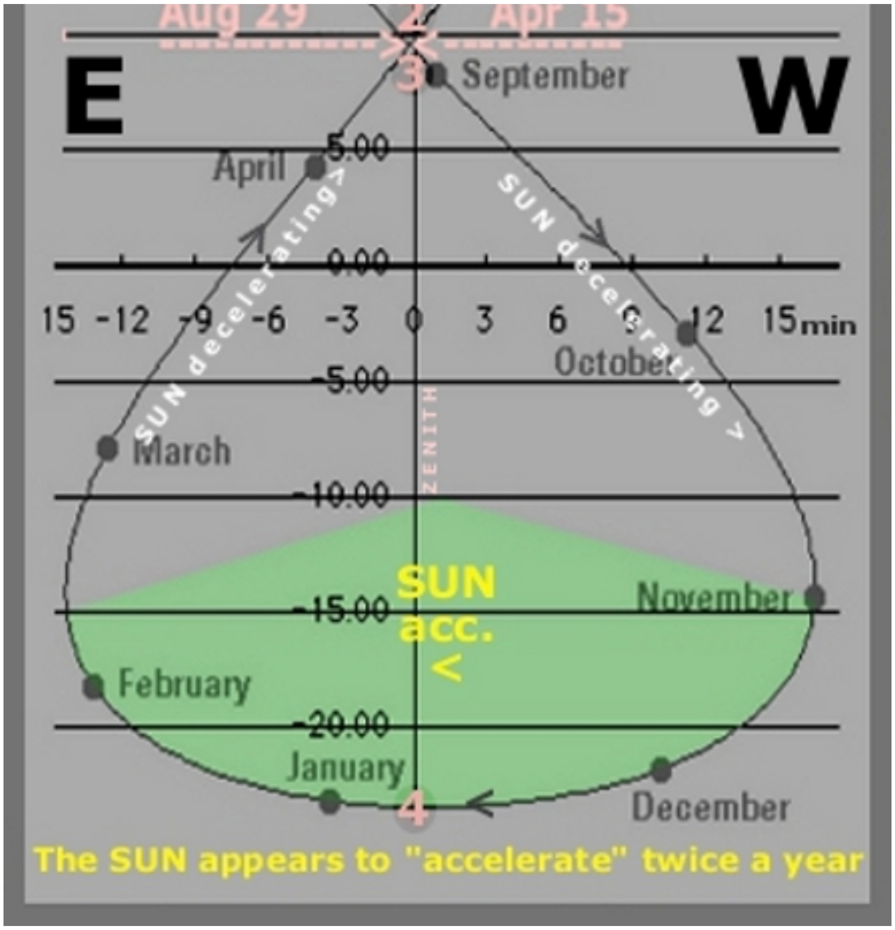
Above — by Anthony Ayiomamitis
More of Ayiomamitis' admirable original photography can be found at his web site: www.perseus.gr

> *"The Sun's movement against the starry background is gradual — on average about 1 degree a day — but its motion accelerates during northern-hemisphere autumn and winter, then slows down [decelerates] during spring and summer."*

— p.20, *Parallax: The Race to Measure the Cosmos* by Alan W. Hirshfeld (2001)

Hirshfeld's description above is incomplete. Here's a more thorough and accurate description of the Sun's seasonal West-to-East oscillation. The Sun briefly appears to accelerate from West to East between June and mid-July (*i.e.;* for a circa 1.5-month period). Then, between November and February, the Sun appears to accelerate again (but this time for circa 3 months). Only on four occasions in the course of a year will our clocks "agree" with the Sun's zenith at noon. Here's how this can be illustrated:





What exactly causes this curious analemma phenomenon? Of course, the vertical component (December-June) of the analemma is due to the Sun's shifting elevation between winter and summer (23.3°X 2 = 46.6°) — so not much mystery there.

On the other hand, the lateral component of the analemma (*i.e.;* the alternating east/west drift of the Sun) has not, to this day, been adequately explained in any satisfactory manner. As Keplerian theory has it, *"it is caused by Earth accelerating / decelerating around its slightly elliptical orbit"*. This, we are told, would account for the Sun's zenith to oscillate in our skies by more than 30 minutes. What sort of magical forces would cause Earth to speed up and slow down is unclear. Here on Earth, there is simply no such physical phenomenon to be observed in nature. Yet, this has somehow been accepted as a scientific fact in absence of any experimental corroboration!

Enter the so-called "Equation of Time". Here is what we can read on Wikipedia about this matter.

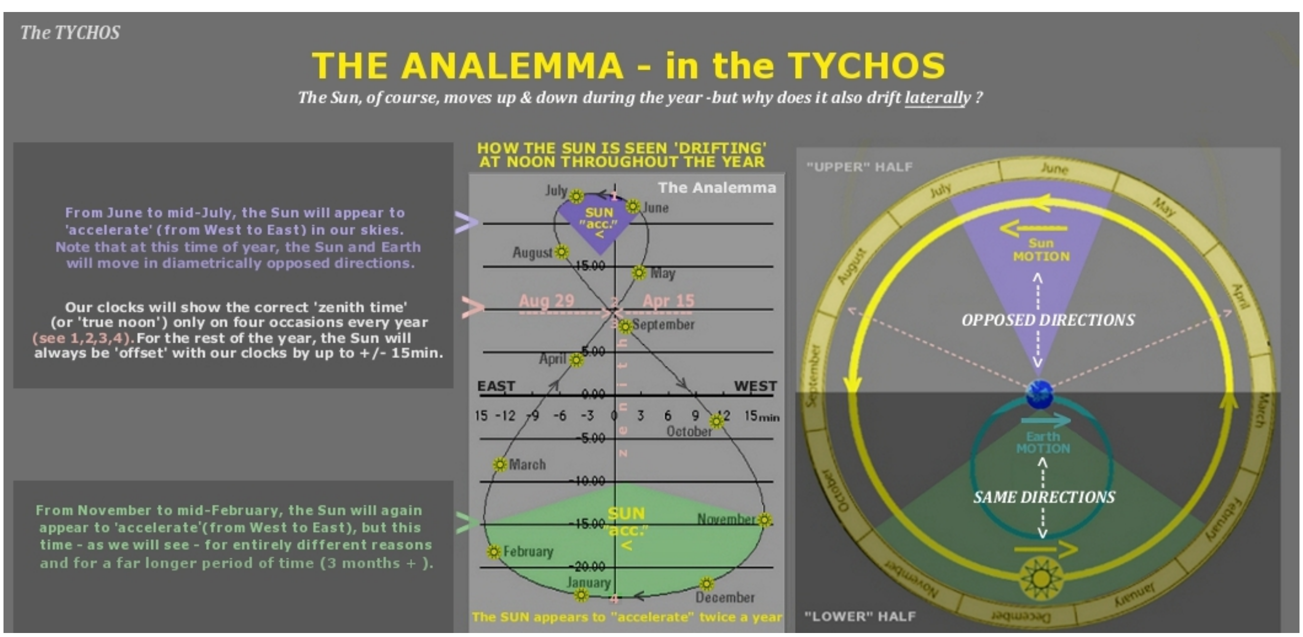
> *"The equation of time is the east or west component of the analemma, a curve representing the angular offset of the Sun*

> *from its mean position on the celestial sphere as viewed from Earth. [...] Apparent time, and the sundial, can be ahead (fast) by as much as 16 min 33 s (around November 5), or behind (slow) by as much as 14 min 6 s (around February 12).”*

So let’s see: if our clocks, in the course of the year, can be “ahead” by about 16.5 min. and “behind” by about 14 min., the total East-West offset of the Sun in relation to the true zenith would thus amount to 30.5 minutes. Now, how can we possibly accurately measure time and calibrate our clocks with the Sun’s motion if our timekeeper (the Sun) keeps “accelerating and decelerating”?

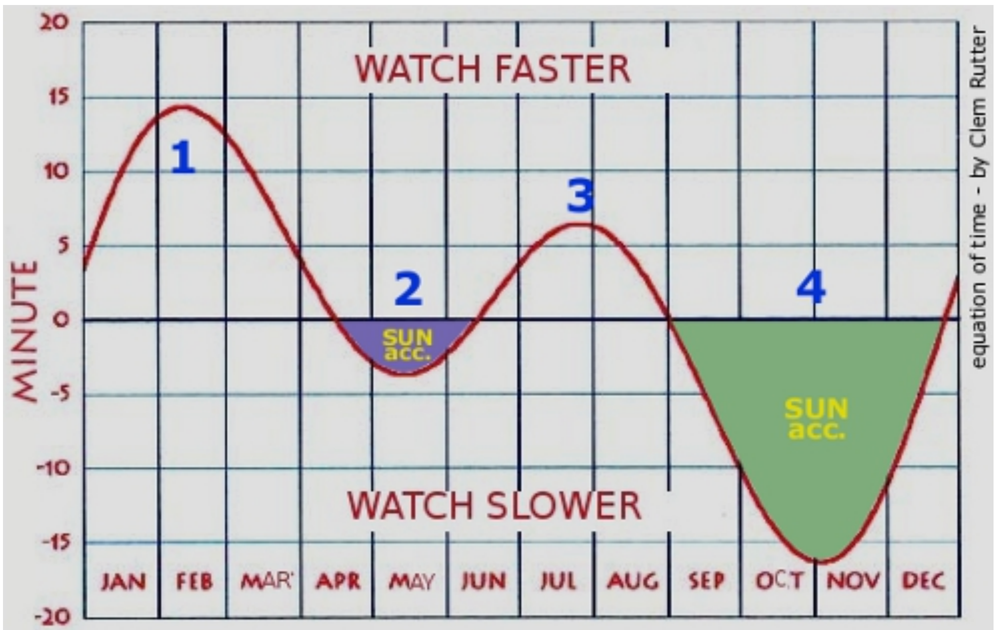
The so-called “Equation of Time” is a man-made convention devised to deal (to the best of our capacities) with this pesky lateral oscillation of the Sun. In fairness, the “Equation of Time” has provided an ingenious solution to this problem. Yet, the fact remains: our clocks, as useful as they are for our daily purposes, are cosmically-speaking almost never exactly synced with the Sun. So, what is going on? Well, let’s see how the TYCHOS model can account for this.

In the TYCHOS model, Earth is located at the center of our system. The Sun (and all of our surrounding celestial bodies) will therefore alternate between **periods of co-directional motions** and **periods of diametrically opposed motions** as viewed from Earth. This will obviously cause the Sun to ***appear*** to seasonally accelerate and decelerate in relation to us earthly observers. My below graphic should help visualize this fundamental aspect of the TYCHOS model which explains several historical enigmas of observational astronomy (and probably made Kepler theorize about elliptical orbits).



Note that my above graphic still does not explain why the Sun appears to accelerate between November and February. We shall see about that later.

Here follows a diagram I have borrowed from Wikipedia (and enhanced for clarity) illustrating the seasonal fluctuations of the Sun's East/West drift — showing a 4-phased sine wave (corresponding to our 4 seasons) of variable amplitudes:



Note that the observed annual "lateral drift" of the Sun adds up to 30.5 min. of RA. However, this is without accounting for the fact that an extra 3.93 min. is added by convention — via the leap-year gimmick, every four years or so. To be precise, 3.78 min. are added on average or over longer periods of time, since some leap years are skipped). Therefore, ¼ of 3.78 min. (*i.e.;* 0.945 min.) should be added to the annual count of the Sun's lateral drift, giving us a total of:

30.5 min. + 0.945 min. = 31.445 min.

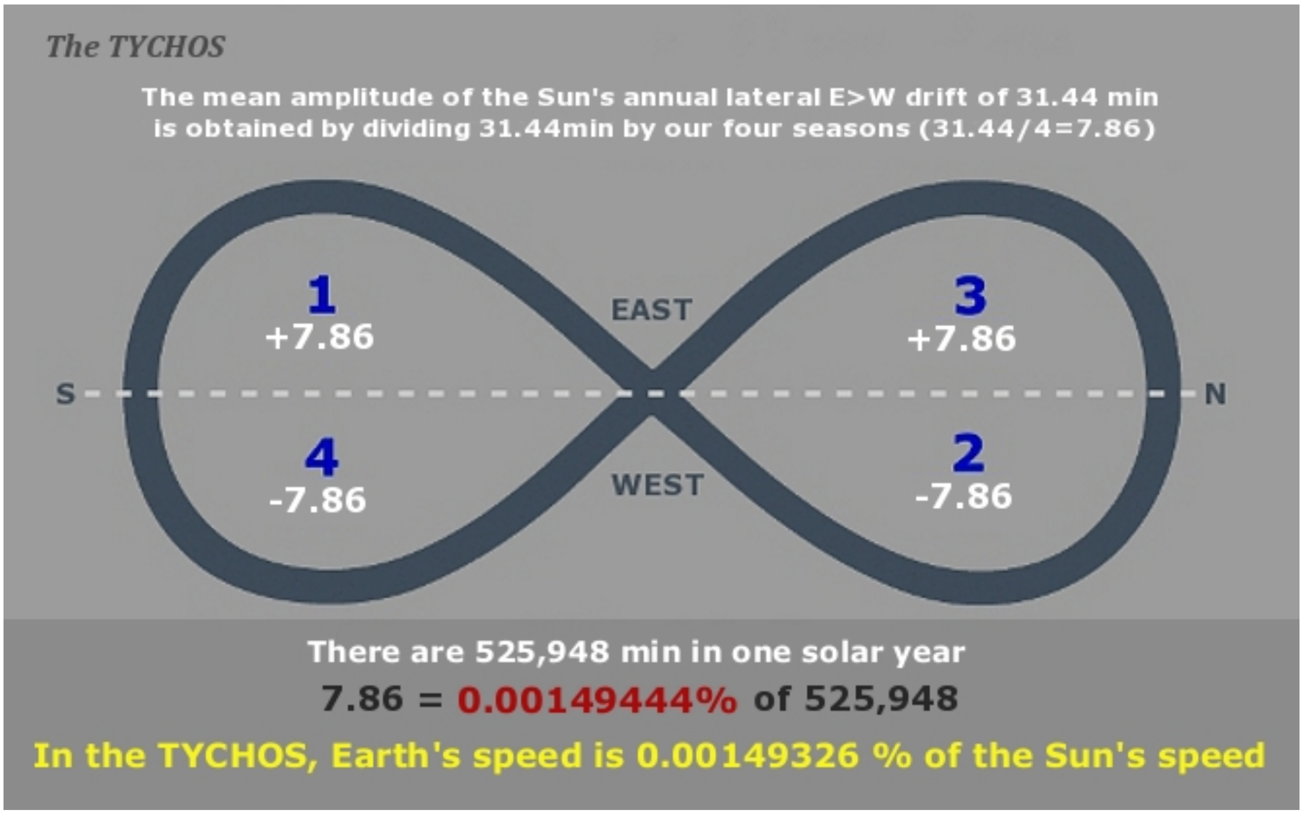
In other words, the mean annual (East-West) oscillation of the Sun around its true zenith amounts to circa **31.44 minutes**.

We shall now verify whether this apparent "acceleration/deceleration" of the Sun is related to Earth's orbital speed of 1.601169 km/h (or ca. 1 mph) which, as we have seen, amounts to a mere **0.00149326%** of the Sun's orbital speed of 107,226km/h.

Since our above analemma sine wave is constituted by four distinct phases (corresponding to our four seasons, *i.e.;* our four celestial quadrants), we may simply divide the total amount of its annual East-West drift (31.44 min.) by 4, in order to obtain the average amplitude of the Sun's annual lateral drift:

31.44 min. / 4 = 7.86 min.

In one solar year there are 525,948 minutes. Our 7.86 value is **0.00149444%** of 525,948 minutes or, lo and behold, near-exactly **0.00149326**. This, if you'll kindly recall, is the TYCHOS "PVP Constant" that represents Earth's motion around its orbit.



As it is, the Sun, traveling at 107,226 km/h, will cover ca. 14,036 km (the annual distance covered by Earth, as of the TYCHOS model) in 7.86 minutes. As we saw earlier, the Sun covers about **half** that distance, as viewed from Earth, in 3.93 min. (7.86 / 2) of RA.

Hence, the East-West "lateral component" of the analemma appears to directly correspond to Earth's orbital speed.

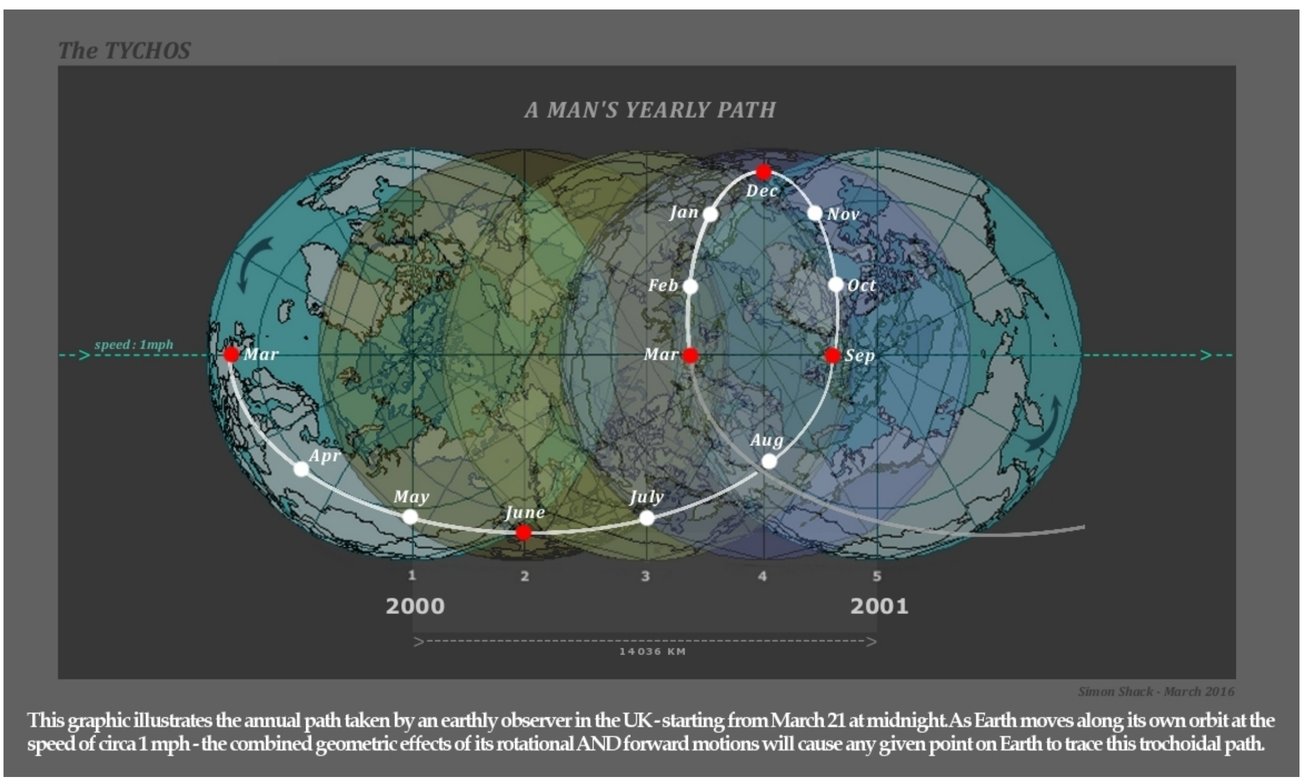
Now, why does the Sun appear to accelerate **for only 1.5 months** between June and mid-July — yet does so **for all of 3+ months** between November and February? What causes this substantial annual asymmetry? Moreover, shouldn't the Sun, on the contrary, appear to ***decelerate*** between November and February, since this is the period when Earth's motion is co-directional with the solar motion, thereby making us catch up somewhat with the Sun?

Well, this is when we need to envision the geometry of the spatial trajectory that an earthly observer will be tracing during the course of one year, in order to conceptualize the geoptical illusion taking place.

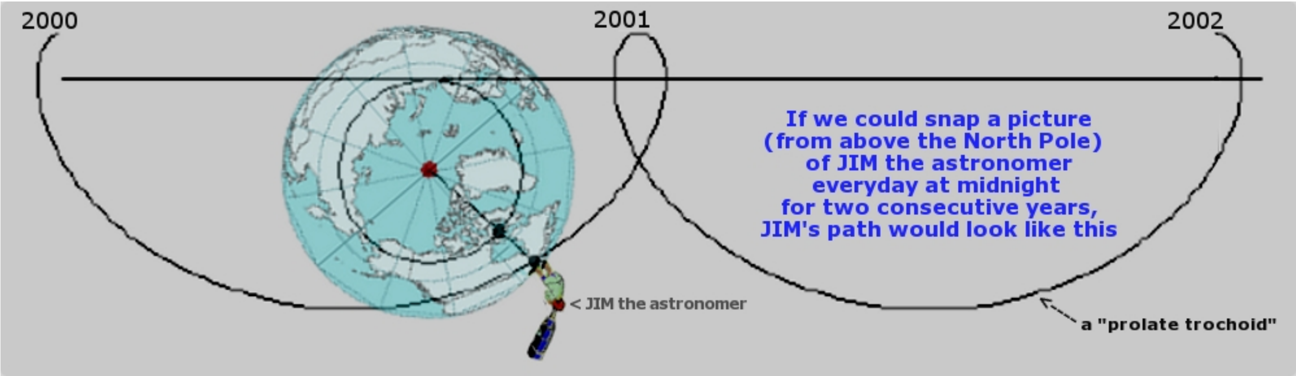
My next graphic plots the path around which any given earthly observer (say, Joe in London) will physically travel each year, as our daily-rotating Earth moves along, covering its annual 14,036 km distance (only slightly more than its own diameter of 12,576 km). This trochoidal path is a natural geometric pattern which any geometers or mathematicians will be quite familiar with.

A Man's Yearly Path

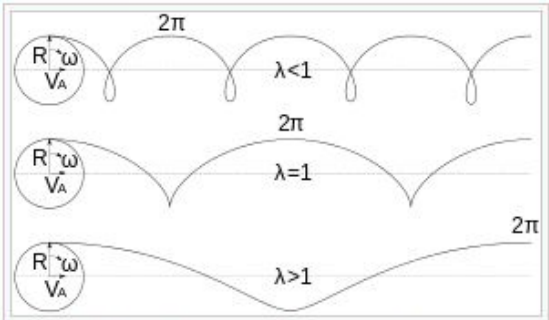
The annual trochoidal trajectory of an earthly observer (view from above North Pole)



As Earth slowly moves ***and*** rotates during the course of the year, "Joe in London" (stargazing from his garden at midnight every night over the course of one year) will be carried around as shown in the above graphic. In fact, all of us earthlings are subjected to this trochoidal path. For instance, <u>any</u> photographer who would patiently snap a picture of the sky at midnight every night (over a full year), will necessarily have to factor in this trochoidal motion of her/his frame of reference, since the path of any given star being monitored over a full year will follow this peculiar trajectory. Thus, to the earthly observer, any given star (our Sun included) will appear to be constantly "accelerating and decelerating" in relation to the observer's perception of space-time.



Ergo, this trochoidal path represents the ever-shifting-frame-of-reference of earthly observers throughout a year.



From top to bottom a prolate, common and curtate trochoid respectively, with *b* being the same for all curves and with λ = *a* / *b*

Please read about "prolate trochoids" on Wikipedia's entry on "Trochoid".

We may thus finally envision the principal cause of so many baffling & bewildering observational oddities debated by astronomers throughout the ages; this pesky trochoidal motion will obviously affect all our earthly perceptions of the annual motions of our surrounding planets and stars, the Sun included. We can see how this annual prolate trochoid can not only provide a definitive explanation for the "analemma dilemma" (see below graphic) but also, a great many of the most hotly debated puzzles, riddles and mysteries of cosmology. To name just a few:

• James Bradley’s puzzlement at the entirely unexpected observed motions of the (circumpolar) stars that he monitored for several years, and which ultimately led him to formulate his dauntingly abstruse (and long-disproved) “stellar aberration” theory.

• Ole Roemer’s perplexity as to the apparent, fluctuating orbital periods of Jupiter’s moon “Io” — which ultimately led him to formulate his (grossly approximated) speed-of-light-estimation that notoriously met with strong scepticism among his contemporaries.

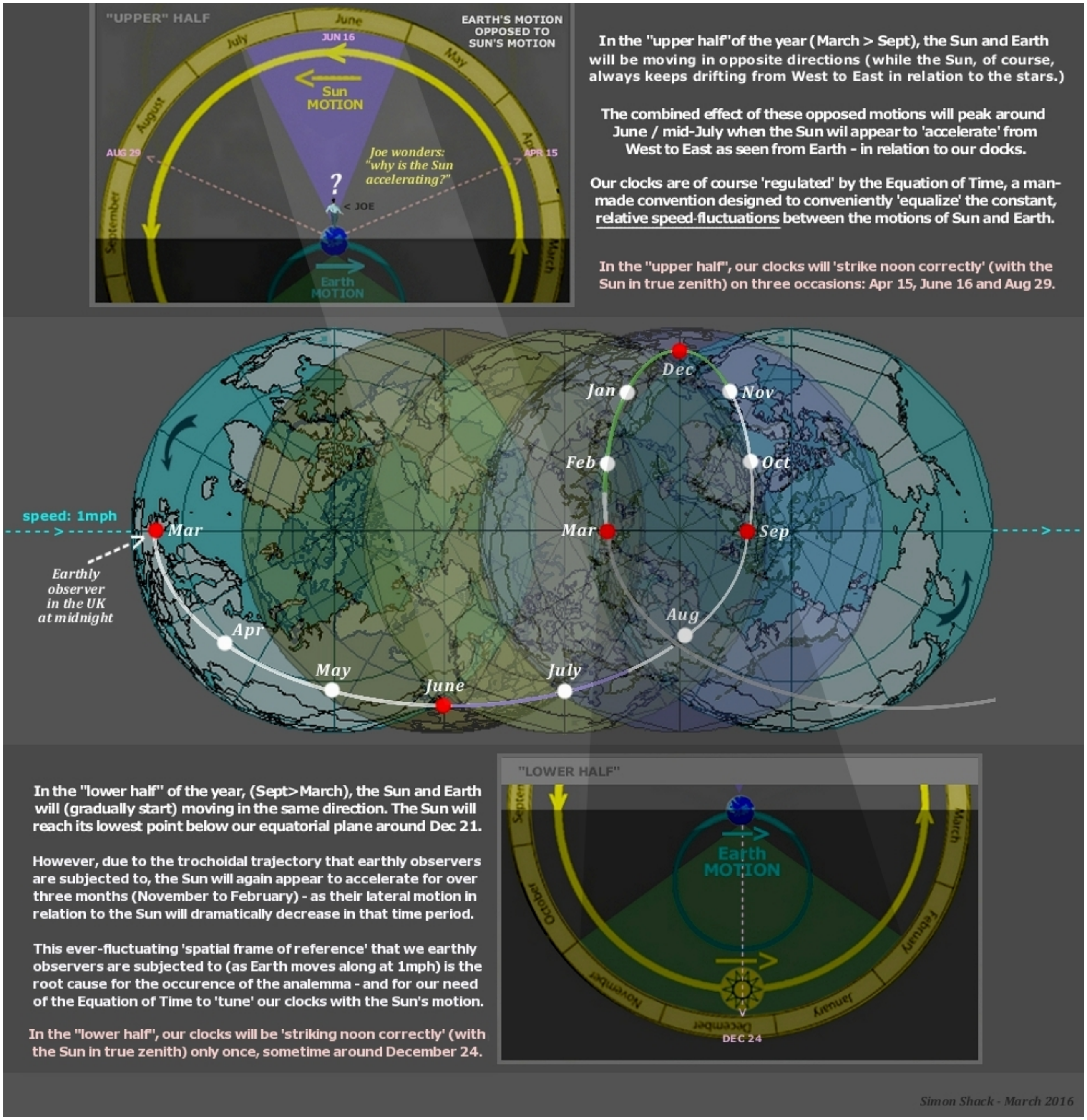
• Johannes Kepler’s bewilderment at the apparent accelerations & decelerations of the orbital speed of Mars, which ultimately led him to formulate his “Laws of planetary motion” all based upon the idea that all of our solar system’s planets revolve around very slightly elliptical orbits rather than uniformly circular orbits.

> *“Calculations of the orbit of Mars, whose published values are somewhat suspect, indicated an elliptical orbit. From this, Johannes Kepler inferred that other bodies in the including those farther away from the Sun, also have elliptical orbits.”*

— from Wikipedia entry for “Kepler’s laws of planetary motion“

Indeed, Kepler only *inferred* that our other planets’ orbits are also elliptical on the strength of his (“somewhat suspect”) calculations of Mars’s orbit. We may now reasonably surmise that Kepler’s proposed elliptical orbits were illusory — and the result of some ad hoc mathematical alchemy he indulged in, so as to make Tycho Brahe’s observations fit into his favored Copernican model.

I now submit my best, definitive explanation for the analemma phenomenon. Although my next graphic may contain a handful of text and conceptual visuals, I hope that it may clearly convey the peculiar “space-time” mechanism responsible for the apparent accelerations and decelerations of the Sun throughout the year.



In conclusion, the lateral component of the Analemma is caused by a combination of two concurring factors:

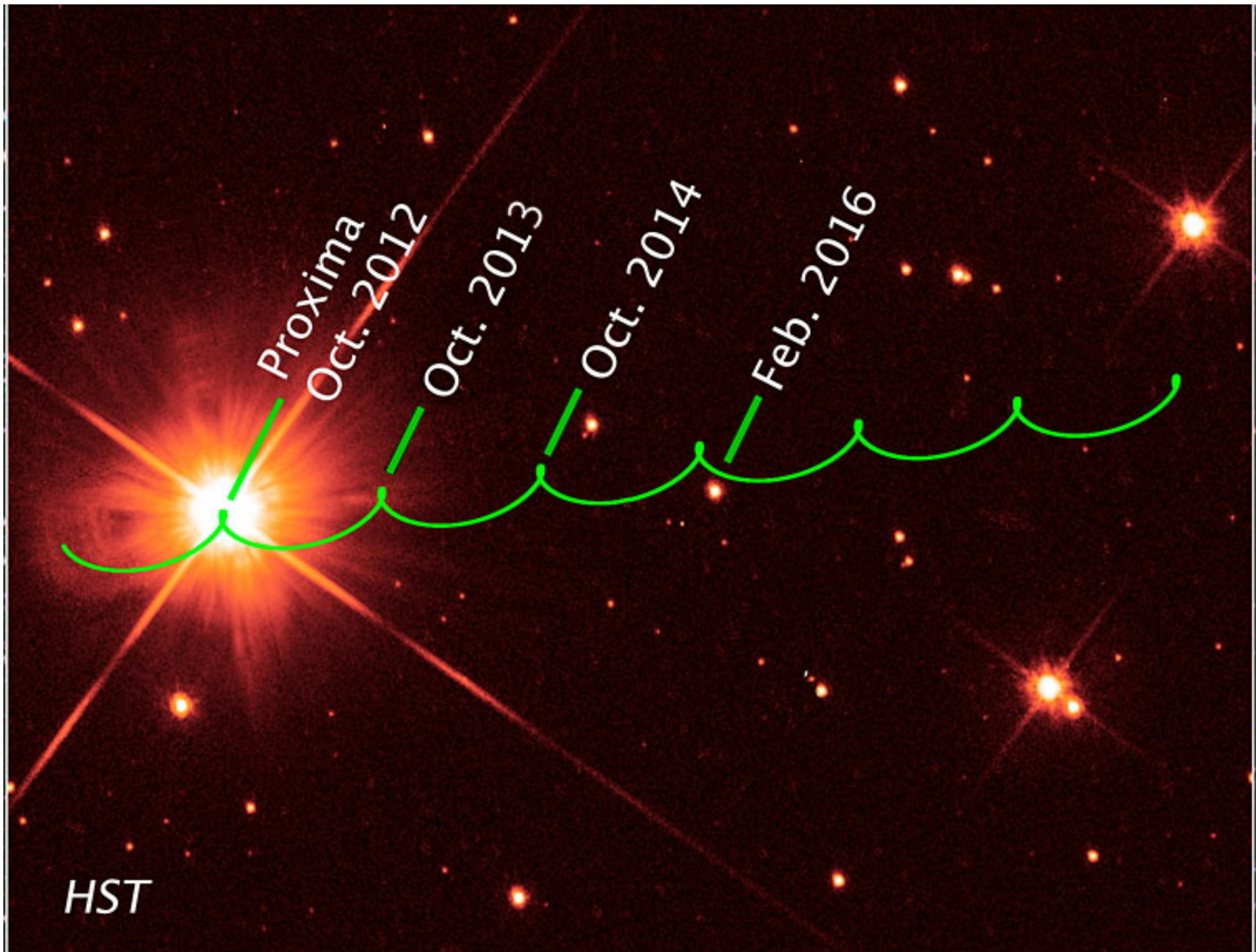
- the seasonally-reversing relative spatial motions of Earth and the Sun

- the annual trochoidal path around which any earthly observer will "swirl"

The latter will cause the Sun to appear to accelerate during our

Northern hemisphere's winter months.

One may wonder if stars observed over long periods of time reveal that they are exhibiting trochoidal paths. As a matter of fact, we do have empirical evidence that they do. Here follows an illustration plotting the observed multi-annual path (between 2012 and 2016) of our nearmost star, Proxima Centauri. It clearly exhibits a trochoidal path (the green looped line) as would be logically expected under the TYCHOS model paradigm.



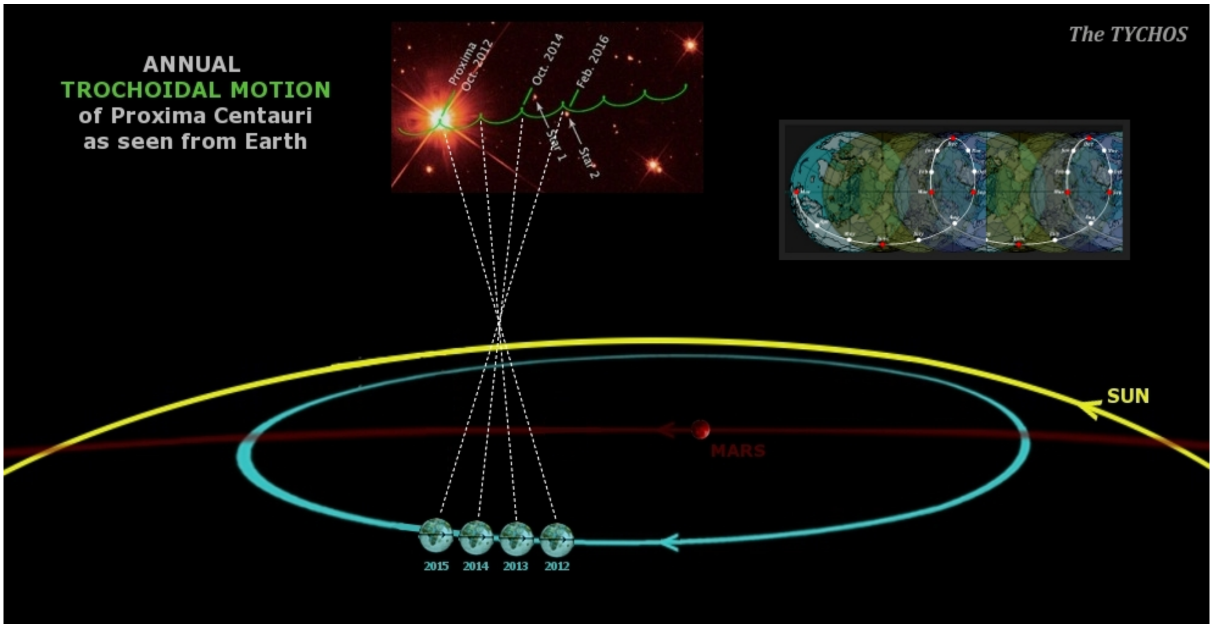
The path of Proxima Centauri through the sky. The looping action is the result of Earth's orbit around the Sun. **(???)**
NASA / ESA / STScI / AURA / UKSTU / AAO

The above image and its curious description are from *Hunting for Planets Around Proxima Centauri* by David Dickinson (January 25, 2016) for Sky and Telescope Magazine

The caption tells us that *"the looping action is the result of Earth's orbit around the*

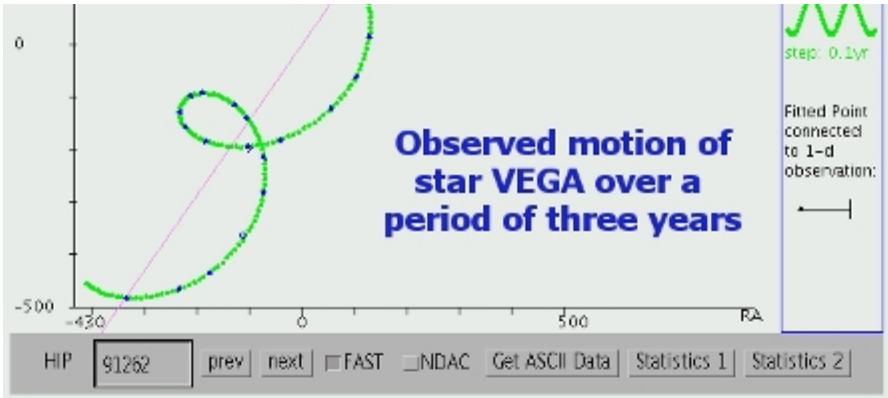
Sun”. How Earth’s annual revolution around the Sun, as of Copernican theory, could possibly generate such an elongated trochoidal pattern has no conceivable explanation.

On the other hand, the TYCHOS model can plainly illustrate why Proxima Centauri is observed to trace a trochoidal path:



In the above graphic, Earth’s size versus that of its orbit is exaggerated for graphic clarity. An earthbound observer of Proxima Centauri would note, over several years, that the star would appear to advance on a “bobbing” motion line. Why would Proxima Centauri exhibit such a multiannual trochoidal path under the Copernican model’s tenets? In reality, any star being monitored for several successive years will naturally exhibit this trochoidal path, since any astronomer measuring from a fixed location on Earth is subjected to it.

Here follows another diagram plotting the observed motion of star Vega over a three-year period. As you can see, Vega traces a three-year-long trajectory which is perfectly consistent with the geometric principles of the TYCHOS model.



Above – from *Heliocentric parallax* by Michael Richmond (2014) for Rochester Inst. of Technology

What all of this implies should be intuitively obvious:

1. All astronomical observations must necessarily take into account this annual trochoidal motion of our earthly reference frame.

2. This trochoidal motion is the root cause (along with the seasonally-reversing relative motions of Earth and the Sun) for our need of the Equation of Time – the function of which is an attempt at equalizing the irregular lateral drift of our "time-keeper", the Sun.

3. Our earthly trochoidal motion goes to resolve a number of age-old, astronomical riddles in relation to matters pertaining to stellar motions, parallax, the Equation of Time and all the way to James Bradley's arcane "stellar aberration" theory.

In fact, as I made the above graphic titled "A Man's Yearly Path", I had in mind Astronomer Royal James Bradley, the man widely credited with proving, once and for all, that Earth revolves around the Sun. The entirely unexpected stellar motions that Bradley had observed made no sense whatsoever under the Copernican heliocentric theory, and caused a humongous stir among the scientific community. Little did Bradley know of the annual, trochoidal path affecting his own body, telescope and frame of reference!

As one reads the detailed accounts of Bradley's famed, multi-annual observations of stellar motions, it becomes clear that what Bradley describes is just what would be expected within the rotational framework of the TYCHOS model. He eventually concocted a bizarre *ad hoc* antidote to his problem, namely the infamous “aberration of light” theory, which I will tackle in Chapter 34.

Previous Chapter Next Chapter

Chapter 27 — About our Moon and what it tells us

In the TYCHOS, our Moon turns out to have the most revealing period of 29.22 days, which I will henceforth call the Moon's True Mean Synodic Period (TMSP). As mentioned earlier, this figure provides us with the spectacular indication that our Moon plays a central role in our Sun-Mars binary system. This stands in stark contrast to the Copernican notion that the Moon is just a peripheral appendage circling around Earth. If that were the case, why would all of our system's celestial bodies in the Copernican scenario exhibit exact multiples of Moon's average synodic period of 29.22 days? Let us now review the crucial point of determining this figure.

As mentioned earlier, there is no conceivable reason, within the Copernican model, for our lunar satellite to interact with Mercury, the Sun, Venus, Mars and Jupiter at such exact multiple orbital resonances of 1 : 4 : 12.5 : 20 : 25 : 150. Review once more my table for the planetary orbits:

ORBITAL PERIOD	MULTIPLE of TMSP	TOTAL ORBIT
Moon	29.22 X 1	29.22 days
Mercury	29.22 X 4	116.88 days
Sun	29.22 X12.5	365.25 days
Venus	29.22 X 20	584.4 days
Mars	29.22 X 25	730.5 days
Jupiter	29.22 x 150	4383 days

Our Moon is ostensibly at the center of our system in the capacity of some central driveshaft for its cosmic companions.

I can hear an objection like, *"Hold it! Why 29.22 days? Isn't the known synodic period of the moon 29.53 days?"*

Yes, that is indeed what an earthly observer may hastily conclude. Yet, that value will depend on the particular time-window chosen to compute the Moon's synodic period. Therefore, only by spending centuries of careful observations will a correct average value of the Moon's synodic period be obtained. That is just what the meticulous Aztecs appear to have done, as their famed Toltec Sunstone suggests.

> *"To summarize, then, the Toltec Sunstone is an image of the motion of Venus, consisting of two hundred sixty, 8-year, periods, divided up into forty 52 year periods, as encoded in the ring of 40 quincunxes surrounding the ring of 20-day names. Each 8-year period of 2922 days is counted by a rotation of the 20 day-sign ring, where each day-sign actually represents one month of 29.22 days. Therefore, one complete revolution of the day-sign ring counts 20 x 29.22 days, or the average Venus year of 584.4 days. Five of these revolutions, each uniquely named in the center quincunx, counts 100 x 29.22 = 2922 days, or five Venus years of 584.4 days each, which is equivalent to eight years of 365.25 days each. By assigning the 20 day-sign symbols to a lunar month of 29.22 days, each month of the Venus year has a unique name, just as the twelve months of our Earth year has, making it easy for the public to mark the months, or 'moons,' as they went by."*

— p.6, *The Aztec Calendar Stone is not Aztec and it is not a Calendar* by Douglas L. Bundy (November 13, 2012)

For instance, if you choose a time-window of 65 years + 2days (a little-known interval at both ends of which the Moon will realign with the Sun) you would conclude that the Moon's average synodic period is "29.53 days", because 65 X 365.25 days + 2 days ≈ 23743 days.

If we divide 23743 days by 67 (the number of possible integer Lunar years in 65 solar years), we obtain 354.373 days.

Therefore, one average "Long ESI" (Empiric Synodic Interval) of the Moon will compute to:

354.373 days / 12 ≈ **29.53 days**

Whereas if you choose a time window of 19 years (a well-known time interval, the Metonic cycle, at both ends of which the Moon will realign with the Sun), you would conclude that moon's average period is 28.91 days.

19 X 365.25 days = 6939.75 days

If we divide 6939.75 d by 20 (the number of possible/ integer Lunar years in 19 solar years) we obtain 346.98 d.
Therefore, one average "short ESI" (Empiric Synodic Interval) of the Moon will compute to

346.98 d / 12 = **28.915 days**

But the smart Aztecs probably knew better to average the Long and Short ESIs in order to obtain the more accurate (over longer time periods) True Mean Synodic Period:

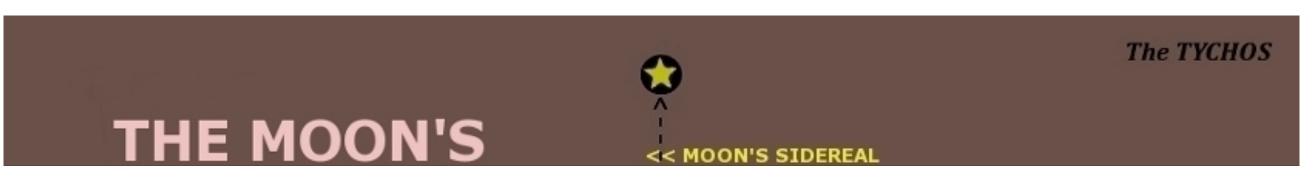
(29.53 + 28.915 = 58.445) / 2 ≈ **29.22 days (our TMSP)**

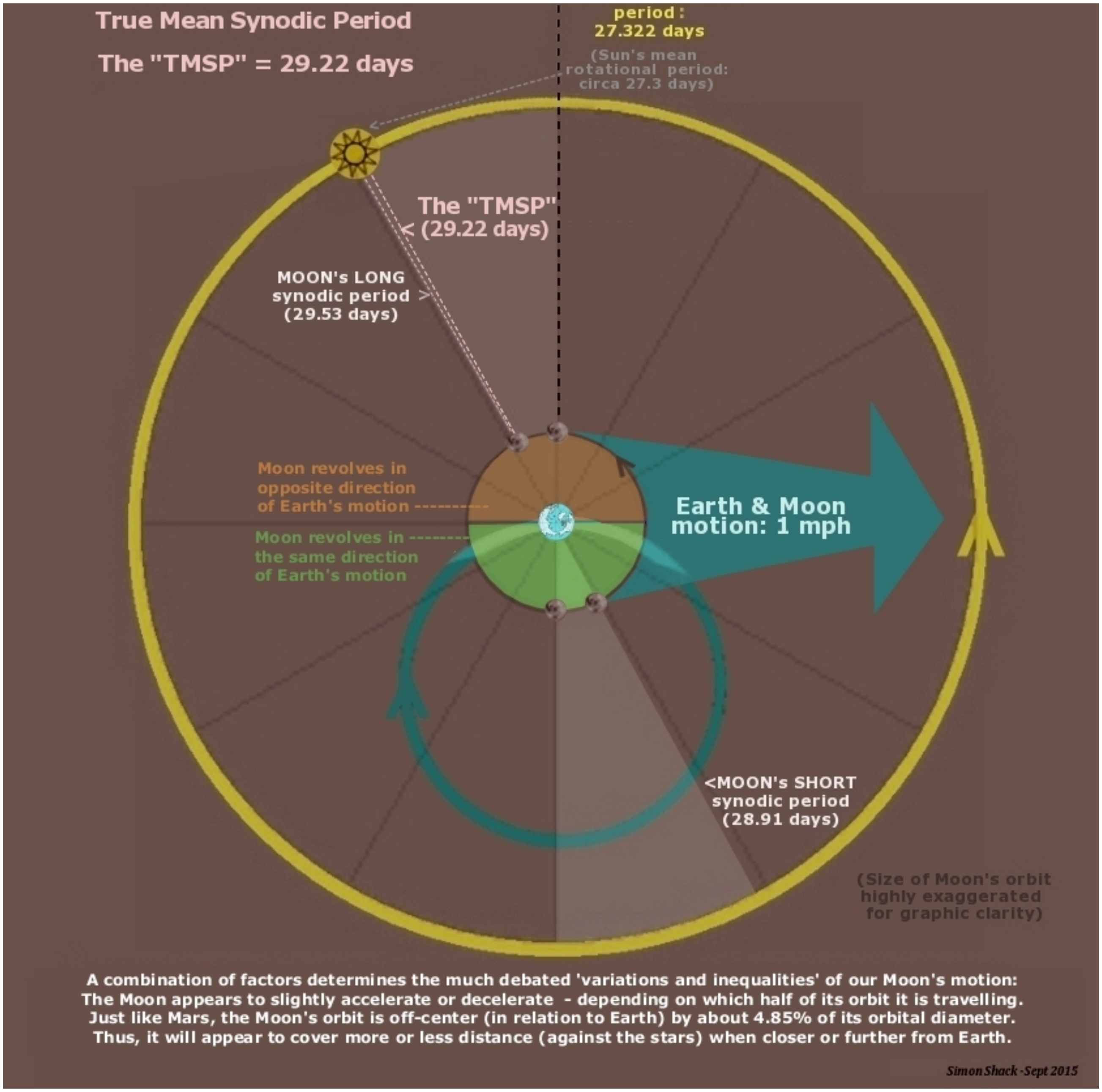
The Moon also has a little-known 8-year cycle in which it very nearly realigns with the Sun every 2922 (+1-2) days.

This number can be obtained from: 100 revolutions X 29.22 = 2922 days = 8 solar years

Notably, the Moon's 8-year cycle mirrors Venus' 8-year cycle of 2922 days (5 Venus synodic periods of 584.4 days).

In conclusion
29.22 days is our TMSP (True Mean Synodic Period) of the Moon. The higher and lower observed values of the Moon's synodic periods (29.53 days and 28.91 days) are just seasonal fluctuations caused by the collective 1-mph-motion of Earth and the Moon as they jointly advance along the PVP orbit. Since the Earth-Moon system revolves in the opposite direction of the Sun, their respective revolutions will be opposed or co-directional, depending on the time of year. The "acceleration/deceleration" illusion of the Moon is thus created.





Note that the Sun's mean rotational period is also circa 27.3 days. This is close to the Moon's sidereal period of 27.322 days. In other words, the Sun rotates once around its axis in roughly the same time that the Moon revolves once around Earth!

> *"The Carrington rotation number identifies the solar rotation as a mean period of 27.28 days, each new rotation beginning when 0° of solar longitude crosses the central meridian of the Sun as seen from Earth."*

— p. 55, *The Sun and How to Observe It* by Jamey L. Jenkins (2009)

Magnetic storms and their correlated parameters tend to recur with period of about 27.3 days. An active part of the sun develops as solar storm. Such a region, symbolically called *M* region, increases its radiation output to a maximum over a period of time, and then the output begins to decay over a longer period. The radiation output causes magnetic storms as in section 8.16. As the sun rotates the *M* region faces the earth again and again, causing storms in the solar rotation period of about 27.3 days. The increased wave radiation from the *M* region also increases the amplitude of *Sq* with a period of 27.3 days. This is discussed in section 8.3.

Extract from "Equatorial Electrojet" (page 13) - by C Agodi Onwumechikli

p. 13, *Equatorial Electrojet* by C Agodi Onwumechikli (1998)

Let us now verify whether the various orbital speeds of the Moon versus its companions (Earth, Sun and Mars) correctly relate to each other. The fact that the Moon returns facing a given star in 27.322 days (or 655.728 hours) seems to add up: in 655.728 hours, the Moon (traveling at 3656 km/h) will cover **2,397,3**41.568 km — which is only a trifle more than its orbital circumference of **2,397,3**33.6 km.

As seen from Earth, the Moon usually returns facing the Sun in 29.53 days (or 708.72 hours — its synodic period). As it travels at 3656 km/h, in 708.72 hours the Moon will cover 2,591,080,32 km, which is ca. 8% more than the Moon's orbital circumference of 2,397,333.6 km.

Please note that our Moon's TMSP (True Mean Synodic Period) of 29.22 days is exactly 8% of 365.25 days. And in fact:

> In one TMSP, Earth (traveling at 1.601169 km/h) will cover 1122.867 km.
> This is **exactly 8%** of its annual motion (of 14,036 km) along the PVP orbit.
>
> In one TMSP, the Sun (traveling at 107,226 km/h) will cover 75,195,449.28 km.
> This is **exactly 8%** of its full orbit's circumference (of 939,943,910 km).
>
> In one TMSP, Mars (traveling at 81,854.866 km/h) will cover 57,403,180,43 km.
> This is **exactly 4%** of its full orbit's circumference (of 1,435,079,524 km).

Observe that the Moon's TMSP corresponds to the same 8% ratio of both Earth's ***and*** the Sun's orbital motions in the same time period. Moreover, the fact that the TMPS equals 4% of Mars's orbital motion (as opposed to 8% of the Sun's motion) provides further evidence that the Sun and Mars are, in fact, two binary companions ”interlocked” at a perfect 2:1 ratio.

The Copernican model's “lunatic” sidereal period

Keep in mind that if Earth and the Moon truly traveled together around the Sun at 107,226 km/h they would both move by about 70 Million kilometers every 27.322 days. Yet, in observation, our Moon lines up with the very same star each and every 27.322-day-period.

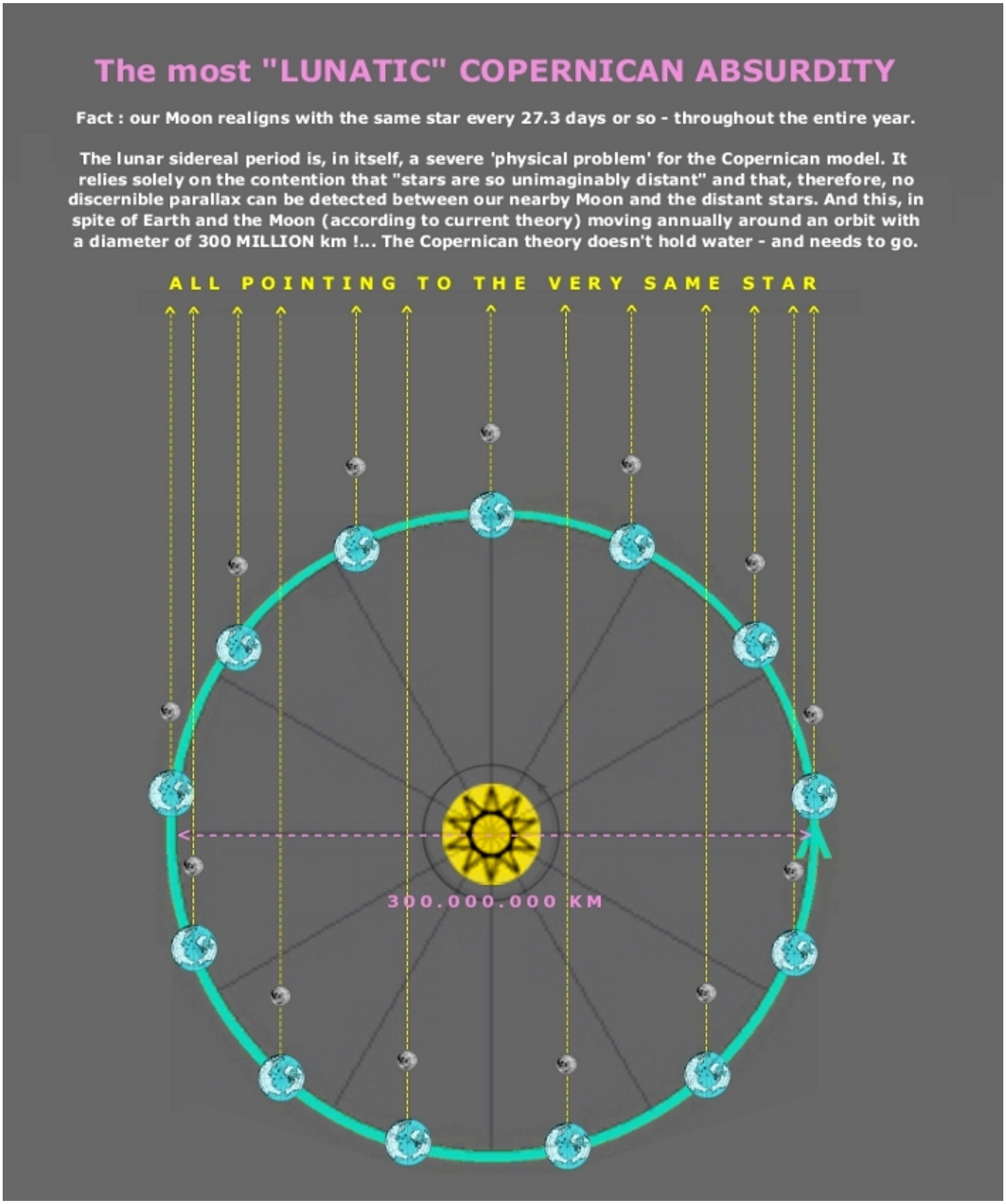
As we take a good look at the Moon's sidereal period (of 27.322 days) through the lens of the Copernican model (which has Earth and the Moon circling the Sun around a 300 Mkm-wide orbit) we see that, once again, it miserably fails the reality test.

Let us compare its premise to a narrative situation that we can easily relate to:

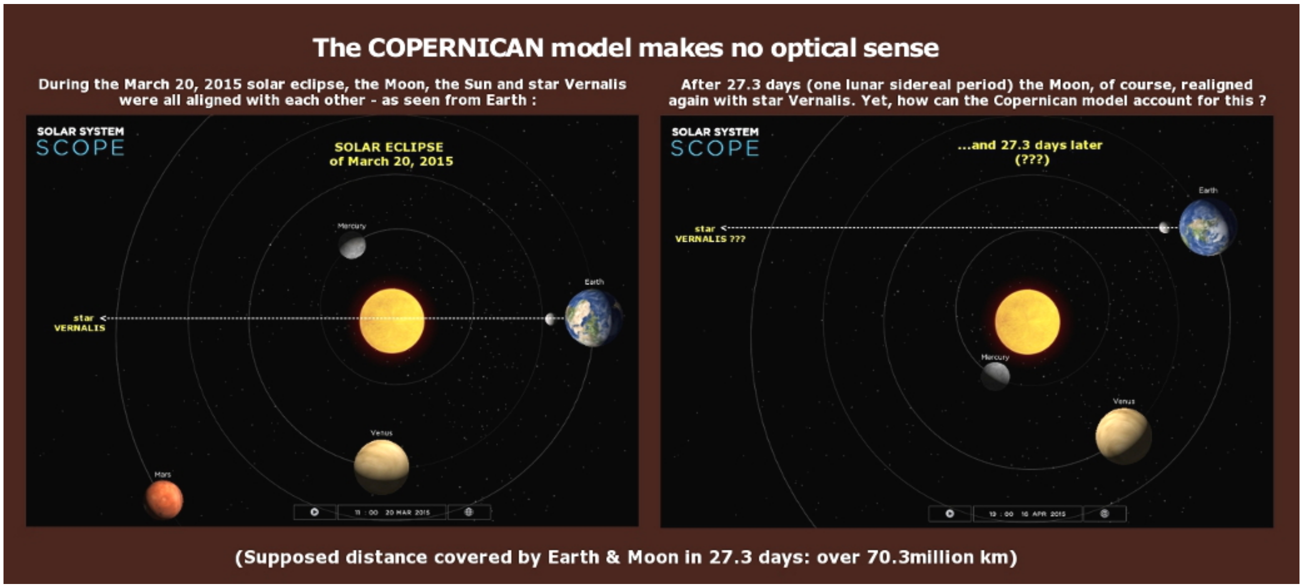
> Imagine a prisoner held on a ship which perpetually “hangs a left” as it travels around a huge, circular route, in a counter-clockwise direction. It takes as many as 365.25 days for the ship to complete this circle (the poor prisoner can sense that the ship is circling at a certain speed). His only equipment is a magnetic compass. One night, the fog clears and this hapless sailor sees a distant lighthouse starboard and somewhat ahead and estimates the lighthouse is due North of the middle of this ship's circular path. He really wants to figure out how long it takes for the ship to complete its circular journey. So he checks his compass and faces himself exactly North, raises his forefinger in front of his nose, and patiently waits for the lighthouse to align with his finger. After it aligns for the first time, he counts the days it takes for the lighthouse to return aligned with his Northward-pointing finger.
>
> The question is:

Should we expect our sailor to see that lighthouse regularly lining up with his finger every 27.322 days?

Of course not. Yet, this is exactly what is implied by the Copernican model!



To make this major Copernican absurdity very clear, here is how the SCOPE Planetarium depicts the solar eclipse of March 20, 2015 (which I personally viewed from Rome) compared to a successive position of Earth & Moon (27.3 days later, on 16 April, 2015):



In fact, the entire Copernican theory relies on the misconception that *"very distant stars will not be affected by parallax."*

Allow me now to state the obvious with regards to the fundamental optics & physics associated to the very concept of parallax:

Yes. Very little parallax will occur between two very distant objects (such as two unequally distant stars).

No. A relatively nearby object (such as the Moon) cannot possibly remain aligned with any distant star in line of sight whilst both the observer and the nearby object drift laterally for several million kilometers. It does not matter how distant the star may be.

It is truly astonishing that the Copernican theory has survived, largely unchallenged, for as long as 400+ years.

About Lunar and Solar Eclipses — the Saros and Exeligmos cycles

> *"The saros is a period of approximately 223 synodic months (approximately 6585.3211 days, or 18 years, 11 days, 8 hours), that can be used to predict eclipses of the Sun and Moon."*

— from Wikipedia on "Saros astronomy"

Note that the Saros cycle of 6585.3211 days is nearly equal to 16 Full Moon cycles of 411.78433 days:

6585.3211 / 16 ≈ 411.5825 days

Now, the 18-year Saros cycle is just part of a longer more complete Triple Saros cycle of 19,756 days. This is known as the "Exeligmos" (Wikipedia link).

> *"The Mesopotamians, and in particular the Babylonians, were one of the first civilisations to keep records of their astronomical observations. Because of this, they were also the first to notice a remarkable pattern: that eclipses of a particular type are repeated every 18 years, and more closely repeated every 54 years. The 18 year period became known as the Saros, and the 54 year one as the Triple Saros or Exeligmos."*

— *On the Saros* by Kevin Clarke (1999), InconstantMoon.com

As a 54-year Exeligmos is completed, our Moon returns to its start position, which means that a lunar or solar eclipse will recur over almost the same geographic region as it did 54 years earlier. It is highly important to note that at the completion of one Exeligmos the eclipse will return to a place positioned 90 minutes earlier in our celestial sphere.

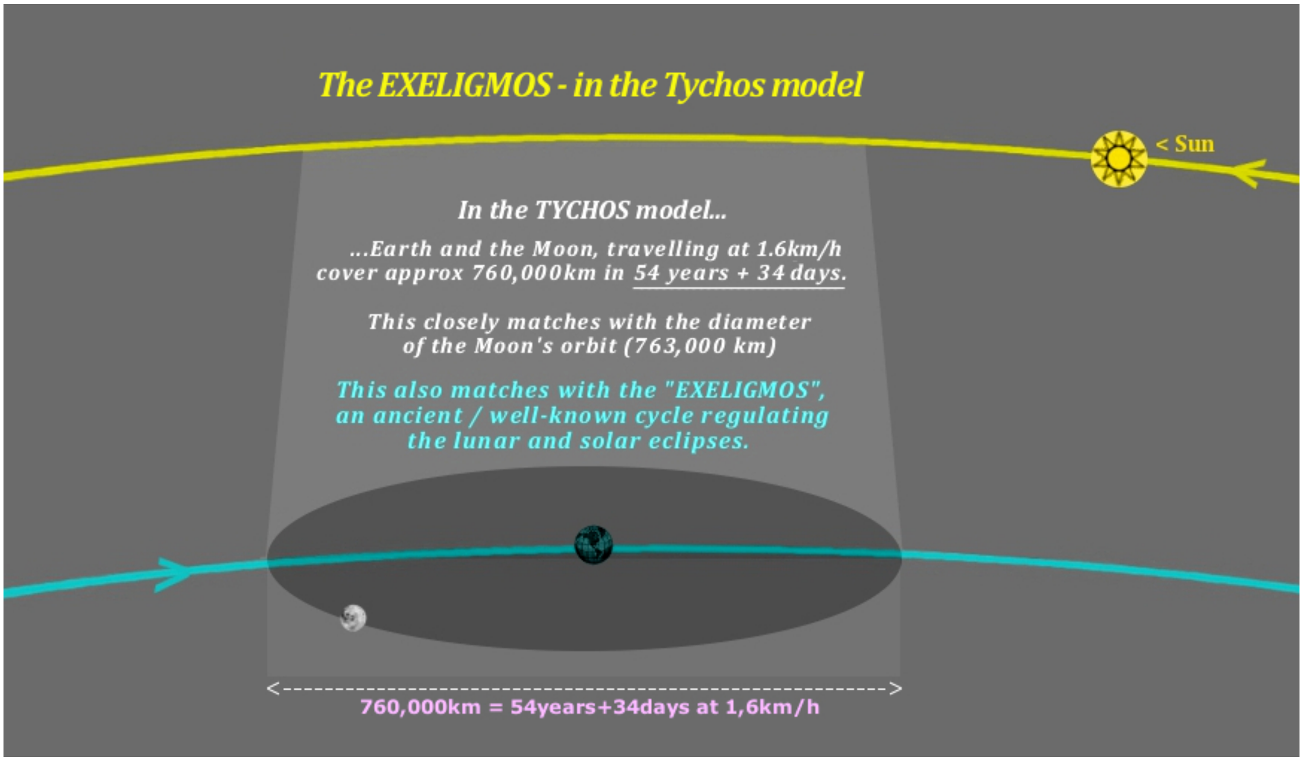
1440 minutes / 90 minutes = 16

That is, the Moon will gain exactly 1/16th of a full revolution of right ascension (RA).

When we consider Earth's 1 mph motion, it gets really interesting. The distance covered by Earth and the Moon, in unison, in the course of a 54-year Exeligmos cycle, turns out to be very close to the **orbital diameter** of our Moon (ca. 763,000 km).

19756 days X 38.43 km = 759,223.08 km

This is just about 3800 km shorter than the Moon's orbital diameter. However, one may reasonably consider that this discrepancy may be accounted for by the diameter of the Moon itself (3476 km).



It would seem intuitively logical that an Exeligmos cycle will be completed when Earth and the Moon have together covered a distance almost equal to the Moon's orbital diameter.

The Triple Saros cycle or "Exeligmos" comprises ca. 19,756 days, into which one can find nearly 48 Full Moon cycle lengths.

19,756 / 411.78433 days (a Full Moon cycle) ≈ **48**

Please read the Wikipedia entry on "Full moon cycle".

So 16 shows up again (3 X 16 = 48) telling us just how much the unsung "16 factor" pervades the arithmetic regulating our system's celestial bodies. Add to this our realization that orbits share resonance at various multiples of the Moon's TMSP period of 29.22 days. The Moon appears to be in every aspect a body of central importance to our binary solar system.

Let us briefly recap the ubiquitous appearances of the "16 factor".

- Mars revolves around our system (from aphelion to perihelion) in about **16 years**.

• As Mars completes one of its orbits, it processes by **1/16th** of a solar year (22.828 days).

• Every 32 years (2 X **16**), Mars very nearly conjuncts with all of our system's celestial bodies.

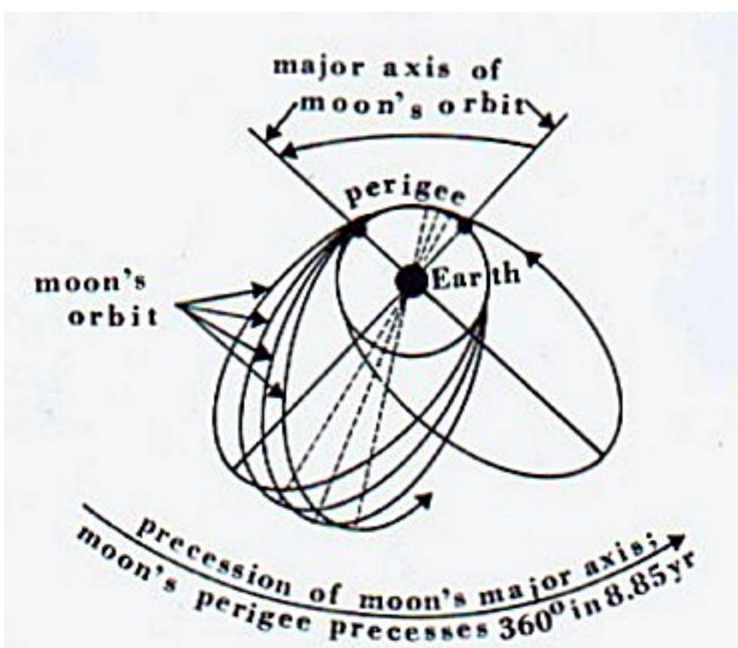
• Mercury regularly retrogrades for an average period of **1/16th** of a solar year (22.8 days).

• The Sun's orbital speed (107.226 kmh) is extremely close to **16** X its rotational speed (6670 kmh).

• Our Moon's Saros and Exegilmos cycles appear to be multiples of **16** Full Moon cycles.

• As it completes one Exegilmos cycle our Moon gains **1/16th** of a full 1440 minutes of RA.

The Moon's Perigee Precession agrees with the TYCHOS Great Year



The above graphic depicts the current astronomical understanding of the Moon's perigee precession (*a.k.a.* the Moon's "apsidal precession"). It is observed that our

Moon’s perigee precesses by 0.1114° per day:

> *“Note that the lunar perigee precesses in the direction of the moon’s orbital motion at the rate of $n - \tilde{n} = 0.1114^{\circ}$ per day, or 360° in 8.85 years.”*

— *A Modern Almagest: An Updated Version of Ptolemy’s Model of the Solar System* by Richard Fitzpatrick (2010)

So, if our Moon’s perigee precesses by 0.1114° daily, it will complete one 360° revolution in 8.8476327 years.

360° / 0.1114° ≈ 3231.5978 (days) or **8.8476327 years**

In total, the Moon’s perigee precesses annually by

0.1114° X 365.25 = 40.68885°

146,479.86 arcseconds

As we compare this empirically-observed annual precession value of Moon’s perigee with our ACP of $51.1\overline{36}$”, we see that the Moon’s perigee precesses 2864.495 X faster than the Sun.

146,479.86 arcseconds / 51.136 arcseconds ≈ 2864.495

Remember our ACP of $51.1\overline{36}$” adds up to a full 360° precession in 25344 years.

3231.5978 days / TMSP (29.22 days) ≈ 110.595408

There are 110.595408 TMSPs in 8.847632 years.

110.595408 X 2864.495 ≈ 316,800

Ergo the exact number of TMSPs completed in one Tychos Great Year of 25344 years and in perfect accord with my proposed Sun-Moon orbital resonance of 1 : 12.5.

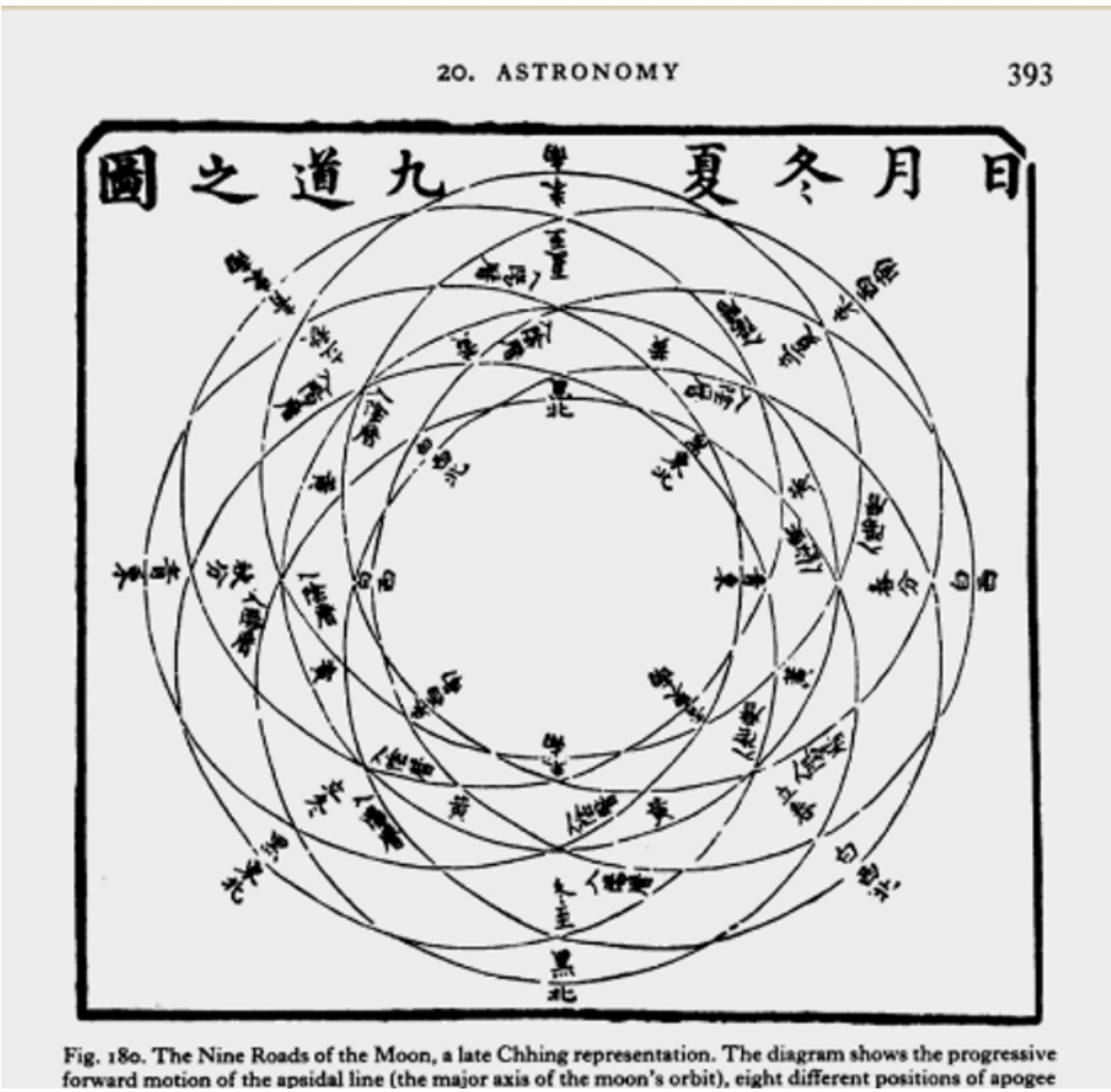
12.5 X 25344 = 316,800

In conclusion, the Moon's empirically-observed apsidal precession is in full agreement with the TYCHOS model.

Previous Chapter Next Chapter

Chapter 28 — The Moon-Mercury Synchronicity

We shall now take a look at the remarkably resonant long-term orbital periods of Mercury and our Moon. As we saw earlier, our Moon completes one precessional period from **perigee to perigee** every 8.84763 years or 3231.6 days. As shown in the below Chinese diagram, our Moon completes one precessional period from **apogee to apogee** in the slightly longer period of 3232.575 days.



20. ASTRONOMY 393

Fig. 180. The Nine Roads of the Moon, a late Chhing representation. The diagram shows the progressive forward motion of the apsidal line (the major axis of the moon's orbit), eight different positions of apogee

(represented by the outermost bulges on the diagram) being passed through in 8–9 years (actually 3232·575 days). The 'road' should of course be drawn as one single interweaving line, not as nine separate lines, but that was the old Han tradition.

A Chinese diagram of the apsidal precession of our Moon's Apogee
from p.393, *Science and Civilisation in China, Volume 3: Mathematics and the Sciences of the Heavens and the Earth* by Joseph Needham (1959)

Let's see: can we perhaps find any long-term resonances between our Moon's behavior and that of Mercury, the Sun's junior moon? (Mercury, of course, transits in perigee when it is in inferior conjunction with the Sun and transits in apogee when it's in *superior* conjunction with the Sun). To verify this, we shall multiply our Moon's perigee & apogee periods by 10, so as to obtain more significant *long-term* periods with which to compare our Moon's and Mercury's respective perigee & apogee transits:

> 3231.6 days (our Moon's perigee-to perigee period) **X 10** = **32,316 days**
> 3232.575 days (our Moon's apogee-to apogee period) **X 10** = **32,325.75 days**

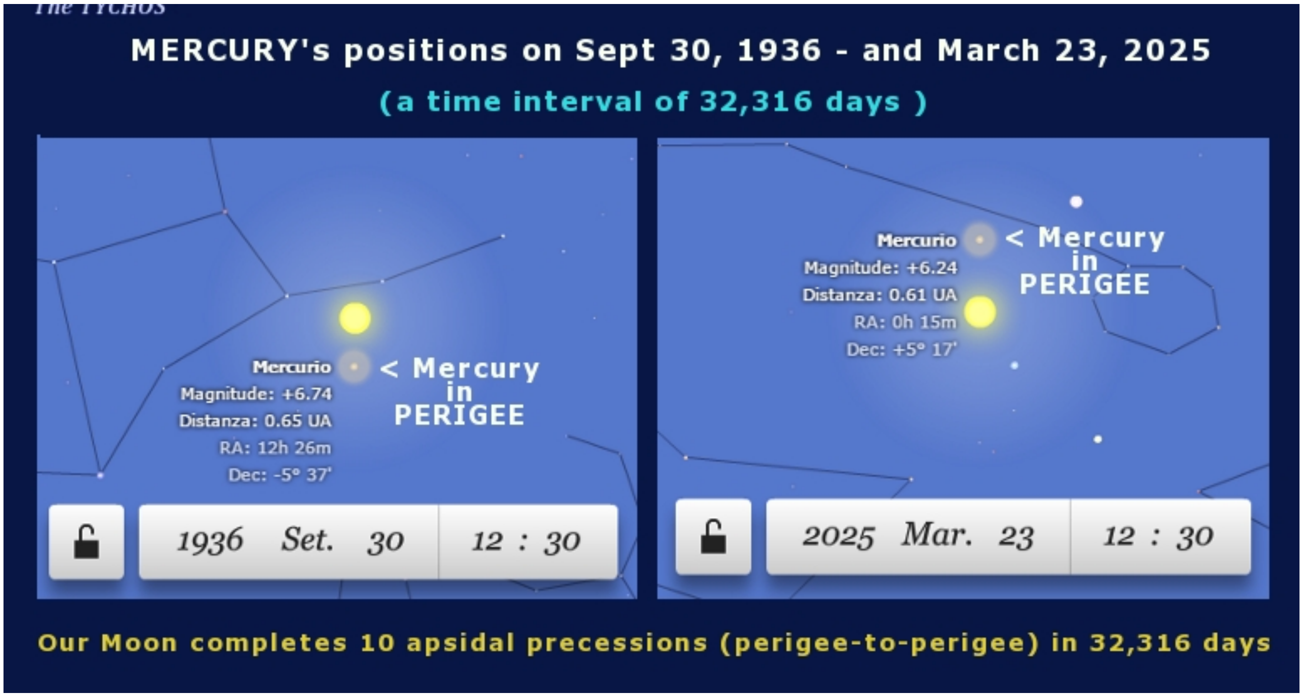
Let us now ask ourselves the following two questions:

1. *"Can Mercury be observed to transit in **perigee** at both ends of a 32,316-day interval, just like our Moon?"*

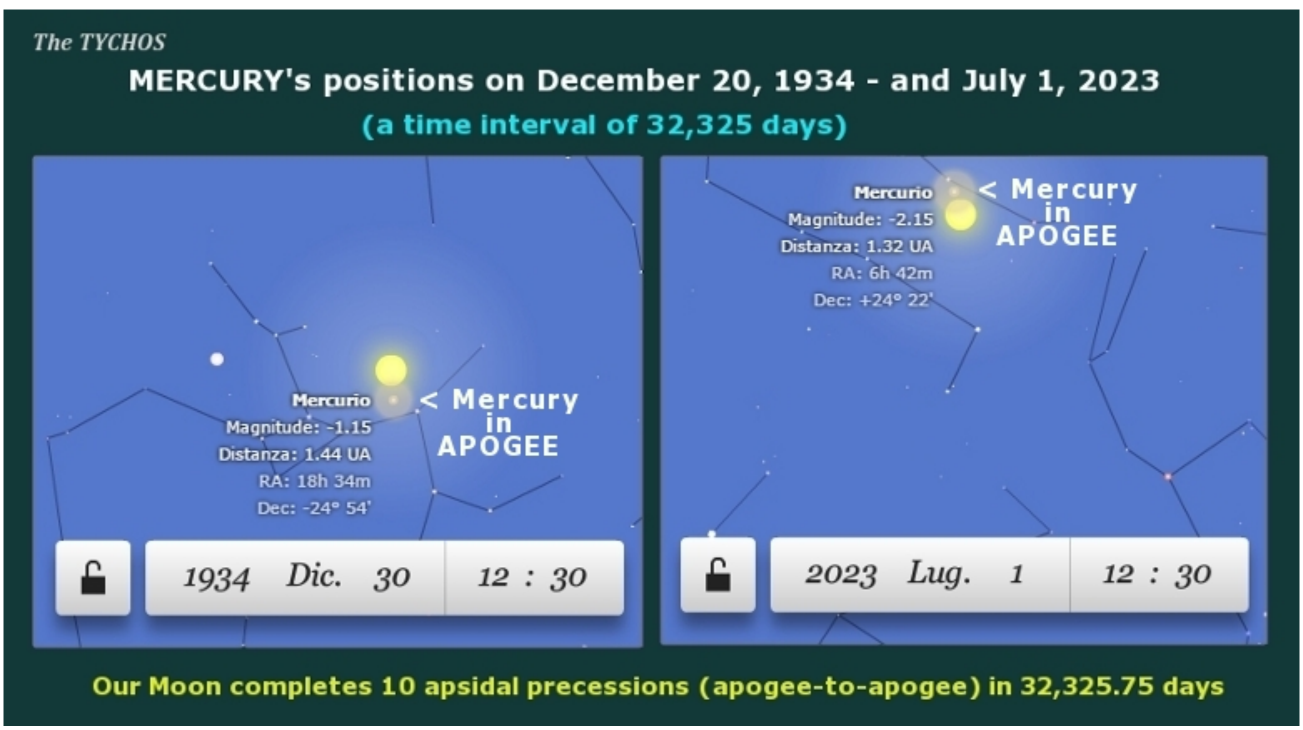
2. *"Can Mercury be observed to transit in **apogee** at both ends of a 32,325.75-day interval, just like our Moon?"*

As astounding as this may seem, the answers to both of these questions is, "Yes!"

I have used screenshots of the NEAVE online planetarium to show that the Sun's junior moon Mercury indeed behaves very much like our own Moon, over extended intervals, to a most exacting (and truly breathtaking) degree of precision. On September 30, 1936, and then (32,316 days later) on March 23, 2025, Mercury is found transiting the Sun as it proceeds in retrograde motion at *inferior conjunction*. This constitutes Mercury's perigee, or closest proximity to Earth.

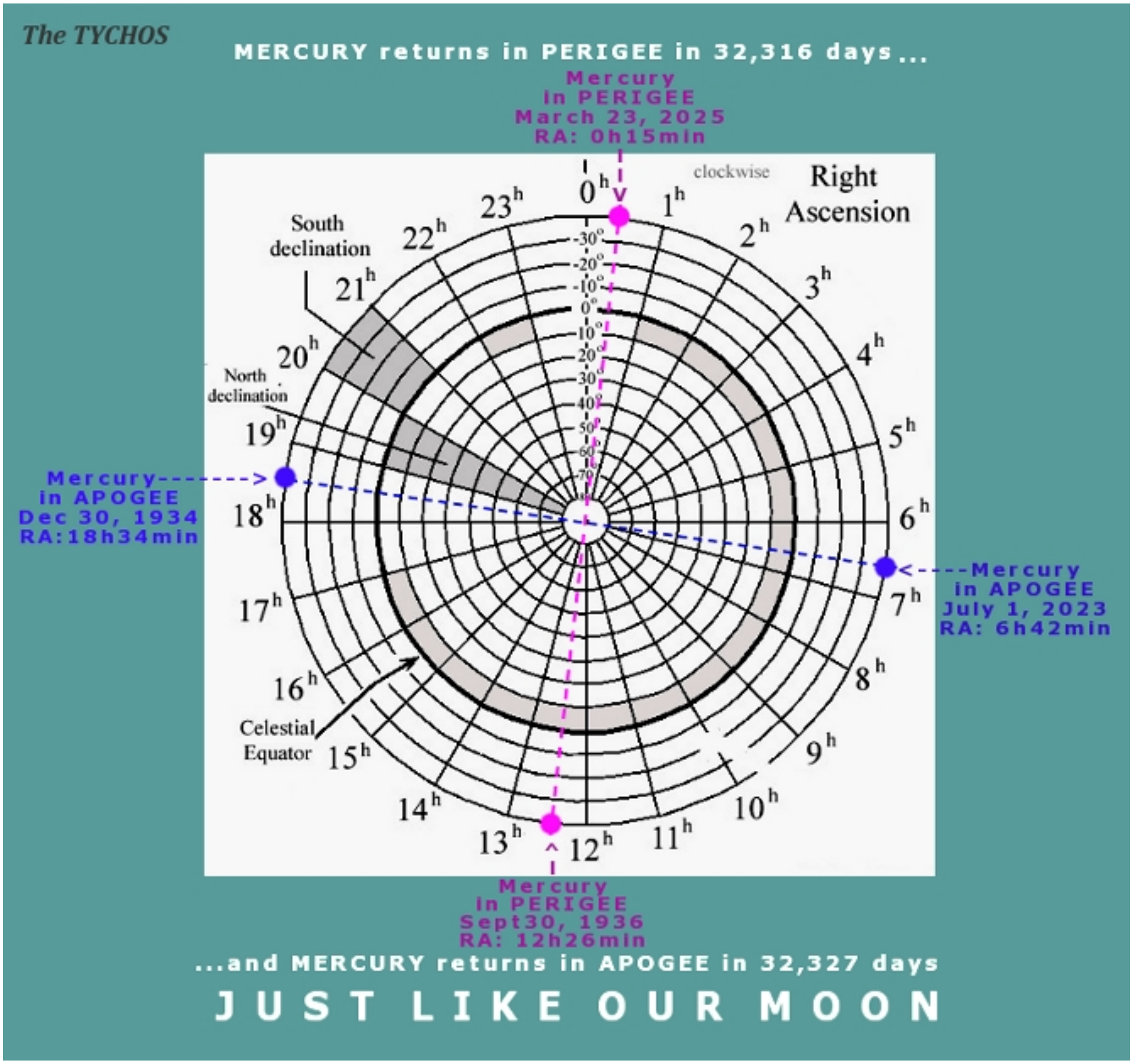


On December 30, 1934 and then 32,325 days later on July 1, 2023, Mercury is found transiting as it proceeds in prograde motion behind the Sun at *superior conjunction* which, of course, constitutes Mercury's apogee, or furthest point from Earth.



All of the above would constitute under the Copernican model a string of extraordinary coincidences well into statistical improbability. But in the TYCHOS model, these long-term periods commonly shared by Mercury and our Moon are expected, since these two celestial bodies are, respectively, the lunar companions of the Sun and Earth.

Please consider the following point. These two pairs of Sun-Mercury conjunctions (as viewed from Earth) occur at exact, diametrically opposed *sides* of our celestial sphere. The odds of this occurring within the Copernican model would, of course, be staggering since they are thought to be two planets revolving around wholly separate orbits at independent speeds. Why would the Earth, the Sun and Mercury be synced in such a manner?



In our magnetically-locked binary system of interrelated bodies, the regularly-spaced recurrences of Mercury's perigee and apogee transits are not just coincidental. Mercury and the Sun both revolve around Earth (and so does our Moon). They "work in unison" in a very systematic, orderly fashion. Mercury and our Moon are both lunar bodies (*i.e.;* moons) exhibiting virtually identical long-term orbital periods.

About the "anomalous" precession of Mercury's perihelion

Not everyone may know that Einstein's "General Relativity" was primarily founded around his acclaimed "resolution" of the purportedly anomalous advance of Mercury's perihelion. It was, in fact, long considered as one of the most compelling proofs of the GR theory, as you may read in the Wikipedia article about "Tests of General Relativity":

> *"Einstein showed that general relativity agrees closely with the observed amount of [Mercury's] perihelion shift. This was a powerful factor motivating the adoption of general relativity."*

However, numerous authors have since then pointed out innumerable problems with Einstein's equations and computational methods, as well as with his highly questionable determinations of Mercury's supposedly anomalous apsidal precession. As it is, *Einstein himself* eventually distanced his subsequent GR research from the dubious argumentations surrounding Mercury's perihelion advance.

> *"Einstein's paper devoted to the GR prediction of Mercury's perihelion advance, is the only one among his publications that contains the explanation of the GR effect. [...] Since then, to our knowledge, he never returned to the methodology of the GR perihelion advance problem. [...] As a matter of fact, the GR foundational premises have been subjected to changes and reinterpretations (optional, alternative, or claimed 'correct' ones) by Einstein himself, his advocates as well as today's GR specialists and self-proclaimed 'experts'."*

— *Einstein Paper on the Perihelion Motion of Mercury from GRT* by A.A. Vankov (2011)

> *"It is thus proven that Einstein's Mercury correction is completely false, and fails for planets as well as black holes! [...] The only*

> *possible conclusion to be made is that the Einstein GR correction is completely false. Thus, one of the only proofs that GR is valid has been shown to be incorrect, and invites GR to be discarded as a valid theory!"*

— *The Incorrect Theory of Mercury's Anomalous Precession* by Roger Rydin (2010)

At the time of the vivid debate set off by Le Verrier about Mercury, the equinoctial precession was observed to be about 5026" (arcsecsonds) per century. Since Mercury's perihelion was observed to precess by 5600" per century (of which 531" were deemed to be caused by the "gravitational tugs" of the other planets) the whole controversy revolved around the supposedly anomalous 43 extra arcseconds per century attributed to Mercury's precession.

As the story goes, the mystery of these pesky 43 extra arcseconds could not be solved by Newton's gravitational theories, but were then 'elegantly resolved' by Einstein's convoluted GR.

I have no desire to add more fuel to the centuries-long inferno concerning Mercury's allegedly anomalous precession. Yet, I feel compelled to ask if I might at least approach the problem with new insight.

As such, I wish to highlight two points that I find more than coincidental:

> The allegedly anomalous precession of Mercury was 43" per century.*
>
> The allegedly anomalous precession of Venus was 8.6" per century.*
>
> > * Source: *Anomalous Precessions from Reflections on Relativity* by Kevin Brown (2017)

As already mentioned above, the observed equinoctial precession was, at the time, 5026" per century. If we divide 5026 by Mercury's synodic period we obtain:

$$5026'' / 116.88 \text{ days} \approx 43''$$

And if we divide it by Venus' synodic period we obtain:

$$5026'' / 584.4 \text{ days} \approx 8.6''$$

The equinoctial precession is caused by Earth's 1-mph-motion. The Sun revolves once around Earth in ca. 365.25 days. The daily equinoctial precession (back in the early 1900's) would thus have amounted to

5026" / 36,525 ≈ 0.1376"

Since Mercury, a moon of the Sun, revolves 3.125 X around the Sun every year,

116.88 X 3.125 = 365.25

we see that:

3.125 X 0.1376" = 0.43"
1/100th of the alleged 43" per century "anomaly"

Similarly, since Venus is a moon of the Sun and revolves 0.625 X around the Sun every year,

584.4 X 0.625 = 365.25

we can also calculate that:

0.625 X 0.1376" = 0.086"
1/100th of the alleged 8.6" per century "anomaly"

I may just have plainly demonstrated that there is no *"anomalous perihelion advance"* at all. What is observed of Mercury and Venus is simply the relative ratios of their precessional progressions, as they revolve around the Sun in their respective orbital periods. Consequently, Einstein's weirdly acclaimed GR theory is — as already concluded by several respected authors — based on thin air.

> *"There are significant arguments that General Relativity has not been proven experimentally, and that it contains mathematical errors that invalidate its predictions. Vankov has analyzed Einstein's 1915 derivation and concludes that when an inconsistency is corrected, there is no perihelion shift at all!"*

— *The Theory of Mercury's Anomalous Precession* by Roger A. Rydin (2011) from *Proceedings of the NPA* 8 501-506

Previous Chapter

Next Chapter

Chapter 29 — Earth’s 1 mph motion explains all of our “Outer” Planets’ parallaxes

As every astronomer will know, the orbital periods of our outer or “Jovian” planets from Jupiter to Pluto are all reckoned to be slightly shorter than a whole integer number of solar years. Jupiter, for instance, is said to complete one of its orbits in 11.862 years. Saturn is said to complete one of its orbits in 29.4571 years.

Likewise, the rest of our outer planets are said to complete their orbits in just a trifle less than “X” integer years. The TYCHOS model can conclusively demonstrate that, in reality, all of our outer (or “P-Type”) planets actually return to the same place in space in an **exact integer number** of solar years. The illusion was caused, yet again, by Earth’s 1 mph motion; as we move around our PVP orbit, we will naturally “meet up” with these planets (as viewed against the starry background) slightly earlier than the completion of their true orbital periods.

The actual orbital periods of our clock-like system are:

PLANET	YEARS
Jupiter	12
Saturn	30
Uranus	84
Neptune	165
Pluto	248

JUPITER

Let’s start with Jupiter and see if we can find out just why it appears to complete one orbit in slightly less than 12 integer years. As observed from Earth, Jupiter appears to orbit once every 11.862 years (or 4332.6 days) or about **1.15%** less than 12 years.

In the TYCHOS model, Jupiter's true orbital period is 4383 days. The gap between 4383 days (12.0 years) and 4332.6 days (11.862 years) is 50.4 days or 1209.6 hours. What will have taken place in 1209.6 hours to create the illusion? Let's see: in 1209.6 hours, Earth will cover:

$$1209.6 \text{ hours X } 1.601169 \text{ km/h} \approx 1936.77 \text{ km}$$

$$\text{As it is, } 1936.77 \text{ km} \approx \mathbf{1.15\%} \text{ of } 168{,}430 \text{ km}$$

168,430 km is about the distance that Earth covers in 12 years, clearly indicating that the reason why we see Jupiter "offset" by 1.15% vis-à-vis the Sun (after 12 years) is due to the parallax effect generated by Earth's motion.

Note that Jupiter's orbit is 13.7519 X larger than Earth's PVP orbit. Hence, every Jovian orbit, we should expect Jupiter to be radially offset by the following amount:

168,430 km (Earth's motion in 12 years) X 13.752 = 2,316,249.36 km

This is 0.0473484667 % of Jupiter's orbital circumference of 4,891,895,452.6 km. We may ideally call this percentage value the "Earth-Jupiter parallax rate".

As it is, $\mathbf{0.0473\overline{48}\ \%}$ of 1,296,000 arc seconds gives us $613.\overline{63}$ arc seconds. If we now divide this value by 12 years we obtain, lo and behold:

$$613.\overline{63} / 12 \approx \mathbf{51.1\overline{36}''}$$

Hopefully you recognize by now the TYCHOS-computed ACP.

In conclusion
Jupiter truly revolves once every 12 (integer) solar years. The observed "offset" is caused by Earth's 1-mph motion.

SATURN

As observed from Earth, Saturn appears to orbit once every 29.4571 years or 10759 days – about **1.81%** less than 30 years.

In the TYCHOS model, Saturn's true orbital period is 30(.0) solar years or 10,957.5 days. The gap between 10,957.5 days (30.0 years) and 10759 days (29.4571 years) is 198.5 days or 4764 hours.

Once again, in 4764 hours, Earth will cover:

4764 X 1.601169 km ≈ 7628 km

That's **1.81%** of 421,075 km

421,075 km is the distance that Earth covers in 30 years, clearly indicating that the reason why we see Saturn "offset" by 1.81% vis-à-vis the Sun (after 30 years) is due to the parallax effect caused by Earth's 1-mph motion.

Note that Saturn's orbit is 25.2 X larger than Earth's PVP orbit. Hence, every 30 years we should expect Saturn to be "radially" offset by the following amount

421,075 km (the distance that Earth covers in 30 years) X 25.2 = 10,611,090 km

This is right around 0.11837% of Saturn's orbital circumference of 8,964,009,501 km. We may ideally call this percentage value the "Earth-Saturn parallax rate".

As it is, $\mathbf{0.11837\overline{12}\%}$ of 1,296,000 arc seconds equals $1534.\overline{09}$ arc seconds. If we now divide this value by 30 years, we once more obtain our good 'ol ACP:

$1534.\overline{09}$ / 30 = $\mathbf{51.1\overline{36}}$**"**

In conclusion

Saturn truly revolves once every 30 (integer) solar years. The observed "offset" is caused by Earth's 1-mph motion.

Likewise, the three remaining planets of our system (Uranus, Neptune and Pluto) can all be shown to appear offset due to Earth's 1-mph motion. All three of them are currently believed to have orbital periods curiously just a whisker short of an integer number of solar years (much like we just saw with Jupiter and Saturn).

URANUS

"Orbital period: 30,589 days" — about 83.74 years, or a trifle less than **84** years

NEPTUNE

"Orbital Period: 60,182 days." — about 164.77 years, or a trifle less than **165** years

PLUTO

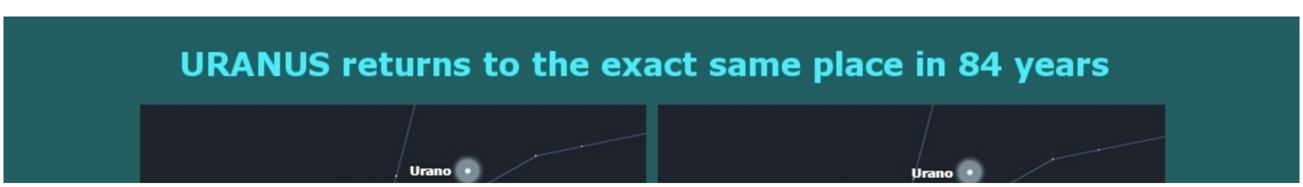
"Orbital Period: 90,560 days." — about 247.94 years, or a trifle less than **248** years

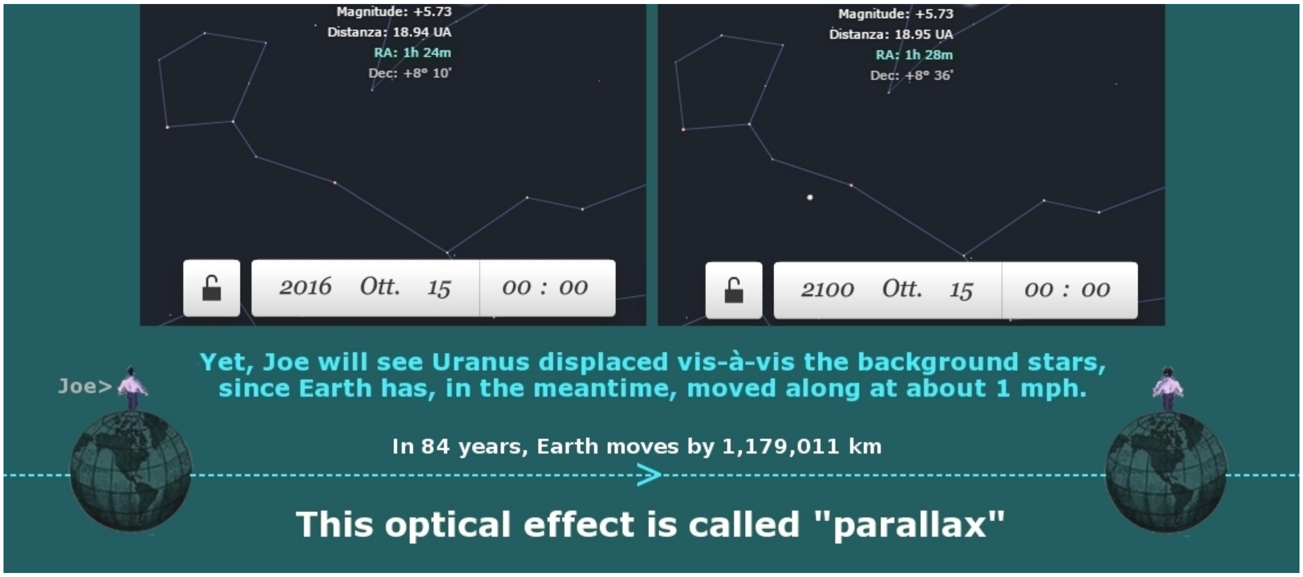
Sources:
1. *Planetary Fact Sheet* by David R. Williams, NASA
2. Wikipedia entry on "Neptune"

In reality, the orbital periods of Uranus, Neptune and Pluto are all perfectly synchronized (at integer multiples) with the Sun and with our Moon. In the TYCHOS, their true orbital periods are, respectively, 84, 165 & 248 solar years exactly!

The only reason why they will appear to be slightly "offset" after completing one of their orbits in relation to the stars, is due to the parallax effect for earthly observers. This will presently be demonstrated by my next three graphics which feature screenshots (at intervals of 84, 165 and 248 years) taken from the NEAVE online planetarium.

It is essential to fully understand what is meant by "the exact same place". Yes, this means that these planets return to the same location in space within the said time intervals.





Uranus — in the TYCHOS:

Orbital period: exactly 84 Solar Years, or 30,681 days – **exactly** 1050 X 29.22 days ("Moon TMSP's").

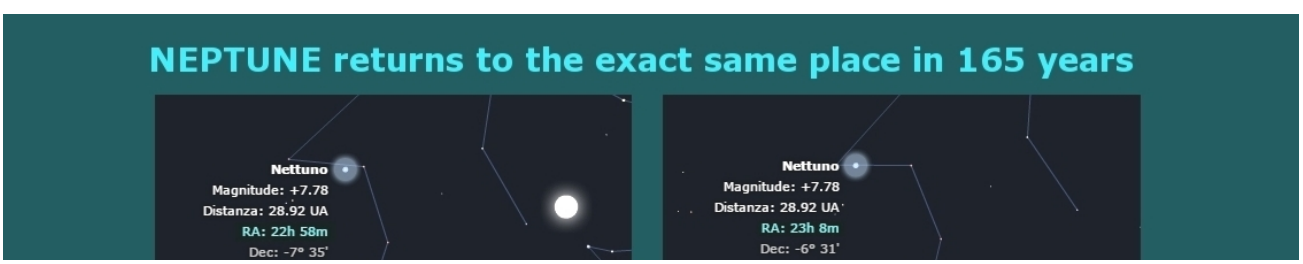
In 84 years, Earth moves by 14035.847 km X 84 ≈ 1,179,011 km (0.3314% of the PVP orbit circumference of 355,724,597 km). Now, 0.3314% of our full, 360° celestial sphere of 1440 min. = 4.77216 min. of RA.

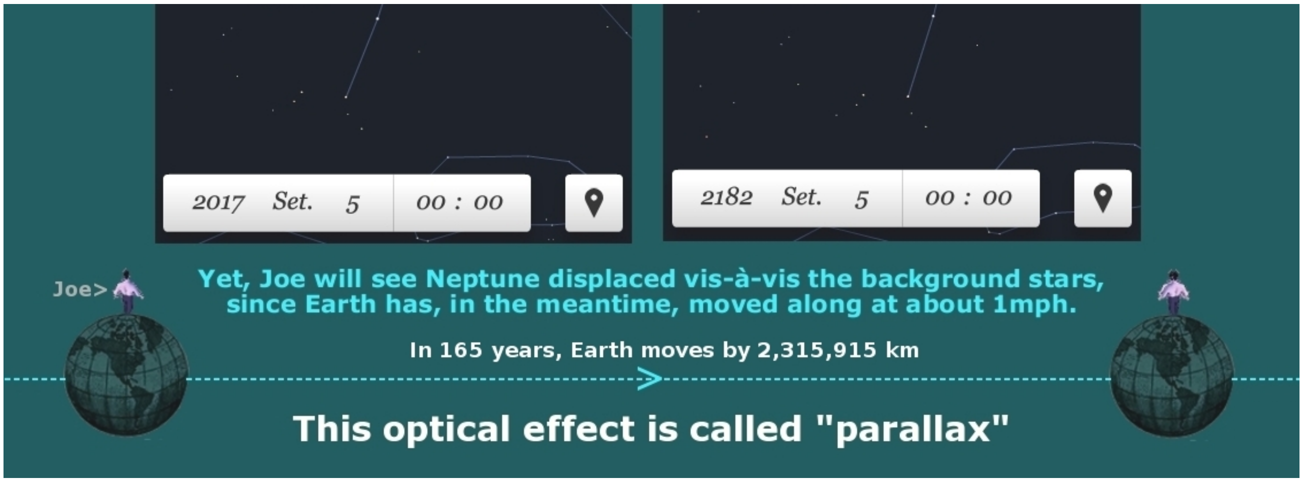
In fact, the NEAVE planetarium shows us a close match:

Between Oct 15, 2016 and Oct 15, 2100 (84 years), Uranus returns to the same celestial longitude (RA) + circa 4.4 min. of RA!

Note that the Earth-Uranus parallax rate (0.3314%) is ca. 2.8 X larger than the Earth-Saturn parallax rate (0.11837%).

This reflects the fact that Uranus's revolution period of 84 years is 2.8 X longer than Saturn's revolution period of 30 years.





Neptune — in the TYCHOS:

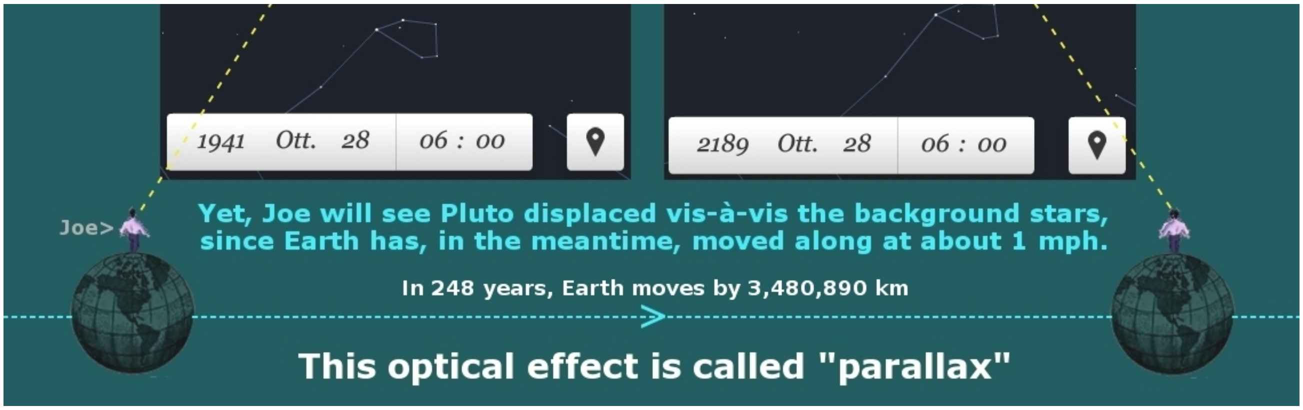
Orbital period: exactly 165 Solar Years, or 60,266.25 days – **exactly** 2062.5 x 29.22 days ("Moon TMSP's").

In 165 years, Earth moves by 14035.847 km X 165 ≈ 2,315,915 km (0.651% of the PVP orbit circumference of 355,724,597 km). Now, 0.651% of our full, 360° celestial sphere of 1440 min. ≈ 9.375 min. of RA — and in fact, the NEAVE planetarium shows us a close match.

Between Sept 5, 2017 and Sept 5, 2182 (165 years) Neptune returns to the same celestial longitude (RA) + circa 10 min. of RA!

Note that the Earth-Neptune parallax (9.375 min.) is ca. 1.965 X larger than the Earth-Uranus parallax (4.77216 min.).

This reflects the fact that Neptune's revolution period of 165 years is ca. 1.965 X longer than Uranus's revolution period of 84 years.



Pluto in the TYCHOS:

Orbital period: exactly 248 Solar Years, or 90,582 days – **exactly** 3100 X 29.22 days ("Moon TMSP's").

In 248 years, Earth moves by 14035.847 km X 248 ≈ 3,480,890 km (0.978535% of the PVP orbit circumference of 355,724,597 km). Now, 0.978535% of our full, 360° celestial sphere of 1440 min. ≈ 14 min. of RA — again, the NEAVE planetarium gives us another (near) match:

Between Oct 28, 1941 and Oct 28, 2189 (248 years), Pluto returns to the same celestial longitude (RA) + circa 12 min. of RA.*

Note that the (expected) Earth-Pluto parallax (14 min.) is ca. 1.5 X larger than the Earth-Neptune parallax (9.3744 min.).

This reflects the fact that Pluto's revolution period of 248 years is ca. 1.5 X longer than Neptune's revolution period of 165 years.

> * NOTE: The reason why Pluto, with its almost 250-year-long period, is observed to be advancing by only 12 min. — that is, two minutes less than the expected 14 min. — should become apparent in Chapter 31, where I will be expounding how the peculiar Gregorian calendar-count sloppily attempts to contain the secular precession of our solar system.

In conclusion, the true values of the orbital periods of every planet are in actuality, integer multiples of the orbital periods of our Sun (and of our Moon). All of their apparent "lateral offsets" with the background stars can be shown to be directly caused by Earth's 1-mph motion through the ACP around its PVP orbit.

In the light of this, we have proven that Jupiter, Saturn, Uranus, Neptune and Pluto are in the category that modern-day astrophysicists currently refer to as **"P-Type"** planets (*a.k.a.* circumbinary celestial bodies) as illustrated in Chapter 8.

Chapter 30 — Understanding the "Great Year" (of 25344 solar years)

Astronomers have long known that — every 2000 years or so — the entire star field will drift (Eastwards in relation to Earth's equinoxes) by about one of the 12 zodiac constellations. In the TYCHOS, this is naturally caused by Earth's slow, 25344-year-long circular journey. In short, what we call precession of the equinoxes is just a direct consequence of Earth's 1 mph motion around the PVP orbit.

> *"At present, signs and constellations are about one calendar month off. In another 2000 years or so, they'll be about two months off."*

— *What is the zodiac?* by Christopher Crockett (2016) for EarthSky

This very slow backward motion of the stars was discovered by Hipparchus as long ago as the second century BCE.

> *"Hipparchus was the first person to notice the earth's precession. He did this by noting the precise locations stars rose and set during equinoxes – the twice yearly dates when night length and day length are exactly 12 hours."*

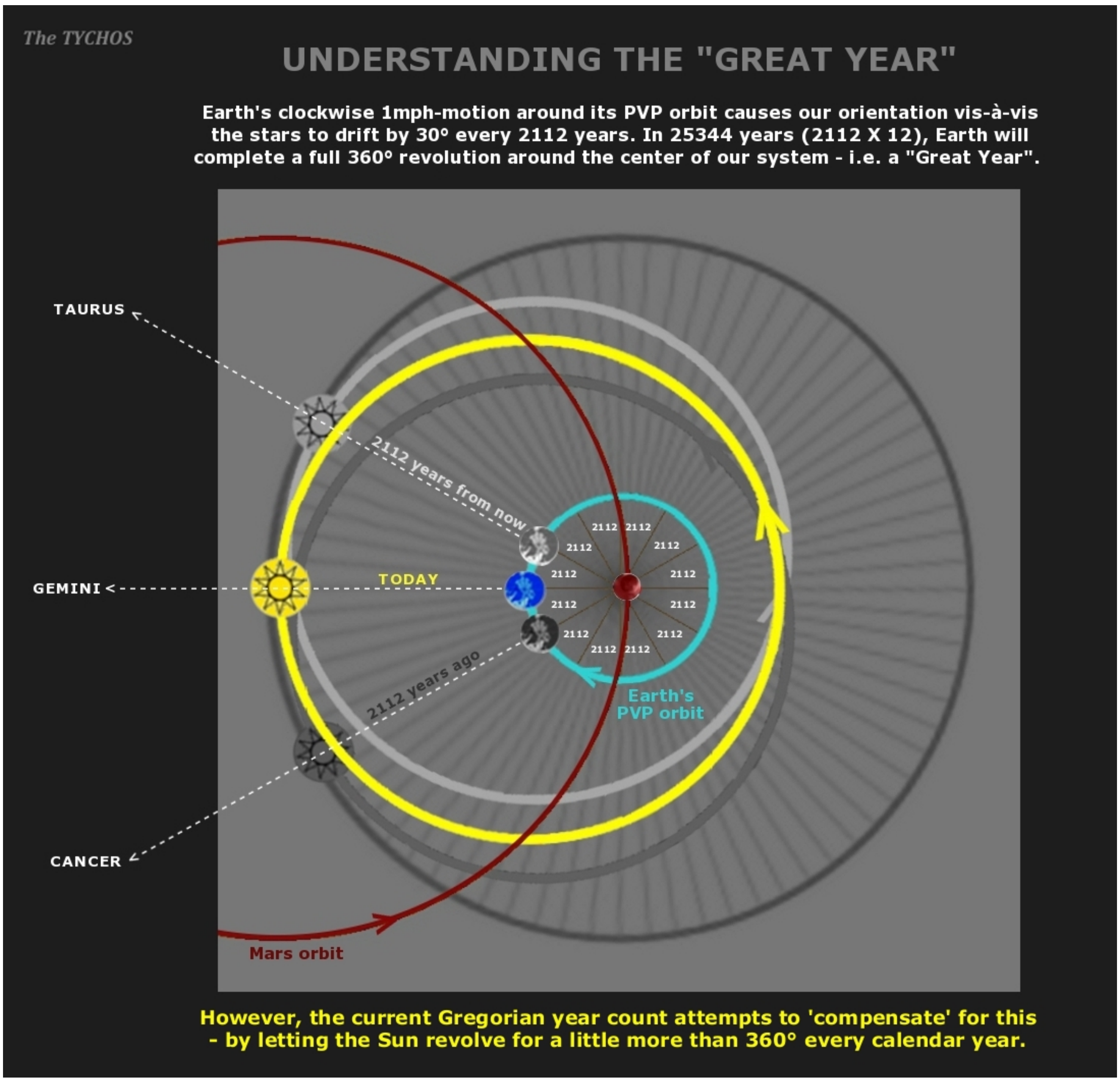
— *Hipparchus. Famous Scientists.* famousscientists.org. (August 26, 2016)

> *"Some time around the middle of the second century BC, Hipparchus discovered that the fixed stars as a whole gradually shifted their position in relation to the annually determined locations of the Sun at the equinoxes and solstices [...] Otto Neugebauer argued that Hipparchus in fact believed that this [36,000 years] was the maximum figure and that he also*

> *computed the true rate of one complete precession cycle at just under 26,000 years. […] Ptolemy has been accused of committing scientific fraud by making up observations that would give the figure of 36,000 years even though the data available to him were good enough to get very near the true figure of 26,000.”*

— Wikipedia entry on “Great Year”

My below graphic shows how the TYCHOS model accounts for the so-called “precession of the equinoxes”. As Earth moves clockwise around its PVP orbit, it will drift by 30° every 2112 years, which adds up to a full 360° circle in 25,344 years (30° X 12 = 360°).



The exact duration of the Great Year (*a.k.a.* "Annus Magnus") has, to this day, never been determined with any degree of certainty. This, because the observed rate of precession keeps increasing (by minimal amounts) over the centuries — to every astronomer's perplexity. There currently exists no explanation for this vexing cosmic mystery which is compounded by the fact that the rate of increase of this drift is observed to grow exponentially. Of course, tentative explanations abound yet none offer more than speculative theories based on so-called "gravitational perturbations", "tidal friction effects" and other such entirely hypothetical factors.

Further on, we shall see why the year count of our current Gregorian calendar ultimately reverses this natural, stellar & zodiacal precession due to its slightly inflated year count. For now, let's see how the TYCHOS model's 1-mph-motion of Earth can be shown to be directly responsible for the observed exponential increase of our "equinoctial precession".

Why does the observed rate of "equinoctial precession" appear to increase exponentially?

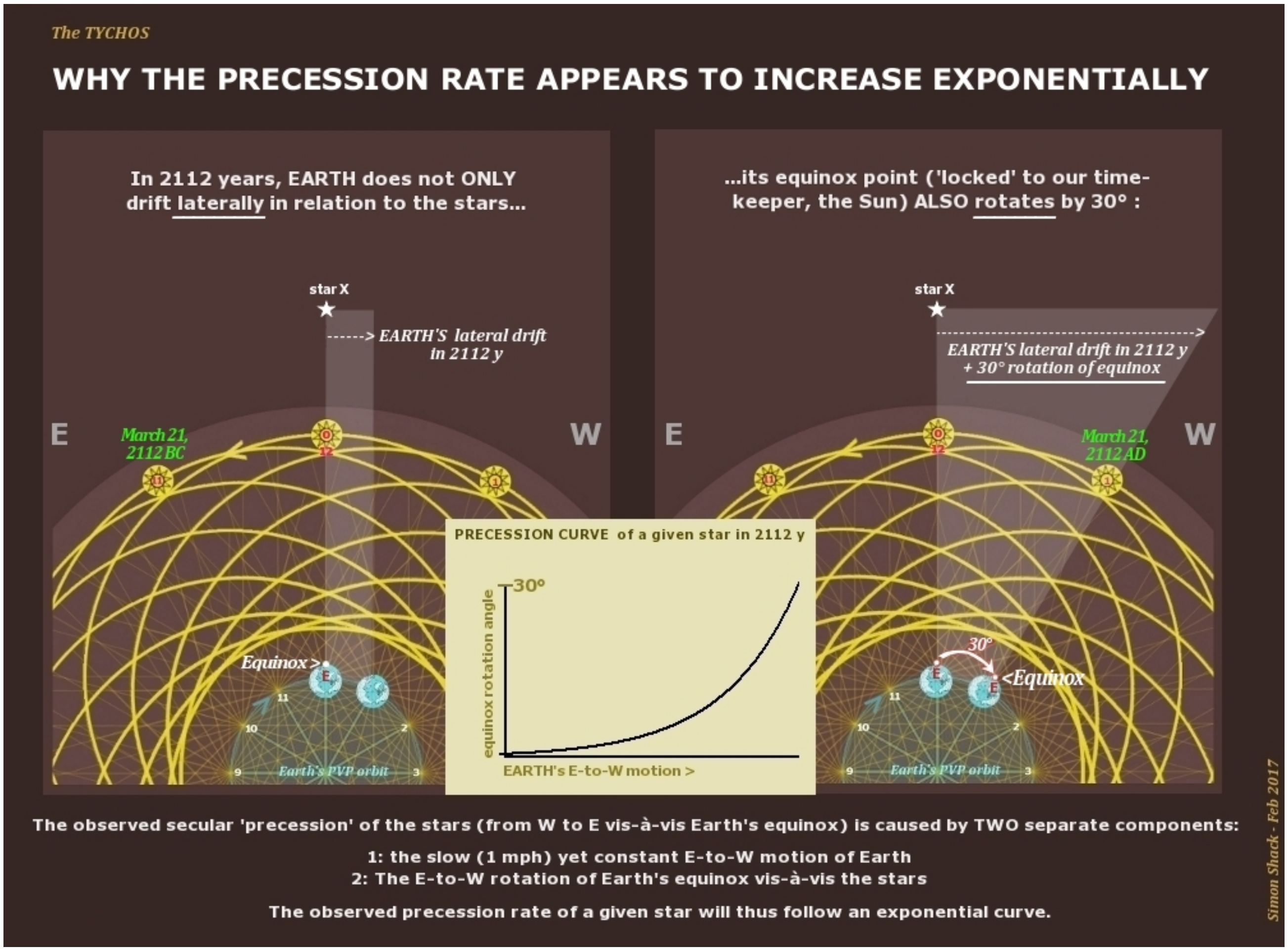
Astronomers have long been puzzled by the observed *non-linear* increase of the stars' West-to-East precession rate. Many have tried to quantify the exact amount of annual precession increase, only to find that the *rate of increase* (from one century to the next) isn't linear, but exponential. For instance, Simon Newcomb offered (back in the 19th century) a constant of annual precession-rate increase of 0.00022″-per-year. Over time, however, this "constant of precession" soon proved to be a misnomer since it wasn't constant at all! In fact, ever-higher rates of secular increase of the so-called "equinoctial precession" were successively observed.

As Walter Cruttenden (of the Binary Research Institute) points out:

> *"The constant seems to work for a while until a close examination of the precession observable shows it is increasing at an exponential rate, outstripping the fixed constant. Thus the equation, even with an annual addition falls a little farther behind each year."*

— *Response to The Precession Dialogues – BAUT Forum post* by Walter Cruttenden at BRI blog (July 16, 2009)

My below graphic shows how the TYCHOS accounts for this observed, exponential increase of the observed rate of precession.



The rate of increase is naturally exponential because it is caused by two separate, cumulative components:

1. The East-to-West motion (the lateral displacement) of Earth vis-à-vis the stars

2. The East-to-West secular rotation of Earth's equinox vis-à-vis the stars

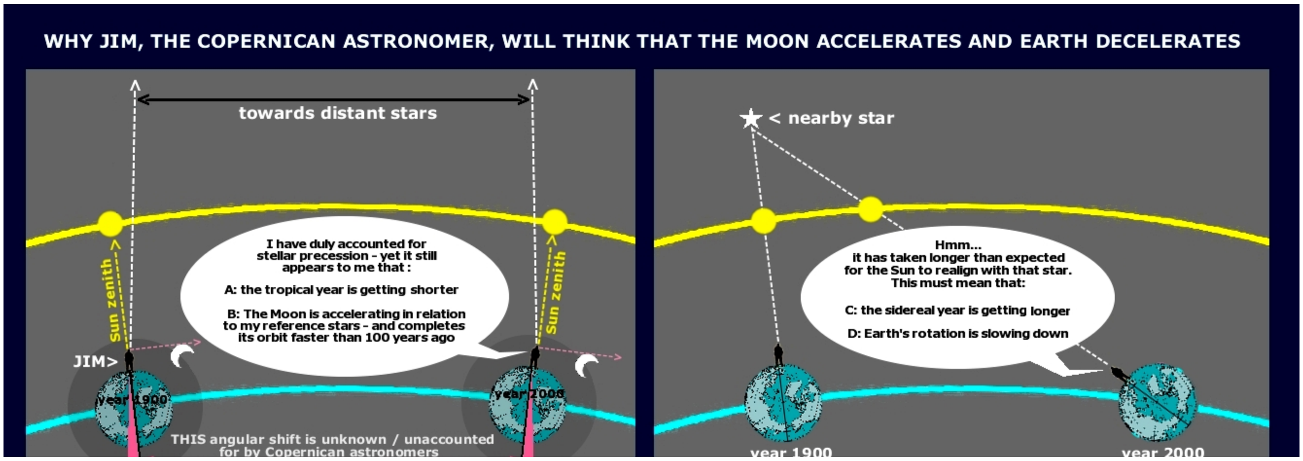
As it is, this observed secular increase of the stellar precession is intimately related to the apparent accelerations and decelerations of the motions of our Moon & Sun — and goes to resolve a string of longstanding and still hotly-debated riddles of astronomy:

- The apparent secular decrease of the length of the tropical year
- The apparent acceleration of the Moon’s orbital speed.
- The apparent secular increase of the length of the sidereal year
- The apparent deceleration of Earth’s rotational speed.

> *“Astronomers who studied the timing of eclipses over many centuries found that the Moon seemed to be accelerating in its orbit, but what was actually happening was that the Earth’s rotation was slowing down. The effect was first noticed by Edmund Halley in 1695, and first measured by Richard Dunthorne in 1748 — though neither one really understood what they were seeing.”*

— *Ask an Astronomer: Is the Moon moving away from the Earth? When was this discovered?* (July 18, 2015, Cornell University)

My below graphic shows that, under the TYCHOS model, all four of these apparent secular variations are part of the same effect of perspective. They are caused by the gradually expanding angular shift between Earth in relation to the Sun, our Moon and the background stars. Of course, under a heliocentric model, no such angular shift would be expected, since Earth is believed to revolve around the Sun — and not vice versa. Hence, a Copernican astronomer won’t make any sense of it and will reach the wrong conclusions.



The Moon is not accelerating over time - nor is Earth's rotation decelerating.
Both are illusory effects caused by Earth's motion around its PVP orbit - and the consequent, gradual angular shift between Earth and the stars

The question of the Moon's *apparent* secular acceleration (and the apparent deceleration of Earth's rotation) was a major debate back in the days. In 1764, Roger Long published his second volume of *Astronomy*, in which he discussed at length about those thorny issues.

> *"Long gave three possible explanations for the observed acceleration of the moon. First, the moon really is speeding up. Secondly, the observed secular acceleration is really an apparent effect caused by a slowing down in the motion of the Earth around the Sun. […] Long's third explanation was that the observed secular acceleration might be an apparent effect caused by a change in the rate of rotation of the Earth."*

— *Ancient Astronomical Observations and the Study of the Moon's Motion (1691-1757)* by John M. Steele (2012)

No firm explanation has been put forth for what causes these apparent variations of the Earth's and the Moon's orbital and/or rotational speeds. Astronomy literature offers very frail theories (and unending flame wars) about the so-called "non-gravitational effects" which would account for the observed phenomena. Astronomy historian John Phillips Britton remarked in a 1992 essay that the Moon's acceleration,

> *"was proving an embarrassment to theoretical astronomers, since no gravitational explanation for this phenomenon could be found."*

— p. 153, "Appendix I. Secular accelerations of the Sun and Moon", *Models and Precision: The Quality of Ptolemy's Observations and Parameters* by John Phillips Britton (Garland, 1992)

Eventually, astronomers turned to geologists for assistance and — for a while — some sort of mad consensus was reached that it all had to do with "tidal friction forces" that would somehow slow down Earth's rotation as well as speed up the lunar motion! However, in the introduction to his academic paper "Non-gravitational Forces in the Earth-Moon System"(1972), Robert Russell Newton (famed for his extensive work on the apparent changes of Earth's rotation rate and expertise about lunar eclipses) curtly states in the abstract:

> *"There are no satisfactory explanations of the accelerations. Existing theories of tidal friction are quite inadequate."*

— p.179, *Astronomical Evidence concerning Non-gravitational Forces in the Earth-Moon System* by R.R. Newton (1972) for *Astrophysics and Space Science*, Volume 16, Issue 2, pp.179-200

Further on in his paper, R.R. Newton concludes:

> *"We are seriously lacking in mechanisms to explain the non-gravitational forces. The only mechanism of tidal friction (the 'shallow seas' model) that has been evaluated quantitatively provides only one-fourth of the necessary amount of friction, and it does not provide for much change with time within a period as short as historic times."*

— p. 199

In the TYCHOS model (as shown in my above graphic), these perceived accelerations & decelerations of the Moon and Earth are illusory and only a matter of inverted (geocentric/heliocentric) spatial perspectives. The Moon's revolution isn't speeding up — nor is Earth's rotation slowing down. All such observations are, of course, closely related to the above-expounded secular increase of the equinoctial precession. Most significantly, in a 1932 astronomy paper, J.K. Fotheringham provided this precious piece of information:

> *"It should be noted however, that when it was discovered that precession was subject to acceleration, the acceleration of precession was not usually included in the acceleration of the Moon's motion, so that acceleration is generally expressed as if it were a term in the sidereal longitude, not in the longitude as measured from the equinox."*

—p. 306, *The Determination of the Accelerations and Fluctuations in the Motions of the*

Sun and Moon by J.K. Fotheringham (1932) for *The Observatory*, Vol. 55, pp. 305-316

In other words, the Copernican astronomers who vividly debated about the Moon's puzzling, apparent secular acceleration were measuring the Moon's motion against the starry background and *not* in relation to Earth's equinoctial points! Thus, they never envisioned the possibility of an illusory acceleration caused by the clockwise motion of the Earth-Moon system, slowly curving in space against the starry background. Nor did they, of course, ever consider the Sun revolving on an external orbit around Earth.

The 51,000-Y (or ca. 25344 X 2) "Great Year" of Mars

As we saw earlier, Copernican theorists attribute the ca. 25,500-year precession of the equinoxes (which is really the "Great Year") to the supposed wobble of its axis (recall Chapter 18 on the fully-disproved Lunisolar theory). Now, if this were the case, why then would Mars exhibit a "Great Year" of its own – and almost precisely *twice* as long (namely, 51,000 years)? What sort of cosmic sympathy could possibly cause Mars's equinoxes to precess at a 2:1 ratio with Earth's equinoctial orientation *vis-à-vis* the Sun, unless the harmonic relationships proposed by the TYCHOS are true?

The fact that the Martian equinoxes precess in about 51,000 years (roughly two Great Years) would be entirely expected under the TYCHOS model paradigm since our two main binary companions are locked in a 2:1 orbital ratio. Mars will quite naturally employ twice as much time to complete its own equinoctial precession.

> *"The Martian equinoxes also precess, returning to an initial position over a period of about 51,000 years."*

— p. 60, *A Change in the Weather* by Michael Allaby and Richard Garratt (2004)

> *"The season of perihelion follows the ~51,000-yr Martian obliquity cycle; the hemisphere receiving maximum insolation (currently the southern hemisphere) will reverse every ~25,000 years."*

—p. 1050, *Mars: Maps* edited by Hugh H. Kieffer (University of Arizona Press, 1992)

> *"As a combined effect of the precession of the spin axis and the*

> *advance of the perihelion, alternate poles of Mars tilt towards the Sun at perihelion every 25,500 years – that is, on a 51,000-year cycle.”*

—p. 200, *The Planet Mars: A History of Observation & Discovery* by William Sheehan (1996)

As you can see, the body of evidence in support of Mars having a binary relationship to the Sun is overwhelming.

Why Mars appears to rotate around its axis a little slower than Earth

As of the best astronomical observations, Mars appears to rotate once around its axis every 24 hours 37.5 minutes. Earth’s sidereal day is 23 hours 56 minutes. This is a difference of **41.5 minutes**. In the Copernican model, Mars is just one of various planets revolving around the Sun. Why would its axial rotation period almost, yet not quite, match that of Earth’s?

Could Mars’s rotation around its axis also be, in actuality, synchronous with Earth’s rotation? Let’s see if we can find any indications in support of this hypothesis.

Each year, as we have seen, Earth covers 14,036 km or **0.0039457%** of the total PVP orbit.

Since the orbit of Mars is 4.034266 X larger than Earth’s orbit, this will radially correspond to a slice of Mars’s orbit equal to:

$$14{,}035.847 \text{ km X } 4.034266 \approx 56{,}624.34 \text{ km}$$

56,624.34 km is 0.0039457% of Mars’s orbital circumference of 1,435,079,524 km

At its perceived orbital speed of 81,854.866 km/h Mars will in fact employ ca. 41.5 minutes to cover the extra 56,624.34 km as it “catches up” with the displacement of an earthly observer.

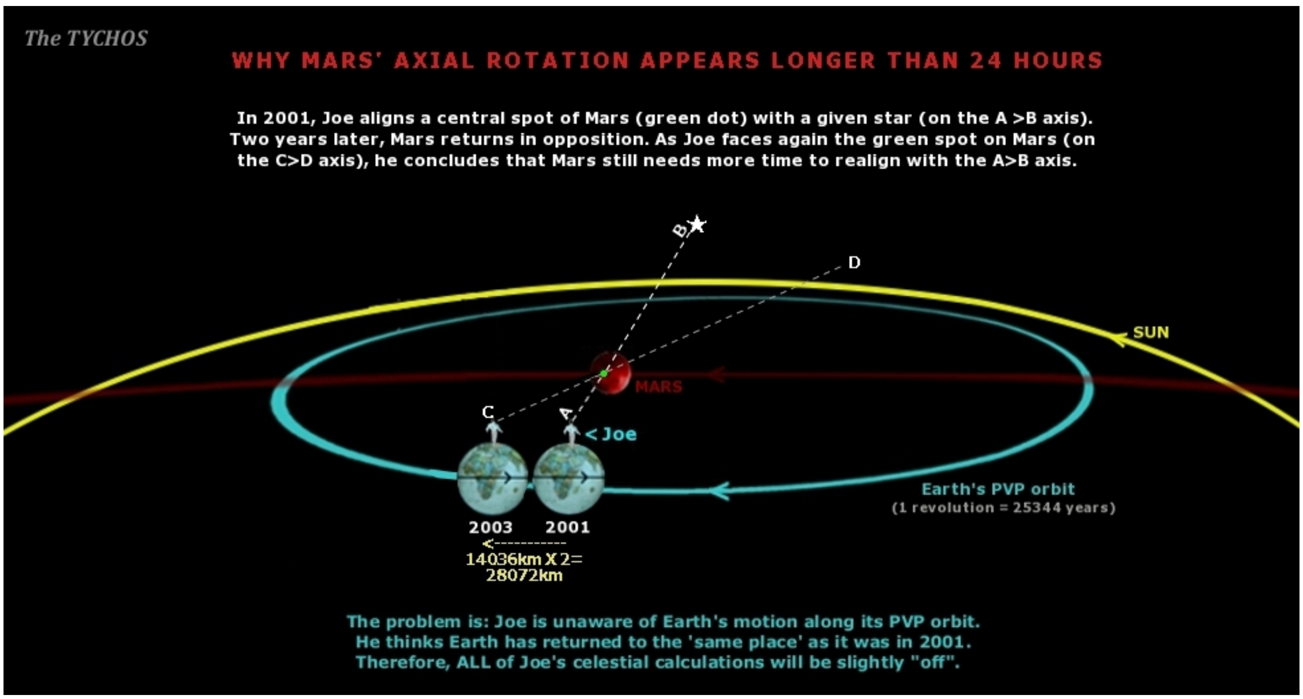
Therefore, Mars only appears from Earth to rotate around its axis approximately

41.5 minutes slower than Earth, since each year, we will be radially offset by that amount in relation to Mars's celestial position. We will thus erroneously conclude that Mars rotates around its axis 41.5 minutes slower than Earth.

This means that Mars and Earth **both** rotate around their respective axes in 24 hours.

In the Copernican model, such a near identical rotational period could only be ascribed to an odd coincidence.

In my below graphic, we can see why Joe (in 2003) will conclude that Mars rotates around its axis 41.5 minutes slower than Earth.



The Martian markings that indicate Mars's geography are being seen from another angle after 2 years, but Mars *has indeed* returned to the same rotational orientation in space as it was two years earlier.

It is worth noting that Mars's rotational speed around its axis would therefore be 891.5 km/h, which is 1.88 X slower than Earth's rotational speed of 1676 km/h. As it is, Mars revolves once around the Sun in 686.9 days, or almost exactly 365.25 days X 1.88 !

Hence, and in conclusion, Mars most likely rotates around its axis in the very same time as Earth:

23 hours 56 minutes (*i.e.;* one “sidereal day”)

Previous Chapter

Next Chapter

Chapter 31 — The Gregorian Calendar and the implications of its current year count

To preface you may want to read some basic facts about the "Gregorian calendar" according to Wikipedia.

We shall now see how the Gregorian calendar and its current year-count (365.24219 days) will ultimately "flip our system upside-down" due to its vain attempt to keep the Sun-Stars axis aligned with our recurring traditional holidays.

> *"The Gregorian calendar aims to keep the vernal equinox falling on or close to Mgeoarch 21; hence it follows the vernal equinox year. The average length of its year is 365.24219 days."*

— Wikia commons article on the "Year"

> *"The real motivation for the Gregorian reform was not primarily a matter of getting agricultural cycles back to where they had once been in the seasonal cycle; the primary concern of Christians was the correct observance of Easter. The rules used to compute the day of Easter used a conventional date for the vernal equinox (March 21), and it was considered important to keep March 21 close to the actual equinox."*

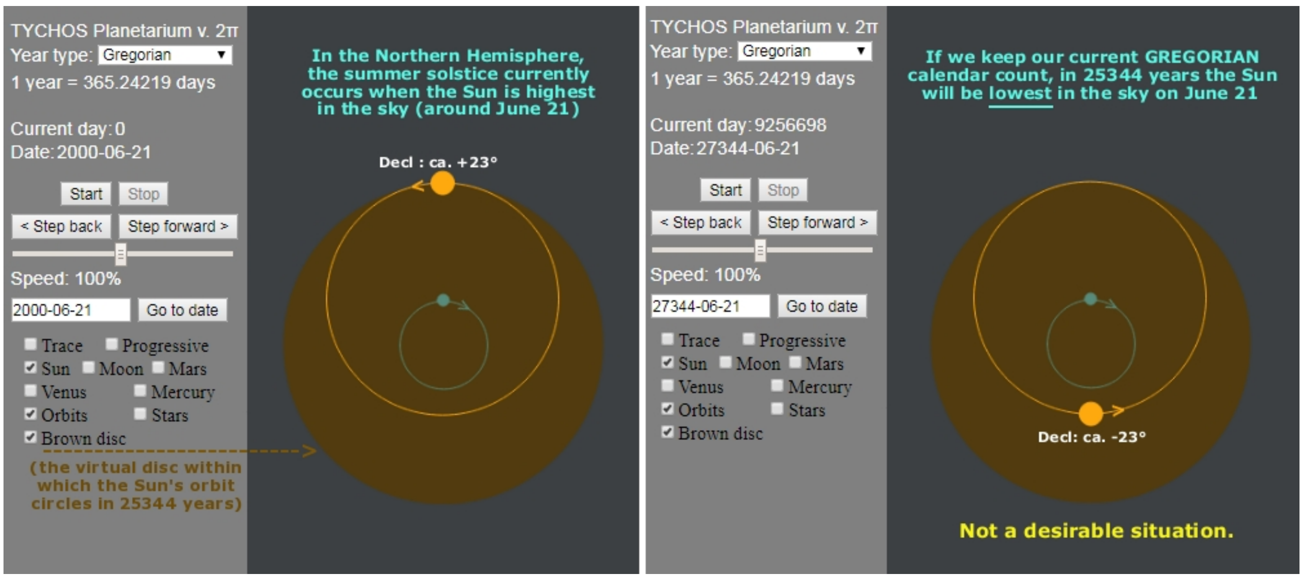
— Wikipedia entry on "Tropical year"

Note that the current Gregorian calendar, with its pattern of 365 + 365 + 365 + periodic leap-year insertions of 366-day-years (yet some of those being skipped), adds up to an average duration of the solar (or "tropical") year of 365.24219 years.

Over a "Great Year" this will cause the Sun-Earth axis to flip 180° in relation to the stars. In other words, the Summer and Winter solstices will become inverted, and so will (most probably) the tilt of the Sun's orbit. As a result, the Sun will in time be lowest in our Northern Hemisphere skies around June 21. Surely, not an ideal way to keep a record of the seasons: although it will take 25344 years for this 180° inversion to occur, this will have significant implications for mankind (even in the short / medium term) for a number of imaginable reasons.

To illustrate what the Gregorian error entails, here are two screenshots from the TYCHOS Planetarium.

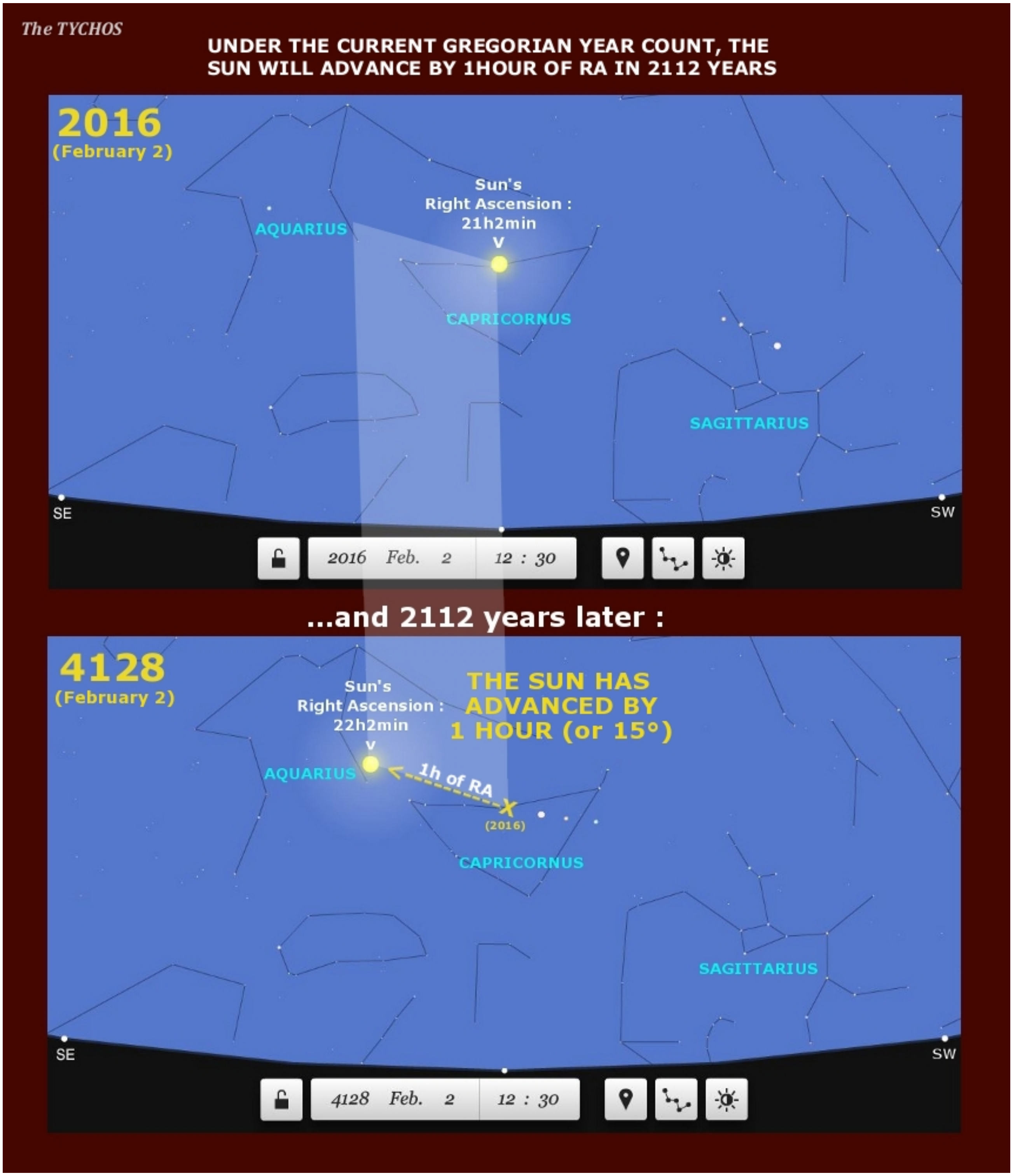
How the Gregorian calendar's year count will cause our seasons to be "flipped upside-down"



> You may ask, *"How did you arrive at the conclusion that the Sun will end upon the opposite side of Earth in 25344 Gregorian years?"*

I perused the NEAVE Planetarium (a mostly accurate and trustworthy tool) in order to verify just how many minutes of RA the Sun is expected under the Gregorian calendar count to slip out of alignment with the background stars.

The two below screenshots from the NEAVE Planetarium show the astounding positions of the Sun on February 2, 2016 and (2112 years later) on February 2, 4128. We observe that the Sun is expected to slowly slip *Eastwards* (!) vis-à-vis the stars by exactly **15°** or 60 minutes of RA. This is a direct contradiction of our current understanding of the precession of the equinoxes, which would have the Sun slowly drifting Westwards vis-à-vis the starry background.



Note: the NEAVE Planetarium once allowed you to toggle the year count well beyond 4000 CE, as documented above. However, around mid-2016, I found that they had (quite inexplicably) restricted their viewing range to year 2500.

This means that, due to the slightly-too-long Gregorian year count of 365.24219 days, we are currently allowing the Sun to drift Eastwards at an annual rate of:

60 min. of RA / 2112 = 0.028409 minutes of RA per year.

If we multiply this amount by the number of years in our TYCHOS Great Year we obtain:

0.028409 min. X 25344 = **720 min.**

Exactly one **half** of our celestial sphere!

So by the Gregorian calendar year's accounting, the Sun is drifting in the opposite direction. What exactly is going on here?

Well, it would seem that, as the Gregorian calendar was promulgated back in 1582 (just as Tycho Brahe started questioning the Copernican theory) the prime concern for the Vatican and its clique of vetted astronomers was to "combat" Earth's inexorable motion around its orbit. Over time, this offsets the Earth-Sun alignment vis-à-vis the stars. Thus, any calendar-based religious recurrences (such as Easter) cannot possibly keep recurring indefinitely under the same star alignments. The whole idea of the Gregorian year count was presumably to try and minimize this problem for, at least, the coming centuries.

So, in 2112 years, the Sun advances by 15° (out of 360° – *i.e.;* by ca. 15.2184 days every Gregorian year of 365.24219 days). We see that 15.2184 days are 0.00197285% of 2112 years – and that:

0.00197285% of 9,256,698 days (25344 Gregorian years)
are 182.62076649 days

1/2 of a year – or half of a solar revolution. In other words, if we keep counting one solar year as "365.24219 days" the Summer and Winter solstices will invert with respect to the stars.

However, there's a relatively simple thing we can do to prevent this from happening. We should ideally recalibrate our reckoning of the duration of a solar year so as to make the Sun's secular precession lock to Earth's clockwise motion around its PVP orbit, which is the physical reality.

It would be difficult to slice a circular birthday cake into 25344 exact equal parts. Luckily, we already know the value to make as many slices of Earth's 360° (or

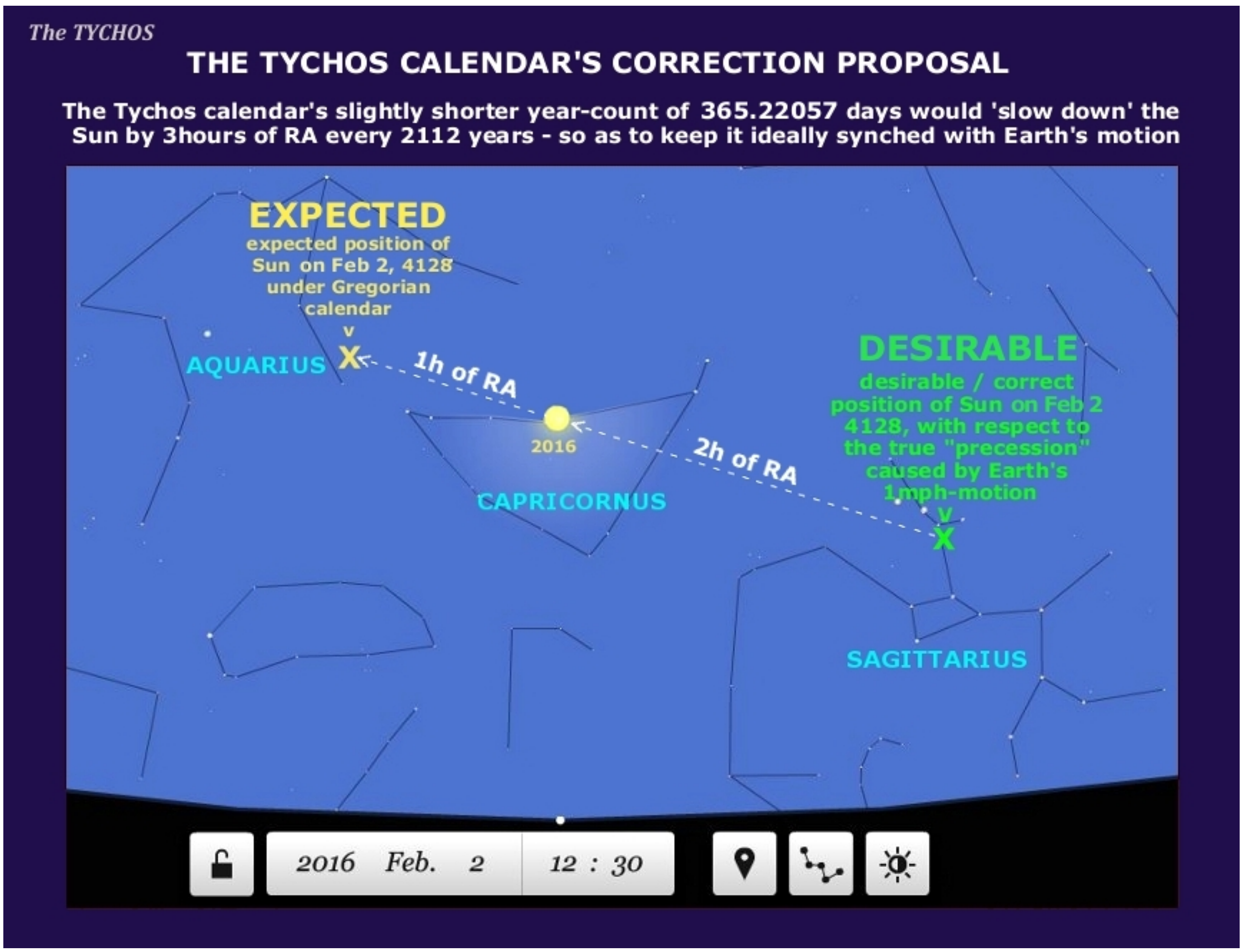
1,296,000”) orbit …

$$51.1\overline{36}'' \times 25344 = 1{,}296{,}000''$$

A full 360° circle

Looking at the above 2112-year example (from 2016 to 4128) we see that the Sun, which was in Capricorn in February 2016, is expected to be near Aquarius In February 4128. ***Ideally,*** the Sun should then be in Sagittarius. This is because empirical observations have long determined that our stars always move Eastwards in relation to Earth’s equinoctial axis.

Thus, we will want to shorten the current, Gregorian solar year count so that the Sun ends up in Sagittarius in February 4128.



To achieve this we only need to shorten our current **Gregorian measurement** of 2112 years by:

15.21843 + 30.43684 = 45.65527 days

1/8th of a solar year (every 2112 years)

Note that 1/8th of 360° = **45°** and that 1/8th of our 24-hour celestial sphere is **3 hours**. Indeed, this 45° or ca. "3-hour offset" occurring over 2000 years-or-so is a well-known calculation. It has been done by observational astronomers who keep track of our solar eclipses.

> *"The computed path of a solar eclipse that occurred 2000 years ago would be in error by about 3 hours, or some 45 degrees in longitude to the west, on the assumption that the rate of rotation of the earth were uniform."*

— *Leap Seconds* from National Time Service Center, Chinese Academy of Sciences (October 28, 2011)

This is currently interpreted as a supposed "deceleration of Earth's rotation" (and/or an acceleration of our Moon's orbital speed) which, in turn, would be the reason for our so-called atomic clocks — our "civil time" — needing to be continuously readjusted. Here's the introduction to the above-referenced article:

> *"The aged Earth is slowing down in its daily rotation, at least in the current epoch. Civil time is occasionally adjusted by one second increments to ensure that the difference between a uniform time scale defined by atomic clocks does not differ from the Earth's rotational time by more than 0.9 seconds. Coordinated Universal Time (UTC), an atomic time, is the basis for civil time."*

Now, in our current Gregorian calendar, 2112 years of 365.24219 days add up to 771,391.5 days. Hence, an ideal duration of 2112 years proposed by the TYCHOS model can be found with:

771,391.5 – 45.65527 = **771,345.84473 days**

To find our ideal duration of a TYCHOS year, we will just have to divide that figure by 2112 equal slices:

771,345.84473 days / 2112

We shall soon see that I am certainly not the first person on this planet to have arrived at the above ideal year count.

Note that 365.22057 days is about 0.0059197% shorter than 365.24219 days (the current Gregorian year count). This is a difference of about 31 minutes. As we saw in Chapter 26, the Sun oscillates back and forth by about 31 minutes every year. We would thus need to reduce Earth's full, annual 360° rotation in relation to the Sun by 0.0059197%.

We should therefore have to recalibrate our clocks with respect to this desired, annual, slightly shorter angular rotation of Earth. Theoretically, all we could is shorten our clocks´measurement of Earth´s last rotation of the year (December 31) by 0.0059197%.

Earth rotates in the Gregorian scheme once every 86,400 seconds. We see that:

0.0059197% of 86,400 seconds = 5.1146208 seconds

However, to advance our clocks every December 31 by 5.1146 seconds would, of course, be impractical. Instead, we should more logically distribute these 5.1146 seconds across the full 365.24219-day spectrum of our current Gregorian calendar's year count:

5.1146208 seconds / 365.24219 days ≈ 0.014003368 seconds
or roughly **14 milliseconds per day**

We may thus obtain our desirable Sun-Earth synchrony with our calendar count by making our clocks count off 14 more milliseconds than we presently do each day. As a result, the Sun's orbital precession rate would remain ideally "locked" with Earth's clockwise motion around its PVP orbit — and our civil calendar´s year count. This should allow for unprecedented reliability of all astronomical and climatic predictions for future times.

The TYCHOS ends the endless "leap second" debate

A vivid international controversy has been raging for several decades regarding the periodic (yet arbitrary) insertion of leap seconds to the international coordinated timescale (UTC). This “system of correction” was implemented in 1972 because it is erroneously believed that Earth’s rotation is gradually slowing down, thus causing our atomic clocks to slip out of sync with true solar time. However, this erratic practice has caused serious problems and confusion over the years in various areas of human activity — so much so that many countries are now suggesting to abolish the leap second gimmick altogether. This short article sums up the problem succintly:

> *“The US has supported dropping the leap second for quite a while, and had the backing of countries including Japan, Italy, Mexico and France at an international meeting in 2012, according to a BBC report at the time. The UK, on the other hand (along with Canada and Germany if the last meeting is anything to go by), is pretty set against the change. Because while a second once or twice a year doesn’t sound like much, they’ll add up to throw our measured days out of sync with solar days—which we’ve been using long before fancy atomic clocks as an indicator of time. When opening up the public dialogue on the matter, Minister for Science David Willetts made his view pretty clear. ´My view is that without leap seconds we will eventually lose the link between time and people’s everyday experience of day and night,´ he said. The NPL (the UK’s National Physical Laboratory) does the math: In 800 years, the sun would be at the highest point at 1pm instead of noon.”*

— *The Plan to Lose Leap Seconds Would Throw Our Clocks Out of Sync With the Earth*
by Victoria Turk (June 6, 2016) for Motherboard

As of my above calculations, the Sun will in fact be at the highest point at 1pm instead of noon in circa 704 years*. That is, only if our time-regulating institutions should decide to drop the leap second insertions – and to ignore the optimal solution provided by the TYCHOS model with its proposed 5.1146-second adjustment of our clocks´ chronometric quantification of one solar year.

* 704 years X 5.1146208 seconds ≈ 3600 seconds — or approximately 1 hour.

And yes, this means that in about 8448 years (704 X 12), the Sun will be at the highest point in a bright daylit sky when our clocks strike midnight !

Hence, we can see how the TYCHOS may, yet again, effectively resolve another longstanding scientific controversy. Undoubtedly, further study and refined computations are needed to determine how we may optimally synch our clocks with the TYCHOS year count. Yet, if the people currently in charge of our all-important time metrology were to have it their way(s), this may ultimately have catastrophic consequences. In a worst-case scenario, our clocks will drift dramatically out of phase with the true solar time – while "our days will become our nights" (and vice versa) long before the completion of a Great Year.

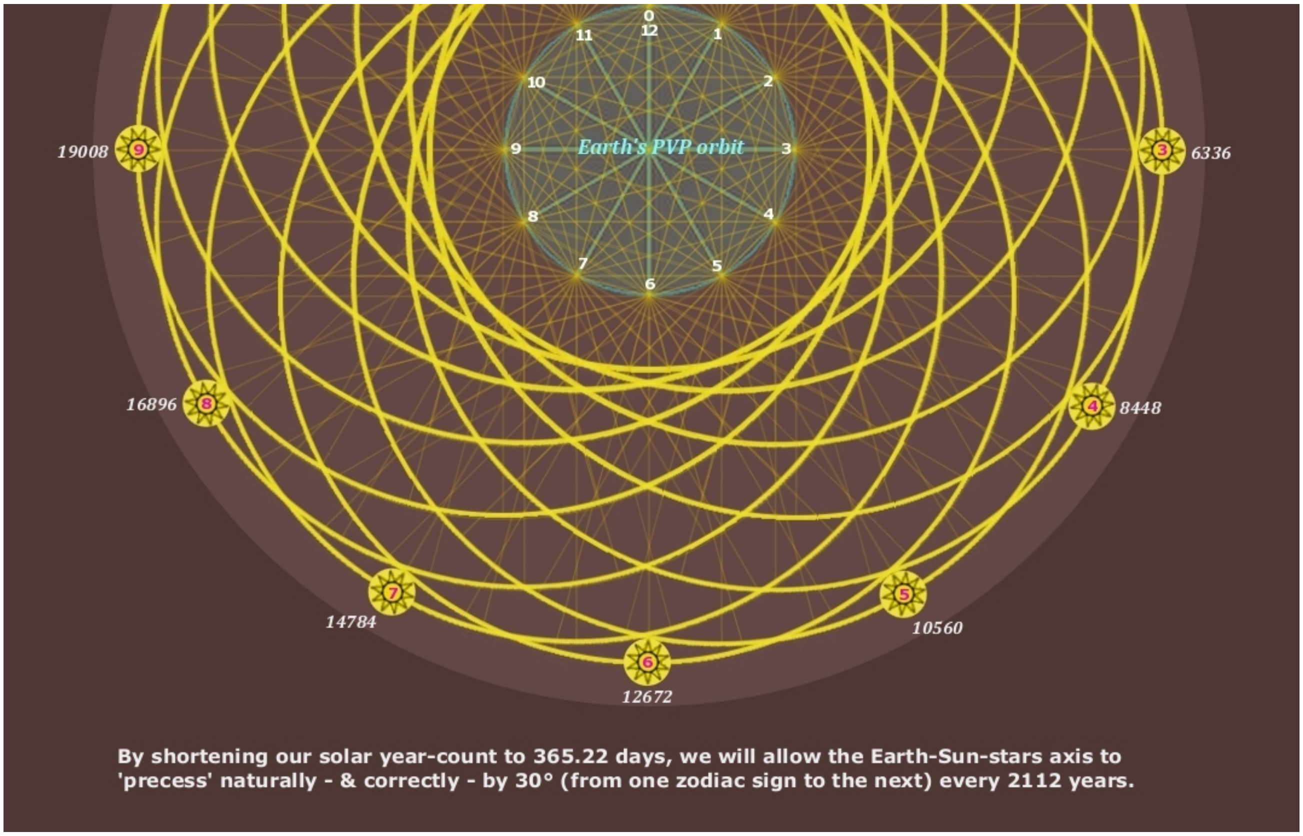
Previous Chapter Next Chapter

Chapter 32 — The TYCHOS Great Year (TGY) — 25344 solar years of 365.22057 days

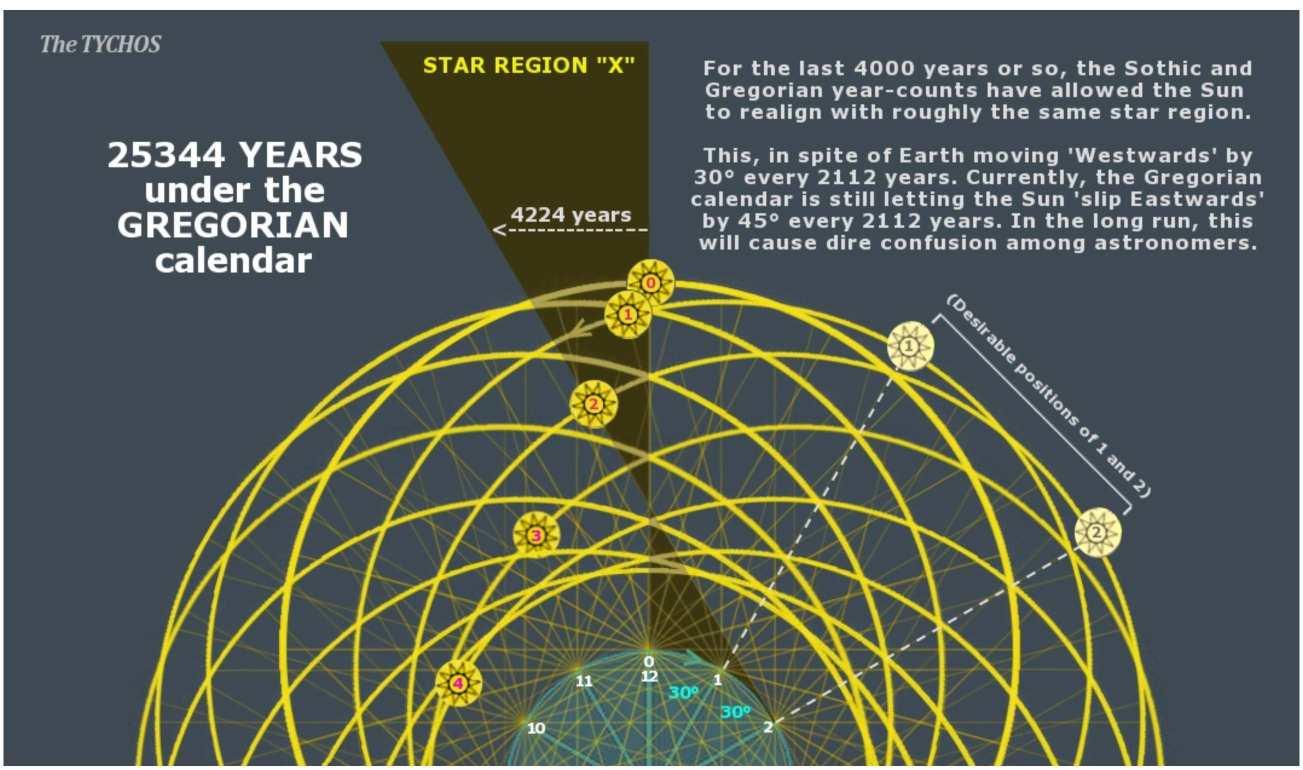
We shall now see how, just by implementing a slightly shorter year-count of **365.22057** "days", we may ensure the optimal synchrony between Sun and Earth over a full Great Year of 25344 solar years. Since Earth moves "Westwards" around its PVP orbit by 30° every 2112 years, we should ideally "meet up" with the Sun at the completion of each 2112-year period.

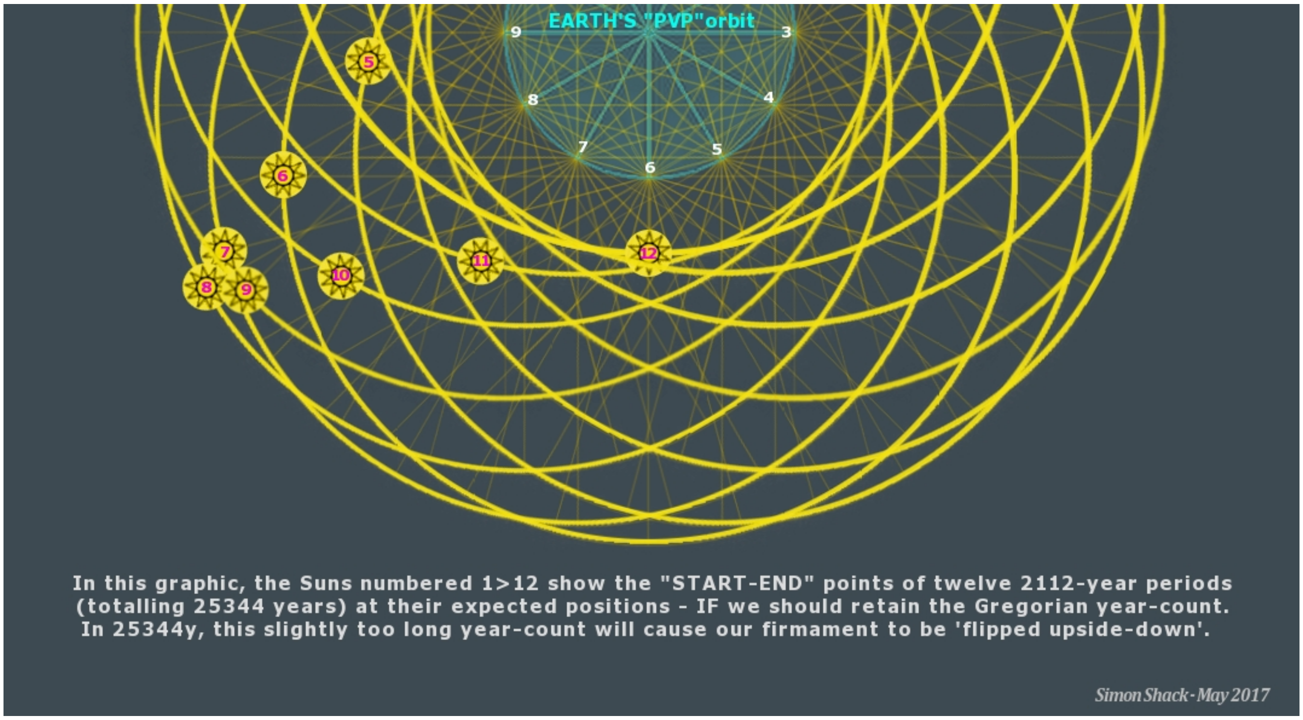
Of course this implies that, every 2112 years, the Sun will be regularly drifting from one zodiacal sign to the next. However, in such way, by optimizing the secular Sun-Earth orbital orientations, we will ensure the secular stability (vis-à-vis our civil calendar's year count) of our earthly seasons throughout future times. This, you may agree, is a most desirable thing for reasons which should become gradually more evident as we go along.

My next graphic illustrates what the ideally-tuned TYCHOS Great Year would look like. It is a perfect, synchronous pattern — of a most harmonious nature — which we may achieve by implementing my day value for the year count, since this would make the Sun correctly precess along with Earth by 30° every 2112 years.



My next graphic shows what a shambles a Great Year would be if we chose to retain our current Gregorian 365.24219-day year count. It should be evident what a disaster this would be for observational astronomers, or for any future chance of building upon the good records kept by countless civilian astronomers throughout the centuries.





As one may well imagine, the Gregorian calendar's proposed year count of 365.24219 days will, over the long term, generate dire confusion and bewilderment among this world's scientific community. My above graphic illustrates just how the Sun will keep slipping out of synch with Earth over time. Imaginably, this will cause even more perplexity and anguish for our world's observatories, since the equinoctial precession rate (vis-à-vis the Sun and the stars) will appear to wildly fluctuate in the coming millennia. Ultimately, our system would be flipped upside down in relation to the stars — along with the seasons familiar to the inhabitants of our two hemispheres. (Incidentally, 93% of our world's population lives in the Northern Hemisphere, whereas only 7% lives in the Southern Hemisphere. *(See: http://brilliantmaps.com/human-hemisphere)*

One may envision that the Gregorian calendar was probably devised to compensate for Earth's 1-mph motion as it attempted to keep the Earth-Sun axis oriented as long as possible (see positions 0,1, and 2) towards the same star region. In the long run, of course, this is not a sustainable way of dealing with Earth's progression around its PVP orbit.

Fine-Tuning of the TYCHOS Great Year

For clarity and simplicity's sake, I have been using earlier in the book the "round" year count of 365.25 days for my wider Great Year computations (the relative ratios of the various planetary periods have nonetheless been respected)*. However, since the Gregorian count is more precisely 365.24219 days and since my proposed Tychos Optimal year count is 365.22057 days, it is best to perform some fine tuning for a more accurate estimate of the duration of a TYCHOS Great Year.

> A Gregorian Great Year of 25344 solar revolutions (of 365.24219 days each) will add up to 25344 X 365.24219 ≈ 9,256,698 days.
>
> A TYCHOS Great Year of 25344 solar revolutions (of 365.22057 days each) will add up to 25344 X 365.22057 ≈ **9,256,150 days.**

The difference being 9,256,698 – 9,256,150 = 548 days (or just about 1.5 solar revolutions — *i.e.;* years).

Note that these 1.5 solar revolutions reflect the fact that, if we should keep using the Gregorian calendar count, the Sun will end up on the wrong side of our system (as we saw earlier on). You may now ask, *"Will this not cause Earth's **rotations** to become offset by 1.5 units in relation to the Sun – and thus, in relation to our clocks?"* No, and here is why:

Remember that our previous calculations determined that we need to shorten the day-count of our clocks by about 14.0033 ms. Well, 14.0033 ms is about 0.0000162075% of 86,400,000 ms (the number of milliseconds in 24 hours).

If we now multiply 0.0000162075% by the number of days in a TYCHOS Great Year, we see that:

0.0000162075% X 9,256,150 ≈ 150%
where 100% represents 1 Earthly rotation

Ergo, in one TYCHOS Great Year, the Sun will revolve 1.5 fewer times around Earth (as compared to our current Gregorian year count) – while Earth will rotate 1.5 fewer times around itself. All this with the desirable bonus that our Summers and Winters won't become inverted!

> Note that 365.22057 is 0.00806% less than 365.25. This is to say that, for all research purposes and maximum accuracy, *all* values submitted earlier in this text concerning the orbital circumferences, sizes and speeds of our system's celestial bodies (such as in Chapter 17 and

Chapter 18) will eventually need to be shortened by this 0.00806% reduction factor.

About the TYCHOS' 365.22057-day year length (and its proposed 25344-year-long Great Year)

It is now time to explore the significance of the gap between the integer value 365 and our 365.22057 value. Does the extra amount of 0.22057 actually represent Earth's 1-mph-motion, thus causing our solar year to be a trifle longer than 365(.0) integer years?

Indeed so it appears, as I will henceforth demonstrate. The difference between 365 and 365.22057 is 0.06043 %. We see that 0.06043% of 25344 (the number of solar revolutions in a TYCHOS Great Year) is **15.3153792**. Think of this value as the angular factor by which the Sun and Earth would be offset, if we were to use a year-count with an integer value of 365(.0) days.

Since the Sun's orbit (as of the TYCHOS model) is 2.642336 X larger than Earth's orbit, we shall divide:

0.06043% ÷ 2.642336 = 0.0228699151054219%

However, we know that Earth's speed is 0.00149326469 % of the Sun's speed, hence:

0.0228699151054219 ÷ 0.00149326469 = 15.3153792886 (our "Special Angular Factor")

Let us now use our Special Angular Factor along with our 0.06043% value to demonstrate the exactitude of the 25344-year-long TYCHOS Great Year. We see that 0.06043% of 360° amounts to 0.217548°.

360° / 0.217548° ≈ 1654.807214959457°

and the above

X 15.3153792886 = 25344

Moreover, we see that 0.06043 % of 1,296,000" (also a full circle) amounts to 783.1728". If we now divide this by our Special Angular Factor we obtain:

783.1728” / 15.3153792886 ≈ **51.1$\overline{36}$”** Our good’ol ACP!

So there we have it; the extra **0.22057** does indeed appear to reflect Earth’s motion. In other words, the reason why we cannot use an integer value for the day count of each of the 25344 revolutions of the Sun around Earth is, once more, a direct consequence of Earth’s 1-mph-motion.

The “365.22-day” value — not a TYCHOS model novelty

Am I the first individual on this planet who has arrived, by logical avenues and deductions, to the 365.22-day year count? Apparently not! It appears that this precise value was proposed by some knowledgeable folks many years ago:

> *“Do our Science teachers tell us of the genius of the Olmec, Zapotec, Maya, and Aztec astronomical star mapping? That the Maya calculated a solar year to 365.22 days? That their calendar was more accurate than the calendar used in Europe at the time?”*

— *Education*, Chicano History site by Manuel (2003)

> *“Our Maya people created the most accurate calendar in the world at the time including the calendar used in Europe. They calculated a solar year to 365.22 days.”*

— *Identity*, Chicano History site by Manuel (2003)

Moreover, it is also known that Sosigenes of Alexandria had arrived to this exact “365.22-day” value. The great astronomer was brought to Julius Caesar in 46 BCE to help him “overhaul” the Roman calendar and seemingly did a jolly good job:

> *“Thus, the wise Sosigenes not just re-introduced the ancient Egyptian solar calendar with its well-known four-year leap day cycle, but also accounted for the secular error of one (leap) day every 128.18 solar years. According to Hipparchus’ wrong calculation of the tropical year that error would have amounted to one day in about 300 years. For it is remarkable that Sosigenes’*

> *tropical calendar (a.k.a. Julian calendar) was kept accurate until approximately 300 CE, as the knowledge of its additional leap-day was being lost again for nearly another 1300 years!"*

— p. 8, *Sirius and precession of the solstice* by Uwe Homann (2005)

Alas, Sosigenes's calendar was then dismissed by the bigwigs behind the 1582 Gregorian calendar reform of Pope Gregory XIII.

> *"Then, during the late 16th century work of the 6th century Anglo-Saxon monk, Bede, was submitted to Pope Gregory XIII who accepted the calculations. He made the decision to issue a more accurate calendar that ultimately was accepted and proclaimed that Sosigenes had made a mistake in calculating each year as 365.22 days (the devil is all in the detail here); he was advised that each year was in fact 365.2422 days long. There was an error amounting to 0.78 days per 100 years."*

— *Chairman's Report August 2001* by Bob Solly for The Sole Society (2001)

There was no error in Sosigenes's calculations. Yet how exactly he arrived to this correct reckoning of the year's duration is, to my knowledge, not described in any existing astronomy literature. In any case, my proposed ideal 365.22 value is, apparently, nothing new. As far as I know, I arrived at this value via wholly different avenues than those of Sosigenes or the ancient Mayas. One may reasonably conclude that so long as any cogent cosmic studies rely on empirical and observational facts, concurrent conclusions will eventually be reached, even centuries apart!

Previous Chapter   Next Chapter

Chapter 33 — The Heliacal rising of Sirius

It appears that the Egyptian calendar preceded, and inspired, the Gregorian calendar's practice of tweaking our "Passage of Time" since the Egyptians also tried to mould it to their own liking. So the Gregorian was tweaked to make Jesus Christ's Easter resurrection coincide as closely as possible with the March equinox, the Egyptians also tweaked it to coincide with the heliacal rising of Sirius. The date has remained, for several centuries, quite remarkably stable.

> *"For it is remarkable that owing to the precession of the equinoxes, on the one hand, and the movement of Sirius on the other, the position of the sun with respect to Sirius is displaced in the same direction, almost exactly to the same extent."*

— *Sacred Science: The King of Pharaonic Theocracy* by R.A. Schwaller de Lubicz (1982, Inner Traditions Reprint)

> *"The fact that Sirius seems to maintain its position relative to the position of the sun was a surprise to most scientists (aware of precession), when it was first noticed by the French scientific community following the Egyptian discoveries of Napoleon (and the Dendera Zodiac) in the early 1800's."*

— *Karl-Heinz Homann (April 29, 1933 – April 23, 2008)* by Walter Cruttenden for BRI's Sirius Research Group

According to some authors it was none other than Tycho Brahe who first discovered this behavior of Sirius.

> *" 'Sirius remains about the same distance from the equinoxes — and so from the solstices — throughout these many centuries,*

> *despite precession'. In a personal correspondence with this author, Jed Buchwald also noted that 'the effect was actually first discovered long ago by Tycho Brahe in fact, who informed the chronologer Scaliger about it.' "*

— p. 13, *Sirius and precession of the solstice* by Uwe Homann (2005)

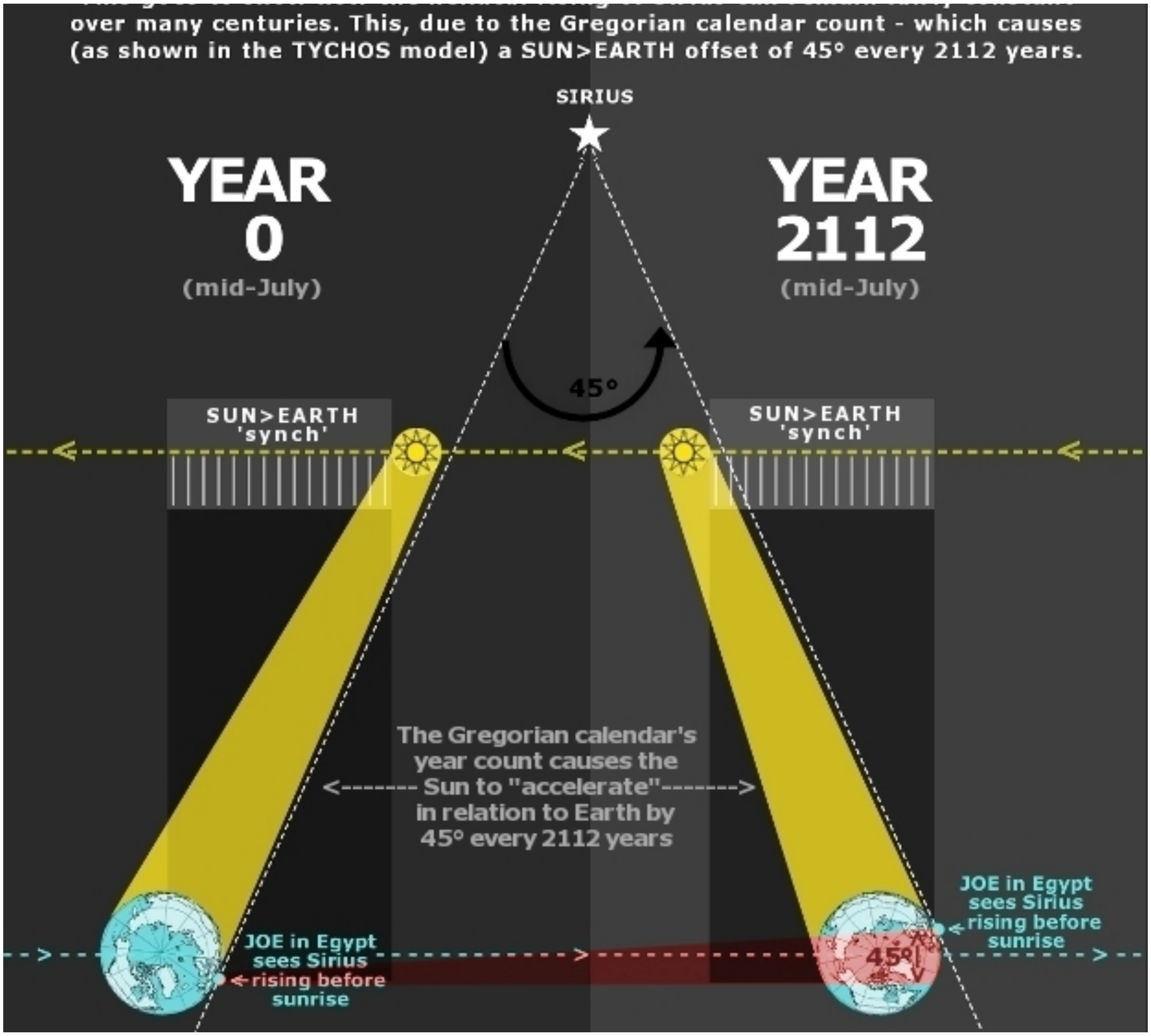
TABLE 1. Heliacal rise dates for Sirius from Egypt.

Year	DSVE*	Julian Date
3500 B.C.	87.8	July 16.4
3000 B.C.	92.3	July 16.9
2500 B.C.	95.8	July 16.6
2000 B.C.	100.3	July 17.3
1500 B.C.	104.8	July 17.8
1000 B.C.	108.2	July 17.2
500 B.C.	112.9	July 18.2
A.D. 1	117.3	July 18.3
A.D. 500	123.0	July 20.3

The above table is from:
p. 50, *The heliacal rise of Sirius and ancient Egyptian chronology* by Bradley E. Schaefer for *Journal for the History of Astronomy*, Vol. 31, Part 2, p. 149 – 155, Yale University

As you can see, the above chart shows that Sirius has "precessed" in 4000 years (from 3500 BC to 500 AD) by only about four days (from July 16.4 to July 20.3). This, in relation to the Julian calendar of 365.25 days which is of course quite similar (by 0.002%) to the Gregorian count of 365.24219 days. This remarkable stability of the heliacal rising of Sirius is another hotly-debated riddle of astronomy.

In the TYCHOS, the fact that Sirius has kept rising just before sunrise (for the last 2000 years or so) at almost the same time of year – and thus appears to precess less than other stars – can be explained as follows: Sirius is located in a position almost perpendicular to Earth's direction of travel. As we just saw in Chapter 32, a 365.25-day year count will let the Sun drift "too much eastwards", thus skewing Earth's rotational position (with respect to the Sun's zenith) by about 45° in roughly 2000 years. Consequently, the date of the heliacal rising of Sirius has remained fairly stable (*in relation to our calendar count*) for several centuries.



The Egyptian "Sothic Cycle" was a period of 1461 years (which equaled 1460 Julian years).

> *"The Sothic cycle is a period of 1,461 Egyptian civil years of 365 days each (or 1,460 Julian years averaging 365¼ days each). During a Sothic cycle, the 365-day year loses enough time that the start of its year once again coincides with the heliacal rising of the star Sirius."*

— Wikipedia entry on "Sothic cycle"

It becomes apparent that the Sothic cycle was devised in order to keep Sirius rising around the same desired calendar date – in spite of Earth's inexorable 1-mph-motion around its PVP orbit. It could be said that the Sothic cycle was a precursor of the currently-adopted Gregorian calendar, which also vainly attempted to compensate for Earth's unknown motion.

Earth's 1-mph motion also resolves the "Sirius mystery" which, of course, is directly related to the fundamental (and even more controversial) question of the officially-defined durations of the tropical & sidereal year. Karl-Heinz Homann (who studied the Sirius question for decades) justly underlined the utmost importance of this matter in his brilliant paper:

> *"Experts at the International Astronomical Union (IAU) are in an uproar. Worldwide, thousands of students and teachers have been confronted with the most controversial astronomical problem in the history of science. In 1955 the IAU substituted the tropical year of 31,556,925.97474 seconds for the sidereal year as the fundamental unit of time. But in authoritative textbooks it is asserted that the time interval of the sidereal year or Earth's complete period of revolution measured with respect to inertial space is about 31,558,149.5 seconds. The IAU refuses to confirm this assertion. Experts have recognized the fact that such a sidereal year does NOT exist in reality. The IAU is accused of willfully misleading the scientific community."*

— *The Precession Paradigm* by Uwe Homann (May 2000)

Fortunately, the TYCHOS model provides a definitive resolution to all of these astronomical controversies concerning Sirius.

Previous Chapter Next Chapter

Chapter 34 — The stellar sophistry known as the "Aberration of Light"

> *"James Bradley, (born March 1693, Sherborne, Gloucestershire, Eng.—died July 13, 1762, Chalford, Gloucestershire), English astronomer who in 1728 announced his discovery of the aberration of starlight, an apparent slight change in the positions of stars caused by the yearly motion of the Earth. That finding provided the first direct evidence for the revolution of the Earth around the Sun."*

— *James Bradley — English Astronomer* by Gerald S. Hawkins (2017) for *Encyclopædia Britannica*

> *"James Bradley's discovery of stellar aberration, published 1729, eventually gave direct evidence excluding the possibility of all forms of geocentrism including Tycho's."*

—pp. 16-17, *Tycho Brahe* by Wikipedians, from compiled Wikipedia articles about Tycho Brahe and related subjects

Astronomer Royal James Bradley's *Aberration of starlight* is widely celebrated as the definitive proof of Earth's motion around the Sun as it supposedly hurtles at supersonic speeds along a 300 Mkm-wide orbit. For those who might (understandably) never have heard of the formidably contrived "Aberration of light" theory, here follow some basic descriptions of this arcane astronomical concept.

> *"The aberration of starlight was discovered in 1727 by the astronomer James Bradley while he was searching for evidence of stellar parallax, which in principle ought to be observable if the Copernican theory of the solar system is correct. He succeeded in*

> *detecting an annual variation in the apparent positions of stars, but the variation was not consistent with parallax. The observed displacement was greatest for stars in the direction perpendicular to the orbital plane of the Earth, and most puzzling was the fact that the displacement was exactly three months (i.e., 90 degrees) out of phase with the effect that would result from parallax due to the annual change in the Earth's position in orbit around the Sun."*

— *Stellar Aberration from Reflections on Relativity* by Kevin Brown (2017)

Here's an extract from a fairly recent book titled *The Sky at Einstein's Feet*.

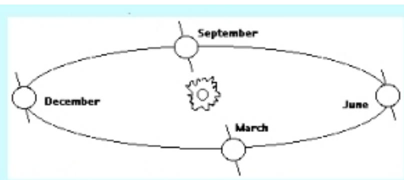
But the real prize would be proof – measurement of the shift in a star's apparent position as we observe it from different parts of the Earth's orbit each year. The quest to see this effect occupied some of the most careful and inventive astronomers for over a century. Among them was James Bradley, who used a long telescope pointing near the zenith (a so-called *zenith sector*, still on view at the National Maritime Museum in Greenwich) near London. This arrangement minimized errors due to atmospheric refraction, and allowed use of very precise scales over shorter angles than other designs. He chose γ Draconis as his quarry, because it was a bright star (hence, possibly close to us) which passed close to the zenith from his latitude. Bradley did find an annual shift in the star's location, as it traced out an elliptical path in celestial coordinates with a major axis of 40 arcseconds. As he soon realized on comparison with other stars, which showed a matching shift, he had found not the expected parallax, but something intellectually just as powerful in demonstrating the motion of the Earth – the aberration of starlight.

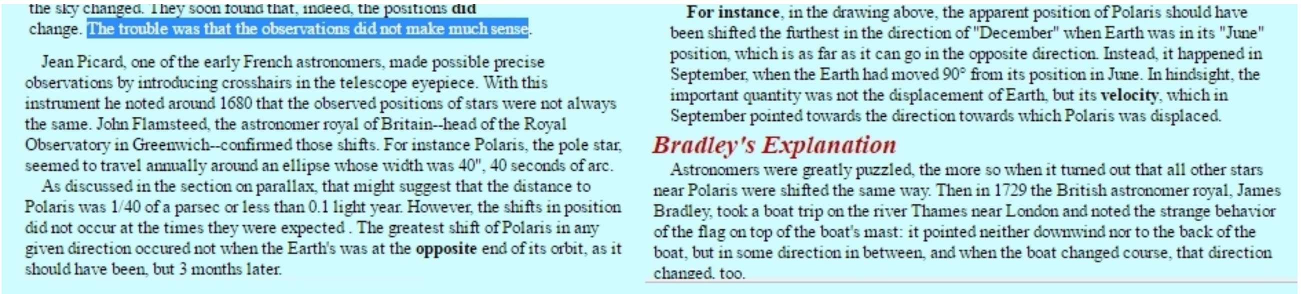
p. 13, *The Sky at Einstein's Feet* by William C. Keel (2006)

The below excerpt of another article neatly sums up Bradley's puzzling observations, which had astronomers scratching their heads. Why does a star's maximum elongation occurs in a nine month period, rather than (as Copernican astronomers would expect) a six month period? Furthermore, why would a circumpolar star such as Polaris be observed to travel around an ellipse of 40 seconds of arc, while stars level with Earth's equatorial plane are all seen precessing annually by about 50.3 seconds of arc?

Apparent Displacement of Stars

This section is about starlight, not about boats and flags. From Newton's days, astronomers have tried to find how far the stars were by the parallax method, using the diameter of the Earth's orbit as a baseline. They carefully measured the positions of stars at times half a year apart--representing two positions of the Earth separated by 300,000,000 km--and then checked whether the positions of stars in




the sky changed. They soon found that, indeed, the positions **did** change. The trouble was that the observations did not make much sense.

Jean Picard, one of the early French astronomers, made possible precise observations by introducing crosshairs in the telescope eyepiece. With this instrument he noted around 1680 that the observed positions of stars were not always the same. John Flamsteed, the astronomer royal of Britain--head of the Royal Observatory in Greenwich--confirmed those shifts. For instance Polaris, the pole star, seemed to travel annually around an ellipse whose width was 40", 40 seconds of arc.

As discussed in the section on parallax, that might suggest that the distance to Polaris was 1/40 of a parsec or less than 0.1 light year. However, the shifts in position did not occur at the times they were expected . The greatest shift of Polaris in any given direction occured not when the Earth's was at the **opposite** end of its orbit, as it should have been, but 3 months later.

For instance, in the drawing above, the apparent position of Polaris should have been shifted the furthest in the direction of "December" when Earth was in its "June" position, which is as far as it can go in the opposite direction. Instead, it happened in September, when the Earth had moved 90° from its position in June. In hindsight, the important quantity was not the displacement of Earth, but its **velocity**, which in September pointed towards the direction towards which Polaris was displaced.

Bradley's Explanation

Astronomers were greatly puzzled, the more so when it turned out that all other stars near Polaris were shifted the same way. Then in 1729 the British astronomer royal, James Bradley, took a boat trip on the river Thames near London and noted the strange behavior of the flag on top of the boat's mast: it pointed neither downwind nor to the back of the boat, but in some direction in between, and when the boat changed course, that direction changed, too.

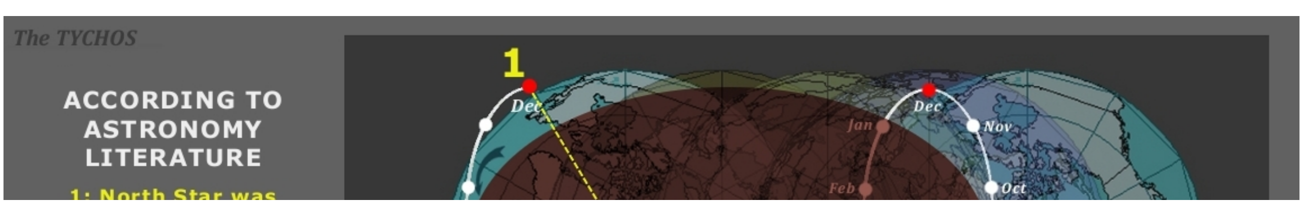
Quoting the above paper:

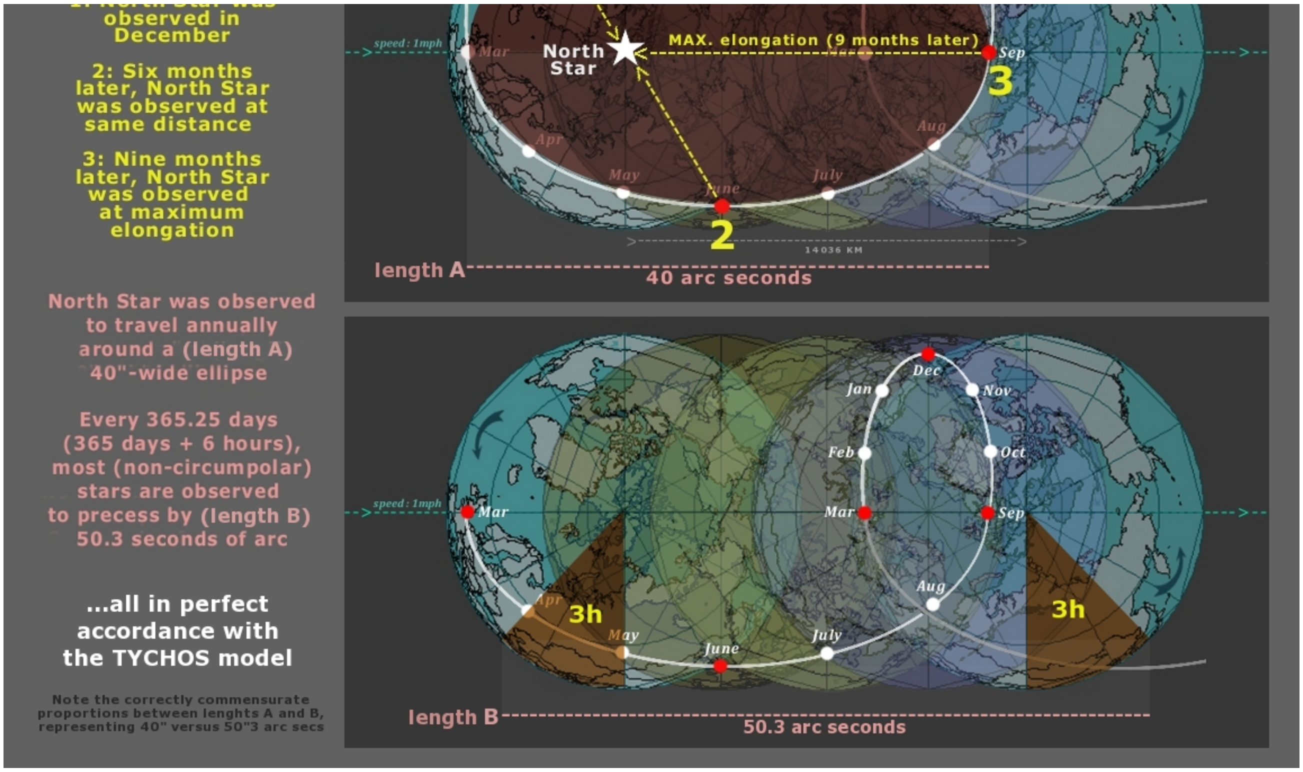
> *"For instance Polaris, the pole star, seemed to travel annually around an ellipse whose width was 40", 40 seconds of arc. [...] However, the shifts in position did not occur at the times they were expected. The greatest shift of Polaris in any given direction [occurred] not when the Earth's was at the opposite end of its orbit, as it should have been, but 3 months later. For instance, in the drawing above, the apparent position of Polaris should have been shifted the furthest in the direction of 'December' when Earth was in its 'June' position, which is far as it can go in the opposite direction. Instead, it happened in September, when the Earth had moved 90° from its position in June."*

— *From Stargazers to Starships — 22a. The Aberration of Starlight* by Dr. David P. Stern (2006) for NASA

That's right! Bradley and his peers found that, to their amazement, the maximum annual elongation of a circumpolar star from an earthly observer does not occur over the expected six-month time period but will, in fact, occur three months later. *i.e.;* nine months after the start of a year-long observation.

I will now illustrate exactly how — under the TYCHOS model — our North star Polaris will in fact reach its maximum elongation (from an earthly observer) over a 9-month (rather than a 6-month) period and why Polaris is observed to travel annually around a 40"-wide ellipse.





As mentioned in my above graphic, please note that the lengths A and B (representing two of the most well-known, empirically-verifiable measurements in astronomy) are perfectly consistent, proportionally speaking. I recommend you verify this for yourself with a simple ruler that length B is 1.25 X larger than length A (since 50.3” is 1.25 X larger than 40”).

Keeping in mind that these commensurate values rely on the core principles of the TYCHOS model (what with Earth’s annual 14,036-km-motion & the trochoidal path of earthly observers), the odds for all this to be entirely coincidental are, objectively speaking, beyond rational consideration.

The almost comical “stellar aberration” theory which Bradley concocted (in his urge to justify otherwise inexplicable observations) has to be among the most contorted attempts at rescuing the doomed Copernican model. In hindsight, it is quite ironic that Bradley’s painstaking efforts very nearly ended up imploding the Copernican theory from within, since his (otherwise quite valid & correct) observations were in stark contradiction with the Copernically expected stellar motions.

> *“It is important to notice that the early attempts were at measuring what today would be called absolute parallax, rather than relative parallax, which is the parallax of a nearer star with respect to that of a distant star”.*

—p. 222, *The Historical Search for Stellar Parallax (Continued)* by J. D. Fernie, from *Journal of the Royal Astronomical Society of Canada,* Vol. 69, pp.222-239

Keep in mind the above quote by J.D Fernie, as we shall soon get to the question of relative stellar parallax and its geoptical implications, which, as I shall thoroughly demonstrate, can only find a rational explanation within the TYCHOS model.

Previous Chapter Next Chapter

Chapter 35 — The Question of Star Distances

How can we see so many stars with our naked eyes?

1 AU (average Earth-Sun distance) = 149,597,870.7 km (or roughly 149.6 Mkm)

1 Light Year = 63241.1 AU = 9,460,730,472,580.8 km

Currently claimed distance to our nearmost star, Alpha Centauri: 4.37 light years or 41,343,392,165,178 km!

It is a matter of historical record that Tycho Brahe rejected the idea of the implied, Copernican star sizes and distances. This conviction may be phrased in a question such as, *"Why would Alpha Centauri (believed to be our nearmost star) be so enormously more distant than, say, Saturn?"* To be sure, this still-unanswered question was precisely what most bothered Tycho Brahe about the heliocentric Copernican theory.

> *"In the absence of any observed stellar parallax, Tycho scoffed for example at the absurdity of the distance and the sizes of the fixed stars that the Copernican system required: Then the stars of the third magnitude which are one minute in diameter will necessarily be equal to the entire annual orb [of the earth], that is, they would comprise in their diameter 2284 semidiameters of the earth. They will be distant by about 7850000 of the same semidiameters. What will we say of the stars of first magnitude, of which some reach two, some almost three minutes of visible diameter? And what if, in addition, the eighth sphere were removed higher, so that the annual motion of the earth vanished entirely [and was no longer perceptible] from there? Deduce these things geometrically if you like, and you will see how many*

> *absurdities (not to mention others) accompany this assumption [of the motion of the earth] by inference."*

— *Tycho Brahe's Critique of Copernicus and the Copernican System* by Ann Blair (1990) from *Journal of the History of Ideas* 51(3): 355-377.

Another fundamental optical issue hardly ever questioned: How can so many stars possibly be visible to our unaided eyes if our nearmost star is 4.37 light years away? And how is this possible if countless others are visible without the aid of a telescope, if they are supposedly located dozens, hundreds or even several thousands of light years away?
Now, if you wonder how distant the farthest star visible to our naked eyes is currently reputed to be, here's what we are told.

> *"The farthest star we can see with our naked eye is V762 Cas in the constellation of Cassiopeia at 16,308 light years."*

— *What is the distance to the farthest star we can see with our naked eye?* by Sudeep Dutt (2016) for Socratic.org

So the farthest star is supposedly **3732 X** farther away than our nearmost star, or **1,031,335,858 X** further away than our Sun! Before you try to conceptualize just how big this star would have to be in order to be visible to our unaided eyes, I would advise you to lie down and take an aspirin.

Please consider that our Sun is located on average about 149,600,000 km (or about 150 Mkm) away from Earth. This distance is defined as "1 AU".

Alpha Centauri A (our nearmost star) is meant to be about **276,360 X AU** away.

This means it is said to be located **41,343,392,165,178 km** away (or "4.37 light years") from our eyes. The explanation for these unthinkable distances goes a bit like this (I paraphrase):

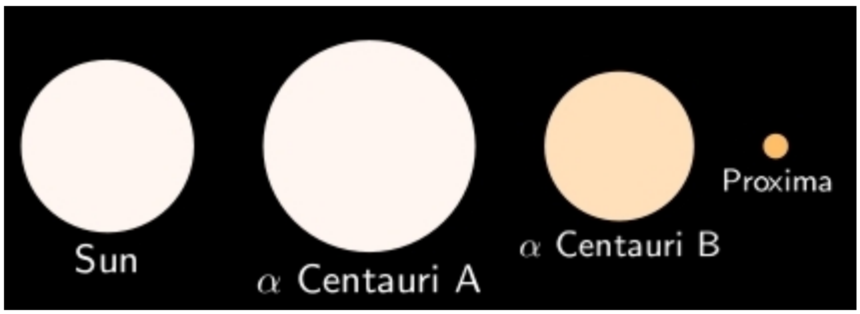
"Most stars are very much larger than our Sun — and some are far more luminous than our Sun."

You may find the Wikipedia page on "Luminosity" to be an enlightening read.

Well, here's the implicit aberration flying in the face of the claim. Alpha Centauri A (the fourth-brightest star seen from Earth) is, according to modern astronomy data, no more than 22% larger than our Sun, and its luminosity is said to be no more than 1.5X that of our Sun.

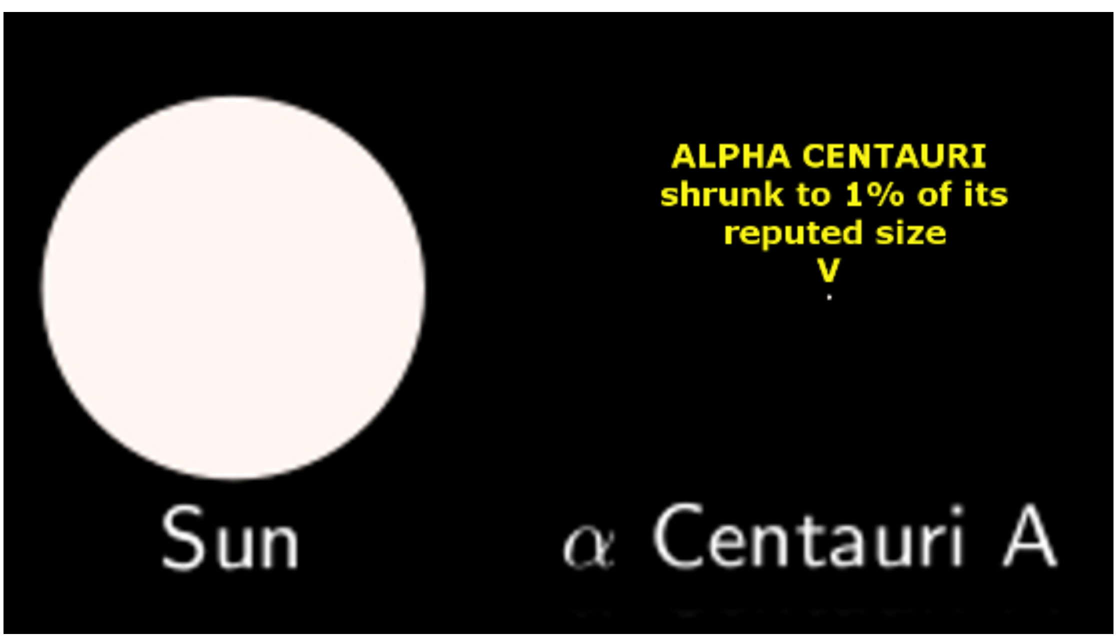
Source data from Wikipedia entry for "Alpha Centauri"

Note that Alpha Centauri is yet another binary (triple) star system composed of Alpha Centauri A, Alpha Centauri B and the much smaller Proxima Centauri. Here they are, all three of them — compared with our own Sun's diameter:



Let me now give you a rough idea of what Alpha Centauri A would look like if we make it only 100 times smaller than shown above.

All I have done in the below graphic is reduce the disc representing Alpha Centauri A to 1% of its size:



Now, Alpha Centauri A is not meant to be only 100 X times further away than our Sun (as visualized above). No, we are told that it is **276,360 X** further away — while being only 22% larger and 1.5X brighter than our Sun! If true, how could it conceivably remain visible to the naked, unaided human eye?

Keep in mind that Alpha Centauri is considered to be our *nearmost* star. If we consider the distances currently claimed for one of our brighter stars Deneb (*a.k.a.* Alpha Cygni) the whole affair becomes well and truly outlandish. Deneb is said to be a good 200 X times larger than our Sun but we are also told that it is a whopping 2600 LY away from our eyes. That's about **164,426,800 AU!**

Or if you prefer, in kilometers : **24,598,249,280,000,000 km**

Yet, Deneb is one of the *brightest* "naked-eye stars" in our skies!

> *"A blue-white supergiant, Deneb is also one of the most luminous stars. However, its exact distance (and hence luminosity) has been difficult to calculate; it is estimated to be somewhere between 55,000 and 196,000 times as luminous as the Sun."*

— from Wikipedia entry on "Deneb"

With such a vast range of brightness estimates, one may suspect that they are little more than wild guesses.

The above Wikipedia page for star Deneb goes on to say that,

> *"one 2008 calculation using the Hipparcos data [gathered by ESA's Hipparcos satellite] puts the most likely distance at 1,550 light-years, with an uncertainty of only around 10%."*

Yet, some modern planetariums have Deneb at a distance of 3227 light years, *i.e.;* over twice as distant! Do the stellar estimations of our world's astronomers *ever agree with each other?* Is star Deneb 1550, or 2600 — or 3227 light years away? Evidently, no one seems to know with any degree of precision. I, for one, grew up with the notion that astronomy was more exacting than this.

Virtually nothing adds up with these claimed, formidable star distances and the wildly conflicting estimates of the same. They are all, as TV-celebrity Carl Sagan loved to say, “extraordinary claims” that “require extraordinary evidence”. It should thus come as no surprise that (as we shall see further on) many respected independent astronomers have, in later years, vigorously questioned the star catalogues published by NASA and ESA (the European Space Agency) over their claimed star distances.

Moreover, the question has extended to ESA’s official catalogues of stellar parallaxes.

What follows about that subject should, I dare say, put the last nail in the coffin of the long-doomed Copernican heliocentric theory. I will now submit indisputable evidence that the geometry of the TYCHOS model provides the only possible explanation for the observed stellar parallaxes.

Previous Chapter

Next Chapter

Chapter 36 — The Mystery of Negative Stellar Parallax

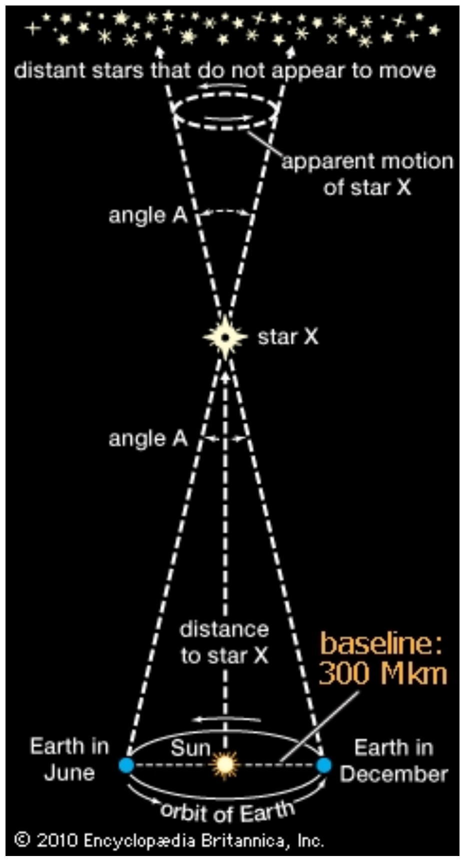
> *"Hipparchus of Nicaea (2nd century BC) is the first known astronomer to have made careful observations and compared them with those of earlier astronomers to conclude that the fixed stars appear to be moving slowly in the same general direction as the Sun. Confirmed by Ptolemy (2nd century AD), this understanding became common in medieval Europe and the Near East, although a few astronomers believed that the motion periodically reversed itself."*

Copernican astronomers measure the distance to the stars as follows. They look at a given, nearby star "X" and record its position against far more distant stars. Six months later, they look at star "X" again and, if it has moved by any amount in relation to the distant stars, they call this apparent displacement the **parallax** of star X. Why six months? Well, Copernican astronomers assume that, in six months, Earth has changed positions by about 300 Million km, from one side of its orbit to the other. Therefore, they figure that these recordings represent the baseline upon which they can perform a simple trigonometric calculation to determine the stars' distances from Earth. All of this reasoning is done under the assumption that Earth revolves around the Sun. The Encyclopædia Britannica entry on stellar parallax continues:

> *"The annual parallax is the tiny back-and-forth shift in the direction of a relatively nearby star, with respect to more-distant background stars, caused by the fact that Earth changes its vantage point over the course of a year. Since the acceptance of Copernicus's moving Earth, astronomers had known that stellar parallax must exist. But the effect is so small (because the diameter of Earth's orbit is tiny compared with the distance of even the nearest stars) that it had resisted all efforts at detection."*

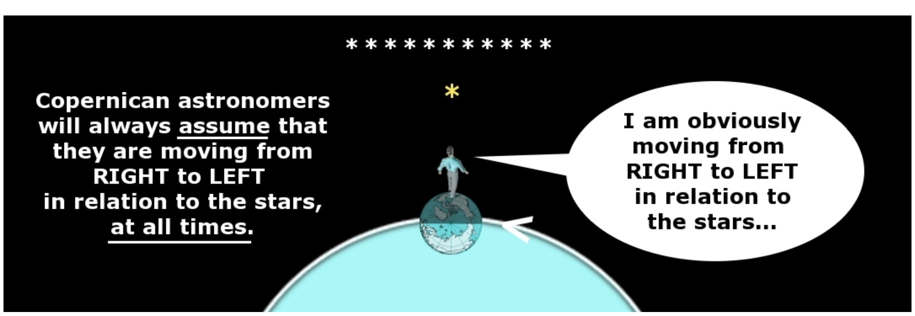
— *The techniques of astronomy* by James Evans (2017)

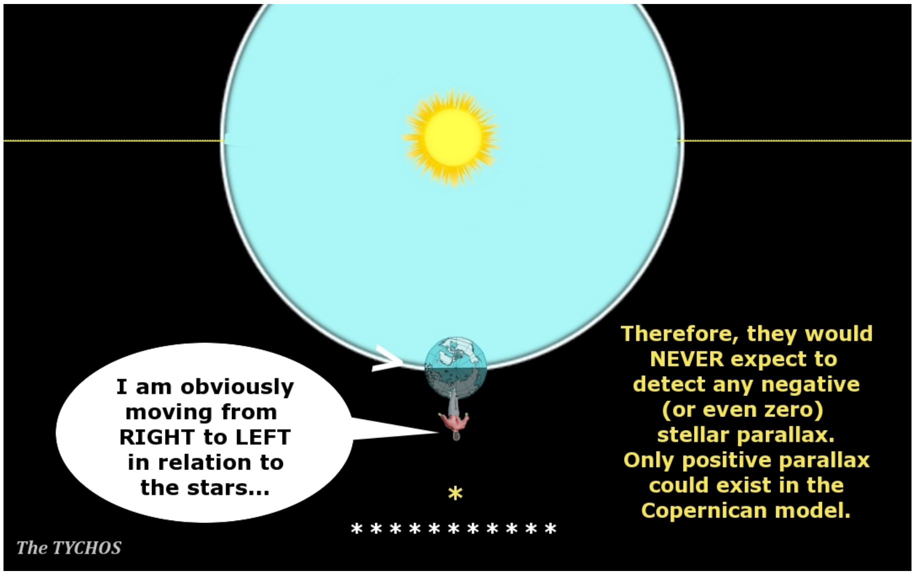
Let us not dwell on the question of just how they determine how far those very distant fixed stars are meant to be. Far more interesting to our present discourse is the fact that Copernican astronomers will obviously assume that they are moving in the same direction in relation to all stars at all times. Therefore, they would always expect any stellar parallax shift (between closer and more distant stars) to exhibit what is known as **positive parallax**, since Earth's motion around the Sun is certainly not believed to reverse direction!



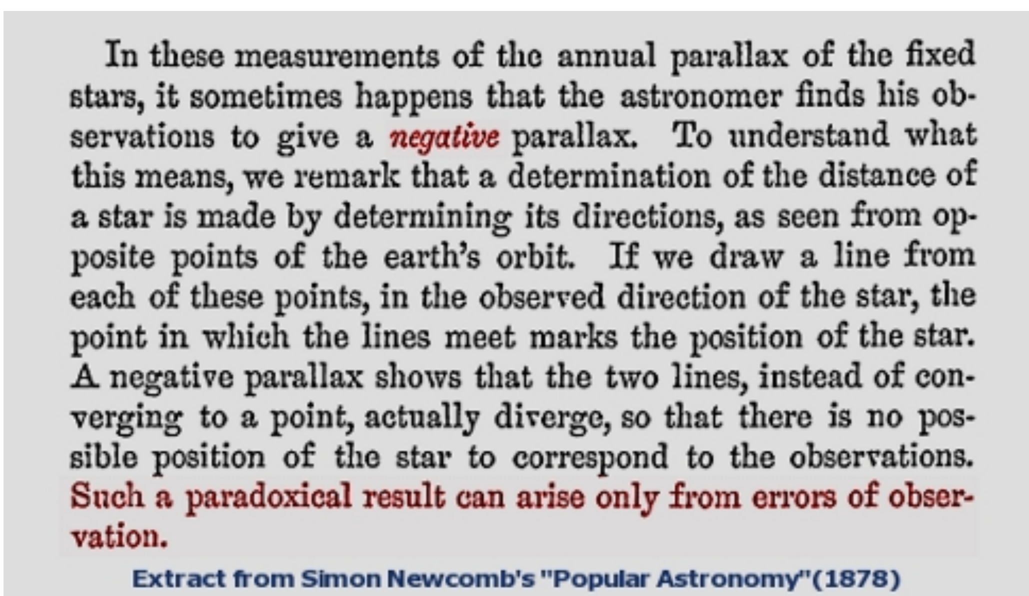
Above — A graphic from the Encyclopædia Britannica entry on "Parallax".

Below — My graphic showing why no negative stellar parallax can exist in the Copernican model.





Well, here's the problem: it has been known for centuries that observational astronomers have kept detecting nearby stars exhibiting **"negative parallax"**. In other words, nearby stars have regularly been observed to drift in the opposite direction the Copernican model predicts! Strangely, it is extremely hard to find mention of this in astronomy literature. The negative stellar parallaxes appear to be a most inconvenient topic among astronomers — and one which has eluded any rational explanation to this day. Back in 1878, the illustrious astronomer Simon Newcomb briefly commented on the spiny negative parallax issue, suggesting that *"such a paradoxical result can arise only from errors of observation"*.


In these measurements of the annual parallax of the fixed stars, it sometimes happens that the astronomer finds his observations to give a *negative* parallax. To understand what this means, we remark that a determination of the distance of a star is made by determining its directions, as seen from opposite points of the earth's orbit. If we draw a line from each of these points, in the observed direction of the star, the point in which the lines meet marks the position of the star. A negative parallax shows that the two lines, instead of converging to a point, actually diverge, so that there is no possible position of the star to correspond to the observations. Such a paradoxical result can arise only from errors of observation.

Extract from Simon Newcomb's "Popular Astronomy"(1878)

"Errors of observation"? Hmm. Well, if that were the case, why then would our modern-day star catalogues contain large amounts of negative stellar parallax values (as well as even more stars exhibiting zero stellar parallax)? This would seem very troubling indeed to a Copernican frame of reference.

As every modern-day astronomer knows, ESA (the European Space Agency) proudly boasts about the purported pinpoint accuracy of their star catalogues, which they claim were compiled with data collected by their space-telescope installed aboard the "Hipparcos" satellite. (Wikipedia entry)

> *"The Hipparcos and Tycho Catalogues are the primary products of ESA's (the European Space Agency's) astrometric mission, Hipparcos. The satellite, which operated for four years, returned high quality scientific data from November 1989 to March 1993."*

— *The Hipparcos and Tycho Catalogues*, ESA (1997)

In later years, however, a number of serious problems with ESA's stellar parallax catalogues have been highlighted by well-respected independent researchers (with solid credentials), some of whom have spent several years studying the issue in great detail.

Vittorio Goretti (b. June 17, 1939 – d. June 7, 2016) was a most esteemed observational astronomer from Bologna, Italy. He dedicated the last years of his life demonstrating the many problems with ESA's Hipparcos star catalogue, as well as their larger Tycho star Catalogue. His critical analyses strenuously demanded answers from, for instance, ESA's selective choice of the 118,000 stars contained in the Hipparcos catalogue, as well as the claimed accuracy (in the order of one milliarcsecond!) of the stellar parallaxes listed in the same.

> *"The Hipparcos Catalogue stars, about 118,000 stars, are a choice from the over 2,000,000 stars of the Tycho Catalogue. As regards the data concerning the same stars, the main difference between the two catalogues lies in the measurement errors, which in the Hipparcos Catalogue are smaller by about fifty times. I cannot understand how it was possible to have such small errors (i. e. uncertainties of the order of one milliarcsecond) when the typical error of a telescope with a diameter of 20÷25 cm is comprised between 20 and 80 milliarcseconds (see the Tycho Catalogue). When averaging many parallax angles of a star, the measurement error of the average (root-mean-square error) cannot be smaller than the average of the errors (absolute values) of the single*

> *angles"*

— *Research on Red Stars in the Hipparcos Catalogue* by Vittorio B. Goretti (2013)

Short of denouncing ESA for outright fraud, Goretti nonetheless suggested that the scientific community should urgently address the many issues raised by ESA's catalogues, such as their flagrant cherry-picking and evident misrepresentation of their stellar parallax data. Yet, Goretti's most perplexing discovery was that nearly half of the 1 million stars listed in ESA's "Tycho 1" Catalogue exhibit negative stellar parallaxes although no satisfactory explanation has been offered as to why this would possibly be the case.

> *"As a matter of fact, about half the average values of the parallax angles in the Tycho Catalogue turn out to be negative! [...] The parallax angle, which is one of the angles of a triangle, is positive by definition."*

To wit, under the Copernican model, negative stellar parallaxes simply cannot exist. If Earth were revolving around the Sun, all of the observed stellar parallaxes would have to be positive. So how is this negative parallax data officially explained so far? This scholarly answer (courtesy of Mike Dworetsky – senior lecturer in astronomy at UCL / London — from a SpaceBanter Forum thread in December 2016) gives us a hint.

> *"If you have a list of parallaxes of very distant objects, so that their parallaxes are on average much smaller than your limit of detection, then the errors of parallax are distributed normally, with a bell-shaped curve plotting the likely distribution of values around a mean of nearly zero. Hence we expect there to be approximately half of those published parallaxes with values less than zero and half with values more. [...] Negative values are unphysical, but form the part of the statistical distribution of values that happen to lie below zero when the mean is close to zero".*

In other words, someone is actually trying to tell us that since most stellar parallax angular measurements are so very minuscule ("even smaller than the optical limits of detection"), the fact that **half** of them are negative is just a matter of statistical error!

If this were the case, why would ESA even go to the trouble of publishing stellar parallax figures? If the published negative parallax figures are inherently useless (since they are allegedly "false negatives" imputable to the error margins of the instruments being larger than the observed parallax itself) why then should the positive parallax figures be any less useless or any more trustworthy? Why would the US Naval Observatory outside of Flagstaff, Arizona spend 60 years on a dedicated mission to document stellar parallax, if all measurements are beyond reliability and no better than merely guessing?

Some geocentrists have also noticed the nonsensical negative parallaxes published by ESA. Naturally, they cannot explain them, but being on the "other side" of the debate gives them a certain valuable perspective.

> *"I believe that conventional astronomical community are in open fraud because they completely ignore negative parallax readings, explaining them away as measurement errors, at the same time as they happily use positive parallax readings to 'prove' their theories in opposition to geocentrism. That is intellectual skulduggery of the worst kind in my view and is basically a lie. If negative parallax readings are 'errors' then what cause do we have to assume that positive parallax readings are not themselves also 'errors'."*

— *Negative Stellar Parallax Proof of Geocentrism and a Smaller Universe* at forums.catholic.com (May 2010)

> *"The Hipparcos satellite recorded that 50% of the parallax readings were negative which is not possible. In one of the biggest cover ups in scientific history the readings were 'adjusted' (or I would call it cooked) to make them all positive"*

— *Please provide a Geocentric diagram* at The Thinking Atheist Forum (February 2013)

It has been pointed out by other researchers that ESA's "Tycho 1 Catalogue" actually features three distinct categories of stellar parallaxes, the latter category actually making up 46% of them all.

> *"Over 1 million objects are listed in the Tycho Main Catalogue, and they state: 'The trigonometric parallax is expressed in units of milliarcsec. The estimated parallax is given for every star, even if it appears to be insignificant or negative (which may arise when the true parallax is smaller than its error). 25% have negative parallax, 29% positive parallax and 46% assumed zero parallax.' "*

— *Amateurs measuring parallax* at the CosmoQuest X Forums (February 2014)

Now we are getting to the meat of the matter. The various groups of stellar parallaxes listed in ESA's vast Tycho Main Catalogue are distributed as follows:

Positive parallaxes

29%

Negative parallaxes

25%

"Assumed ZERO parallaxes"

46%

Anyone blessed with the gift of patience should be able to document and confirm for themselves the same parallaxes collected in the best repositories known. The Hipparcos Main Catalog is one of them.

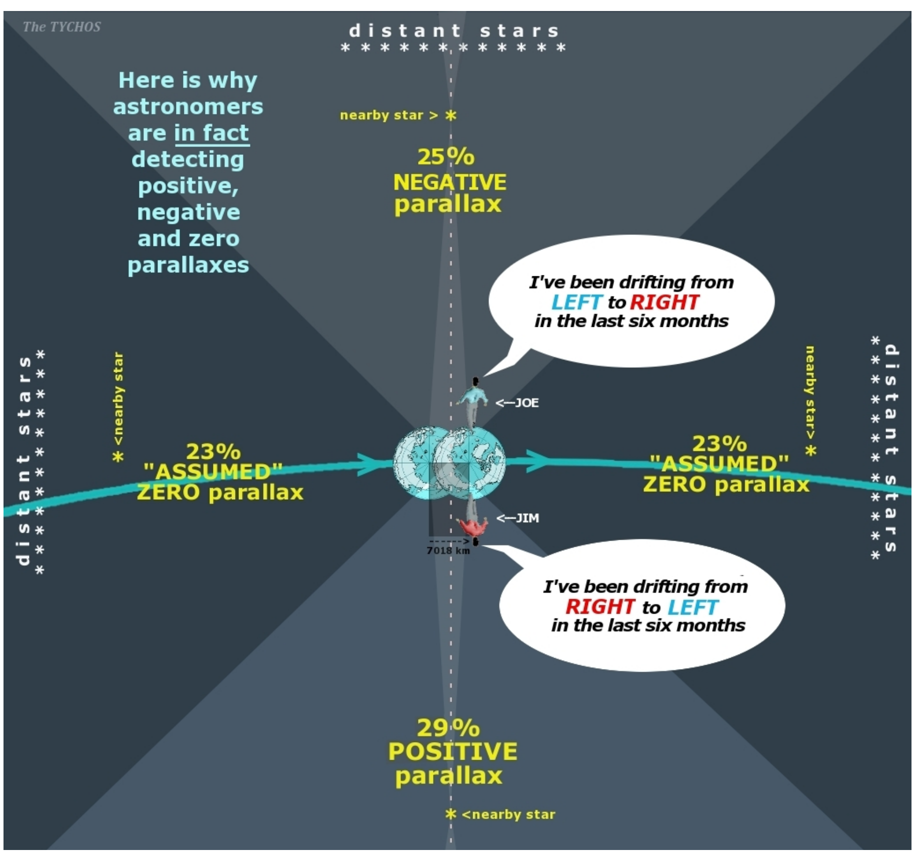
> *"Parallax : The trigonometric parallax pi in units of milliarcseconds: thus to calculate the distance D in parsecs, D = 1000/pi. The estimated parallax is given for every star, even if it appears to be insignificant or negative."*

— *Hipparcos Main Catalog*, NASA (2012)

SEE: HIPPARCOS AND TYCHO MAIN CATALOGUES

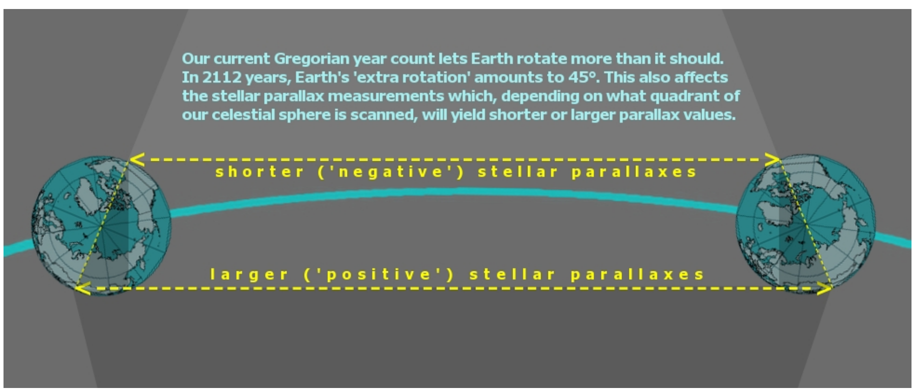
Well, under the TYCHOS model's geometry (and its implicit spatial perspectives), all of this would make perfect sense.

My below graphic shows not only why these three different categories of stellar parallaxes would exist. It also illustrates why their respective distributions (as documented in all official stellar parallax catalogs) should be naturally expected.



As you can see, the distributions of the circa 1 million stellar parallaxes (as listed in ESA's Tycho Main Catalogue) would seem to be perfectly congruent with the TYCHOS model's cosmic configuration. As Earth slowly moves (from "left to right" in my above graphic) by 7018 km every six months, astronomers will measure the parallax of any given nearby star against more distant, fixed star clusters. Depending on which of the four quadrants is scanned (and on the time period chosen for any given survey), nearby stars will appear to drift by different amounts and directions. In all logic, the stars in the "lower quadrant" (of our celestial sphere) will exhibit positive parallax. Stars in the "upper quadrant" will exhibit negative parallax. Also, in the TYCHOS model, it would appear self-evident that the large portion of "zero parallax stars" would be equally split (23% on each side) between the two opposed "equinoctial" quadrants — as I shall shortly clarify with another graphic.

It also stands to reason that the percentage of positives will be somewhat higher than the negatives (29% versus 25%), given what we saw in Chapter 33 regarding Earth's extra 45° rotation every 2112 years. Once again, this has to do with the Gregorian calendar's year count which, little by little, skews the ideal perpendicular axial alignment between Earth and the Sun.



Note that it is a matter of historical record that about ¼ of the observed stellar parallaxes have negative values (or "not greater than their probable errors"). In fact, this was noticed already back in 1921, when the parallaxes of only 1013 stars had been measured.

> *"Then there are occasional stars for which the different observed parallaxes are discordant in amounts far exceeding the probable errors. The true distances of these stars must remain in doubt until further investigations are made [...] Stated as percentages,*

> *26 per cent of these parallaxes are negative or have positive values which are not greater than their probable errors; 14 per cent more have positive values which are not larger than twice their probable errors.”*

—*Recent Determinations Of Stellar Perallaxes By Photographic Methods. A Review* by Robert G. Aitken for Astronomical Society of the Pacific (Vol. 33, No. 191, February, 1921)

It cannot therefore be reasonably argued that those 25% of negative parallax values listed today in ESA’s Hipparcos catalogues could be ascribed to some sort of “systemic” or statistical defect peculiar to their allegedly satellite-based telescopes. It would be a most unlikely coincidence that both old and modern observational techniques (one century apart) would yield a near-identical amount of negative stellar parallaxes, all imputable to the error margins and limitations of the respective state-of-the-art equipments of their days.

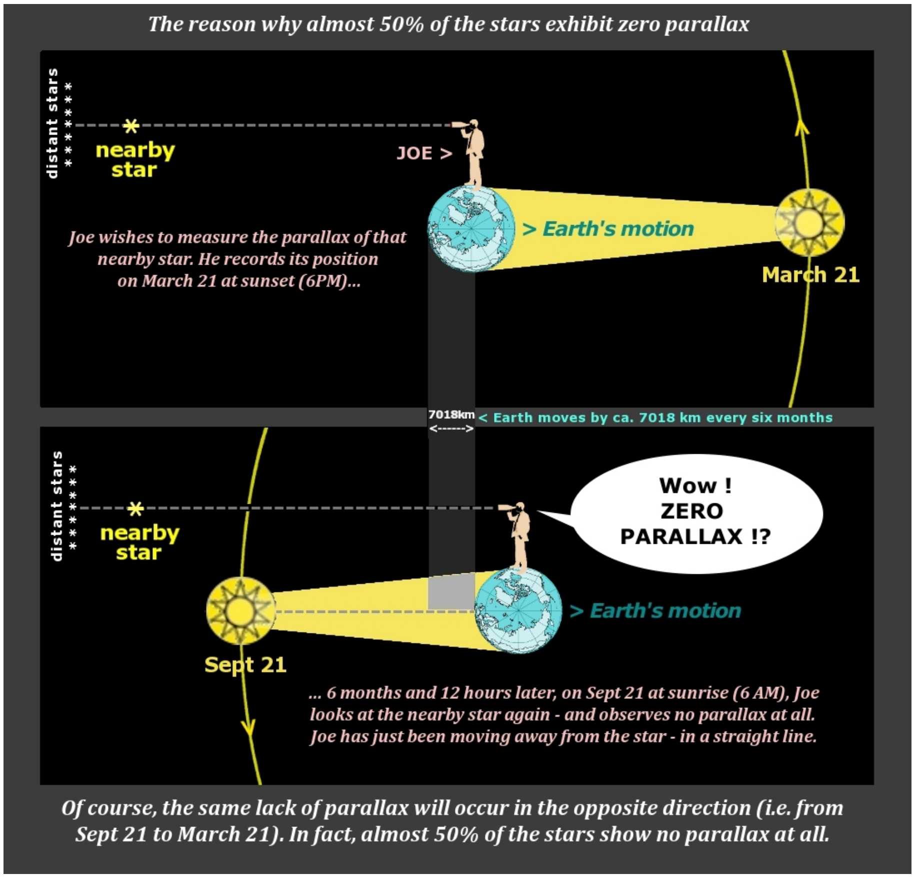
The biggest question of all answered by the TYCHOS model might just be, *“Why do most stars exhibit practically no parallax at all?”* Almost half of the stars listed in ESA’s monumental catalogue are listed as having zero assumed parallax. Under the TYCHOS model’s geometry, this is something that would be fully expected.

Here is how the Encyclopaedia Britannica describes the methodology used by astronomers for measuring stellar parallaxes.

> *“The introduction of the photographic method by American astronomer Frank Schlesinger in 1903 considerably improved the accuracy of stellar parallaxes. In practice a few photographs are taken when the star is on the meridian shortly after sunset at one period (epoch) of the year and shortly before sunrise six months later.”*

— *Parallax* by Kaj Aa. Strand and The Editors of Encyclopædia Britannica (2018)

In the light of this, my below graphic should clarify why almost 50% of the stars do not exhibit any parallax at all.



In other words, any nearby star located in the two "equinoctial quadrants" of our celestial sphere will not exhibit any detectable parallax for the simple reason that Earth *doesn't move laterally* in relation to such stars. Earth is instead either approaching or receding from them. In the TYCHOS, the "equinoctial quadrants" will always (at all times and epochs) be **in front of** and **behind** Earth's direction of travel. This, providing of course that we use the "Tychos Optimal" calendar's year count as described in the Tychosium Planetarium (see Chapter 21), which will ensure that our equinoctial points of March 21 and September 21 correctly follow Earth's slow revolution around its PVP orbit.

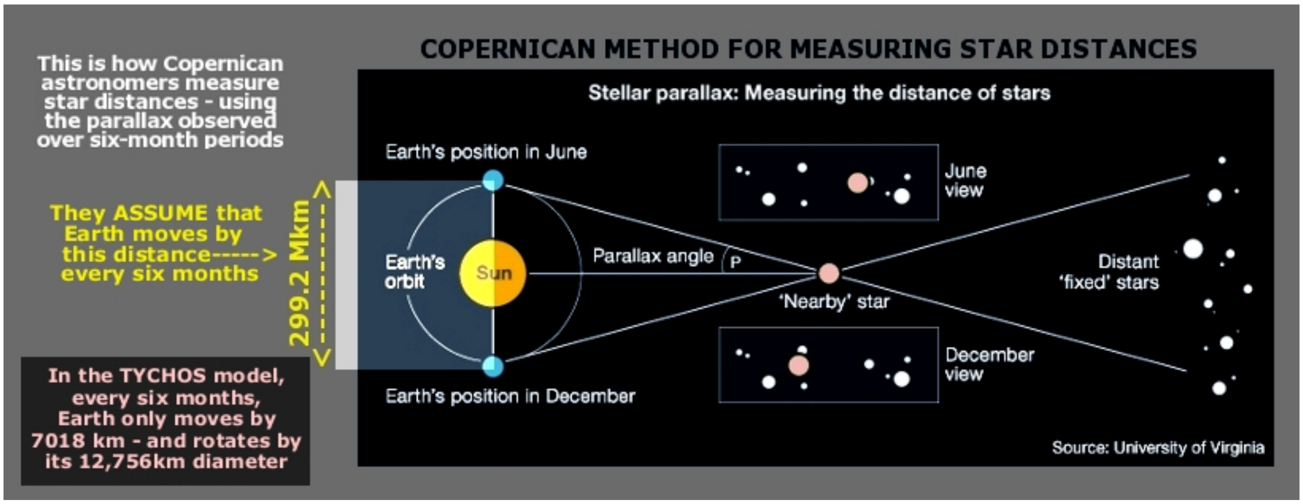
Needless to say, all of this would make no sense whatsoever within the Copernican model's geometry.

At this juncture, I need to make the following point quite clear:

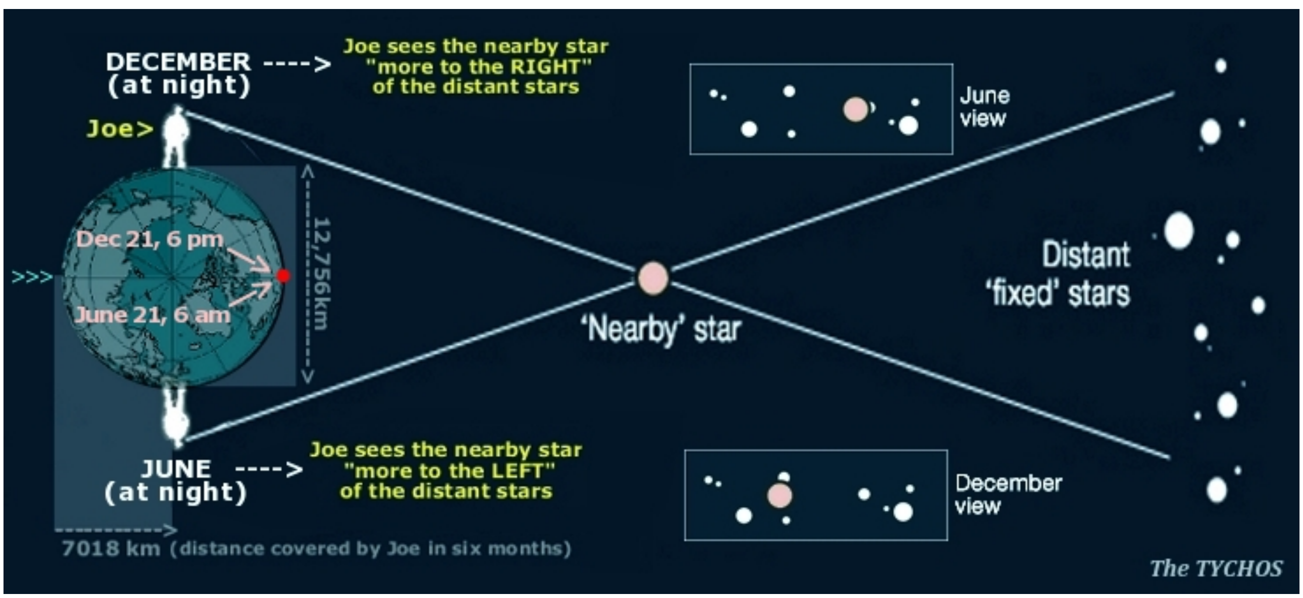
The TYCHOS model generally **agrees** with the established distances between Earth and the **nearby planets & moons** of our own solar system. This is because those distances have been measured using the trigonometric baseline of the diameter of Earth itself – a respectable and reliable measurement which should be safely beyond dispute. How Cassini is said to have measured the distance to Mars using Earth as a "parallax yardstick" can be found in this brief outline:

Background: Parallax by Lindsay Clark (2000) for Princeton University

On the other hand, the TYCHOS model emphatically **rejects** the currently-accepted stellar distances, which is a wholly different matter. The trigonometric baseline used for stellar parallax calculations is based on the errant assumption that Earth revolves around the Sun. Astronomers that adopted the Copernican solar system theory have thus been using the diameter of Earth's assumed **299.2 Mkm-wide orbit** around the Sun as the baseline for computing the Earth-to-Stars distances.



Here is how the TYCHOS model accounts for an observed, six-month (December to June) parallax of a nearby star:



Note that if Joe should choose to measure the parallax of the nearby star at 6 **PM** on December 21 — and then, six months later, at 6 **AM** on June 21 (red dot in above graphic) — he will not detect any parallax of that nearby star, and he'll classify it as a "zero parallax star".

No wonder that those stellar parallaxes are extremely difficult to detect. Even our largest and sharpest earthbound telescopes, every six months, only move by 7018 km and rotate by 12,756 km. On a cosmic scale, these distances are very small indeed.

For centuries this has been a major problem for the Copernican model with its theorized 300 Mkm orbit of Earth around the Sun. Following the invention of the telescope, and for a very long time, no astronomers were able to detect any amount of stellar parallax. Only as late as 1838 did Friedrich Bessel triumphantly announce to have observed the parallax of 61 Cygni (another binary pair).

> *"At the end of 1838, Bessel announced that over a period of one year 61 Cygni made a small ellipse in the sky. The greatest displacement from the average position was just 0.31" with an error of 0.02". This tiny motion of 61 Cygni was a direct consequence of Earth's motion around the Sun. Bessel had finally discovered an annual parallax."*

— p.71, *Measuring the Universe: The Cosmological Distance Ladder* by Stephen Webb (1999)

Of course, according to the TYCHOS model, what Bessel saw was not a consequence of Earth's motion around the Sun, but of Earth's small displacement in relation to star 61 Cygni (currently believed to be the 7th nearmost star) and the more distant stars. Yet, Bessel's observation was widely celebrated as conclusive proof of Earth's motion around the Sun!

To recap, here is what is understood under the TYCHOS paradigm:

The distances between Earth and our own little family of celestial companions (Mercury, Venus, Mars, Saturn, Jupiter, the Main Asteroid belt and so on) have always been computed using the trigonometric baseline of Earth's diameter (12,756 km).

Correctly so.

On the other hand, the Earth-to-stars distances have always been computed using the trigonometric baseline diameter of Earth's supposed orbital diameter (299,200,000 km — or roughly 300 Mkm).

Incorrectly so.

Thus, since the true baseline (of 7018 km) is far smaller than 300 Mkm, the stars should be much closer than currently believed.

Incidentally, the aforementioned Italian astronomer Vittorio Goretti came to the conclusion after decades of personal stellar parallax studies that the stars must be closer than currently believed. About a dozen little-known stars that he had closely monitored turned out to exhibit larger parallaxes than Alpha Centauri (thought to be our nearmost star system) suggesting that they were all closer to Earth than the Centauri binary star system.

As for Goretti's repeated requests to ESA (and the wider astronomical community) to address the many aberrations contained in the Hipparcos and Tycho star catalogues, they all fell on deaf ears. To challenge data diffused by the official science hubs of this world may be, in our day and age, one of the most frustrating obstacles in the life of a thoughtful individual in any field of scientific research. Sadly, Goretti left this world of ours in the summer of 2016 (about six months before I stumbled upon his work) without having received any cogent answers to his eminently rightful questions from the scientific community. Much less from the European Space Agency.

The TYCHOS 42633 reduction factor

As we have seen, in the TYCHOS model, Earth only moves by 14,036 km every year or **7018 km** every 6 months.

Therefore, if Earth does not move laterally every six months by 299,200,000 km but only by **7018 km** it follows that the currently-accepted Earth-Stars distances are inflated by a factor of:

$$299{,}200{,}000 / 7018 \geq \mathbf{42633}$$

This will be our proposed reduction factor for the currently-claimed stellar distances.

This means that, in the TYCHOS, the distance unit known as "1 Light Year" corresponds to less than 1.5 AU.

9,460,730,472,580.8 km (i.e.; one "light year") ÷ 42633 = 1.4834 AU

Alpha Centauri A, is said to be 4.37 LY away. In the TYCHOS, therefore, Alpha Centauri would be as close as

4.37 X 1.4834 ≈ **6.48 AU**

That is rather interesting, for this TYCHOS-computed distance (6.48 AU) to Alpha Centauri would place our nearmost star at a distance 'somewhere between' Jupiter (4.2 AU) and Saturn (8.5 AU). Note however that the Alpha Centauri binary system is NOT located in the same plane as our solar system – but some 62° 'below' it.

DISTANCES BETWEEN PLANETS FROM THEPLANETS.ORG (2018)

Undoubtedly, Tycho Brahe would be most satisfied with that, since his primary objection to the Copernican model was that the stars would have to be "absurdly large and distant" and that there would have to be a most unlikely enormous void between Saturn and our nearmost stars. In fact, Tycho Brahe's expert opinion was that the stars were *"located just beyond Saturn and of reasonable size"*.

> *"It was one of Tycho Brahe's principal objections to Copernican heliocentrism that in order for it to be compatible with the lack of observable stellar parallax, there would have to be an enormous and unlikely void between the orbit of Saturn (then the most distant known planet) and the eighth sphere (the fixed stars)."*

— from Wikipedia entry on "Parallax"

In any event, should Alpha Centauri be located between Jupiter and Saturn, this would certainly help explain why we can see so many stars with our naked eyes and why they appear to be only marginally smaller than our so-called "outer planets".

We shall now see how some other well-known astronomical data go to support my proposed "42633 reduction factor".

About the perceived speed between our "Solar System" and the stars

The velocity value of 20 km/s (or more precisely, 19.4 km/s) keeps popping up all over astronomy literature. As shown in the below-quoted papers, there appears to be some sort of general consensus regarding this velocity value, although its actual meaning is rather nebulous. *"A 20 km/s speed in relation to what?"*

Nonetheless, it appears this value represents the "perceived average relative speed" between our solar system and the stars (as computed under the tenets of the Copernican theory).

> *"…The solar system itself has a velocity of 20km/s with respect to the local standard of rest of nearby stars…"*

— p. 10, *Cross-Calibration of Far UV Spectra of Solar System Objects and the Heliosphere* edited by Eric Quémerais, Martin Snow and Roger-Maurice Bonnet

> *"…the mean motion of the Solar system at 20 km/sec relative to the average of nearby stars"*

— *The ABC's of Distances* by Edward L. Wright (2011)

> *"The average radial velocity of the stars is of the order of 20 km per second"*

— p. 113, *The Motion of the Stars* by J. S. Plaskett (1928) for Journal of the Royal Astronomical Society of Canada, Vol. 22, p.111

> *"The Sun's peculiar velocity is 20 km/s at an angle of about 45 degrees from the galactic centre towards the constellation Hercules."*

— *Spiral Galaxies* by Dmitri Pogosian (2018) for University of Alberta, Astronomy 122: Astronomy of Stars and Galaxies

> *"The Sun is moving towards Lambda Herculis at 20km/s. This*

> *speed is in a frame of rest if the other stars were all standing still"*

— *What is the speed of the Solar System?* by Deborah Scherrer, Hao Tai and J. Todd Hoeksema (2017) for Stanford University Solar Center

> *"The speed of the Sun towards the solar apex is about 20 km/s. This speed is not to be confused with the orbital speed of the Sun around the Galactic center, which is about 220 km/s [or 800.000 km/h] and is included in the movement of the Local Standard of Rest."*

— Wikipeda entry on "Solar apex"

Here we have a more detailed account as to exactly how a 20 km/s motion between the Sun and the stars was determined.

The determinations of the solar motion from the radial velocities we owe mainly to the foresight and energy of Campbell, who first so developed the spectrograph in 1895 that reliable radial velocities could be obtained, marking a new era in the work, and then set out to obtain accurate radial velocities over the whole sky, establishing an observatory in the Southern hemisphere for this special purpose. A considerable portion of the energy and time of the Lick Observatory and its southern annex were devoted to obtaining accurate radial velocities of all stars brighter than 5.5 magnitude of which the spectra admitted reasonably accurate measurement. The results of this great undertaking have just been published, giving in all the velocities of 2,600 stars of which 2149 were used to obtain the solar motion. The solar apex came out as $\alpha = 270°.6$, $\delta = 29°.2$, about 2 degrees distant from that determined from the proper motions, while **the solar velocity towards this point is 19.65,** practically 20 km. per second.

Extract from "THE MOTION OF THE STARS" - by J.S. Plaskett (April 1928)

Furthermore, here are some more recent quotes concerning this approximate 20 km/s velocity (or more precisely, 19.4 km/s).

> *"The point on the celestial sphere, in the constellation Hercules (at about RA 18h, Dec. +30°), toward which the Sun is moving with respect to the Local Standard of Rest, at a rate of about 19.4 km/s (about 4.09 AU/year). As the Sun slowly orbits the galactic center, nearby stars (as seen from Earth) appear to move away from the solar apex because of the Sun's relative velocity."*

— *Solar Apex* by David Darling (2017, daviddarling.info)

> *"Solar apex: The point on the celestial sphere toward which the Sun is apparently moving relative to the Local Standard of Rest. Its position, in the constellation Hercules is approximately R.A. 18h, Dec. +30°, close to the star Vega. The velocity of this motion is estimated to be about 19.4 km/sec (about 4. AU/year). As a result of this motion, stars seem to be converging toward a point in the opposite direction, the solar antapex."*

> *"Antapex: The direction in the sky away from which the Sun seems to be moving (at a speed of 19.4 km/s) relative to general field stars in the Galaxy."*

— *An Etymological Dictionary of Astronomy and Astrophysics* by M. Heydari-Malayeri (dictionary.obspm.fr)

The last sources quoted above seem to agree on the more exacting figure of 19.4 km/s rather than the rounded 20 km/s value. Hence, in the interest of accuracy, we should probably use this value of 19.4 km/s that appears to be our modern-day, currently-accepted value. Before we get on, let us convert this value from km/s to km/h.

19.4 km/s = 69,840 km/h

Note that this velocity is essentially described as representing the motion of the Solar system relative to the stars.

Now, remember that in the TYCHOS, Earth's orbital velocity is deemed to be 1.6 km/h. This would constitute, of course, our proper motion in relation to the stars. Hence, if the stars are much closer to us than currently believed, their *perceived* velocity as viewed from Earth would be "inflated" by our previously-computed "42633 star-distance reduction factor". So let us divide this velocity by our proposed reduction factor and see what we obtain:

69,840 km/h / 42,633 ≈ 1.638 km/h

Good heavens! This is very nearly 1.601169 km/h – Earth's orbital speed as of the TYCHOS model!

In other words, this "general velocity perceived to exist between the stars and our Solar System" (ca. 20 km/s) neatly goes to support both of the TYCHOS model's boldest assertions.

- Earth travels around space at approximately 1.6 km/h.

- The stars are ca. 42,633 X closer than currently believed.

At this point, I will venture to say that the TYCHOS model is more than just another alternative cosmic theory.

It is the current best explanation for every observed geometric phenomenon of the cosmos.

I am satisfied that it represents the most solid interpretation of the vast body of astronomical observations available to mankind today. These observations, gathered tirelessly over the centuries by admirably diligent and hard-working individuals, constitute the very foundation around which the TYCHOS model has woven its logical conclusions. All I have done is to assemble the many pieces of a gigantic puzzle which were already there for everyone to see.

My infinite gratitude goes to all these people who have dedicated their lives to the noble cause of understanding our surrounding cosmos. To name them all would be unrealistic, so let me just symbolically tip my hat to Tycho Brahe whose widely snubbed, sidelined and even ridiculed observational work is now well and truly vindicated.

Let a very peaceful "Tychonic Revolution" begin!

Previous Chapter Epilogue

Epilogue — The Copernican System's many "confirmation flops" — a brief historical memento

Only a few centuries ago, scientists and astronomers all over the world were engaging in vivid, bitter and passionate battles in the quest for the exact most plausible "cosmo-logical" configuration of our solar system. What people tend to forget is precisely what, at the time, was at stake. Mind you, it was likely a largely unspoken truism even back then, but what truly was imperilled was no less than the very survival of the (already widely-embraced) Copernican model — its credibility as the "end-all" of all cosmic models.

Countless experiments were being feverishly carried out, one more intricate than the other, yet all of them shared the same objective: to scientifically verify and establish beyond reasonable doubt that Earth was hurtling around space at the staggering, hypersonic speed of 107.000+ km/h as contended by the Copernican, heliocentric theory. It was a most extraordinary claim yet, one that had to be scientifically verified. Failure was not an option for its illustrious proponents.

Yet today, the most infamous experiment of them all — the Michelson-Morley interferometer study — is billed as the *"greatest failed scientific experiment of all time"*. Mind you, it really doesn't deserve to be singled out for having fallen short of proving Copernicus right; it is a matter of historical record that the totality of numerous other similar experiments — embarrassingly enough — utterly and completely failed to prove Earth's purported, hypersonic orbital motion around the Sun. Despite designs to prove heliocentrism, experimental data continued to tell us what we refused to hear.

One may say that the Copernican model's upside-down heliocentric view has mesmerized humanity for the last four centuries or so, if not just as an opposition to geocentrism. However, the violent refutation of one inadequate theory for another ignited along its way the Mother of all circular debates among the sharpest minds of this planet. Those debates were, essentially, destined to fail so long as our sacrosanct, universally-worshipped science priesthood remained unchallenged about their unshakeable heliocentric convictions.

Another intense series of experiments were those attempting to observe and quantify the so-called "stellar parallax". Of course, this was also understandably a *crucial* test for the Copernican model: if **no** stellar parallax whatsoever could be detected, then the Copernican theory had to be categorically discarded. Instead, after decades of painstaking, feverish efforts by eminent astronomers around the world, some minute/microscopic stellar parallax was finally detected. Incredibly enough (and here's when one must question the intellectual honesty & integrity of the world's scientific community), those infinitesimal star displacements were deemed sufficient to prove that Earth moves at hypersonic speeds around space — completing an almost 1-billion-km-long (and 300 Mkm-wide) orbit every year!

Of course, the official explanation offered by apologists for this near-zero stellar parallax was that *"the stars are far, far, far more distant than anyone had ever imagined!"* Amazingly, it has never occurred to anyone that, since some stars are claimed to be "only" 4 or 5 light years away — while other stars (visually adjacent to those closer stars) are claimed to be some 2600 light years away (or more) — we should most definitely be able to detect some quite substantial parallax between such closer and much more distant stars (that is, if Earth were revolving around the Sun along a 300 Mkm-wide orbit). The TYCHOS model — with its 1 mph earthly motion — provides a plain, intuitively sound and logical solution to this age-old riddle: The observed stellar parallaxes are so very, very small simply because our old Mother Earth moves very little each year, and slower than the pace of an evening walk around the village.

To be sure, still today, no one really knows exactly how distant the stars are. Just consider that previously-mentioned, quite recent (2012) science journal's announcement: *"A scientific astronomy-study has determined that Polaris, our North Star, is approximately 1/3 closer to Earth than previously thought."* So much for the much-vaunted "pinpoint accuracy" of astronomical data! You may agree that this is an almost comical correction of such a "long-established" cosmic distance. If our world's scientific/astronomical community cannot even agree on such a fundamental measurement (the Earth-Polaris distance), what credibility can any other claimed stellar distances possibly retain?

Perhaps the most tragicomical instance of cosmic science-quackery is Arthur Eddington's solar eclipse experiment in 1919. At the time, the fundamental tenets of both the Copernican and the Newtonian theories were perilously at stake, since the observed orbital behaviour of Mercury "refused" to comply with Newton's Laws. So the Royal Society dispatched Sir Eddington to Gabon, Africa — and another team to South America — to photograph an upcoming solar eclipse. Arthur's expedition almost ended in dire disaster, as the skies were cloudy most of the time, yet his team somehow managed to snap a couple of (blurry) shots of the eclipse. The South

American team did better and brought home a few half-decent shots of the 1919 solar eclipse.

Now, the whole point of the exercise was to confirm the validity of a young upstart scientist's thesis, namely the "theory of relativity". The then little-known Albert Einstein had "come to the rescue" of both Newton's and Copernicus' endangered theories, basically stating that, *"The light emitted by a celestial body will bend / warp — in the vicinity of a large mass such as the Sun."* In other words, *"You can't trust what you see with your own eyes; Mercury may seem to be where you see it but in reality it is elsewhere!"* To make a long story short, even though the photographic plates snapped by the two Royal Society teams presented conflicting and utterly inconclusive data, Sir Eddington somehow managed to pass them off as **"definitive/irrefutable proof of Einstein's relativity theory"**! Einstein henceforth became, overnight, the universally-acclaimed celebrity that he still is today.

Another droll, contrived effort aimed at confirming the Copernican model was that of James Bradley, the man who invented the so-called "aberration of light" — or "stellar aberration" as mentioned in Chapter 34. Bradley had been observing the motions of star Draconis for several months with a telescope mounted in his home's chimney — near London. As we have seen, his observations of Draconis' (and all the other stars') seasonal motions turned out to be totally conflicting with the predictions of the Copernican model. Yet, instead of bringing into question the Copernican theory's core tenets (and returning to the drawing board — as any earnest scientist would have done), Bradley concocted the most contorted astronomical theory of them all, namely the "Aberration of Light". Amazingly, Bradley's farcical "solution" is still held by academia as the *"conclusive proof of the heliocentric Copernican model"*. All in all, we may conclude that the Copernican theory has benefited, over the last centuries, from a steady flow of "confirmation bias" (the very opposite notion of what is known as the scientific method).

And so, here we are today. The Copernican theory is safely shielded in its unassailable ivory tower — unquestioned by almost everyone. Curiously, the long string of embarrassing failures to confirm the tenets of the Copernican model have faded away from public memory, or been erased by deliberate efforts. Having inexplicably failed to rattle the near-universal acceptance of the same, this world's scientific community has evidently long canonized the "Universal Laws" promulgated by the sacrosanct Cosmic Quartet (Newton, Copernicus, Galileo & Kepler) and their modern-day court-jester Albert Einstein (the man who warped space), in what amounts to a seemingly dogmatic acceptance — a religious submission — to the claims of those universally-celebrated Gods of Science.

I personally nurture no illusions that my TYCHOS model will become widely-accepted by the “old-guard” within my lifetime (although I am fully satisfied of the validity of its core, fundamental principles). The official scientific intelligentsia of this planet has shown, time and again, an obstinate resistance to revise, update and correct the long-established cosmological knowledge taught to our children. I will just keep hoping that reason will prevail. If not, there is nothing I can do about it — and you may happily keep circling around the Sun (at hypersonic speeds) to your heart’s content. May everyone in this world be as satisfied with her/his beliefs (as to the configuration of our “Solar System”) as I am. I wish a happy life to all of my readers — whatever their “cosmo-logical” convictions may be.

As pompous as these conclusive thoughts of mine may sound, I finally submit that my TYCHOS model provides a long-needed reality check in matters astronomical. I hope that it may herald a resplendent new era of peaceful and open data collection, examination and inquiry. The TYCHOS, I dare say, is the most congruent interpretation ever made of the vast body of literature documenting centuries of painstaking astronomical studies. My highest respect goes to those patient astronomers who dedicated their lives to gather an inestimable wealth of empirical observations for humanity’s sake, some of whom at the cost of their lives at the hands of various ruthless establishments. Let us remember our collective accomplishments well; and perhaps, before the end of another Great Year, humankind will have relegated such ignorant violence to history and legend. May coming generations thrive in the blissful serenity of our planet as it gently sails within the Sun-Mars binary system — at the safe and sensible speed of 1 mph.

I will leave you to meditate on this old & wise Italian adage:

“Chi va piano va sano — e va lontano.”
(Those who go slowly go safely — and go far.)

Peace to all.

Simon Shack

Previous Chapter Appendix I

Appendix I — Table of Acronyms, Terms and Constants

TYCHOS = the term I chose for my cosmic model which, of course, is heavily inspired by Tycho Brahe's model. The final "S" stands for my first name, Simon — since I humbly consider to have completed Brahe's work.

Tychosium : the interactive planetarium developed by myself and IT-programmer Patrik Holmqvist.

The PVP orbit = The Polaris-Vega-Polaris orbit of the Earth = 113,230.656km in Ø — and 355,724,597 km in circumference

The PVP constant: the percentage-ratio of Earth's orbital speed in relation to the Sun's orbital speed : 0.00149326 %.
(The Sun travels at 107,226km/h — whereas Earth travels, in the opposed direction, at 1.601169 km/h.)

TGY = **TYCHOS Great Year** = 25,344 years = the full time period for the Earth to complete one PVP orbit

ACP = Annual Constant of Precession = 51.1363 arcseconds. This is the TYCHOS-computed, true angular amount by which the stars are drifting (Eastwards in relation to the Sun) each year, as a consequence of Earth's 1-mph-motion around its PVP orbit.

TMSP = our Moon's True Mean Synodic Period = 29.22 days. This is the TYCHOS-computed, true (average) synodic period of our Moon.

moon: in lower-case, a satellite of a planet; otherwise capitalized "Moon" being the satellite of Earth.

AU = **Astronomical Unit** = Average Earth-Sun distance = 149,597,870.7 km (or roughly 149.6 Mkm)

RA = **Right Ascension** : the celestial equivalent (used in astronomy) of terrestrial longitude. Wikipedia on "Right ascension"

DECL = **Declination** : the celestial equivalent (used in astronomy) of terrestrial latitude. Wikipedia on "Declination"

360° = **1,296,000 arcseconds** = **1,440 minutes** (our celestial sphere) = **24 hours** = **100%** of 1 circle or revolution. The sky can be divided into a number of degrees, arcseconds, minutes or hours of RA. It can sometimes get confusing — but that's astronomy for you!

Sidereal period: a celestial body completes a "sidereal" period each time it aligns again with a given star.

Synodic period: a celestial body completes a "synodic" period each time it aligns again with the Sun.

Perigee: closest transit point of a body with respect to Earth

Apogee: furthest transit point of a body with respect to Earth

Perihelion: closest transit point of a body with respect to the Sun
Aphelion: furthest transit point of a body with respect to the Sun

Inferior conjunction: when a body (e.g. Venus) is aligned with the Sun while transiting closest to Earth

Superior conjunction: when a body (e.g. Venus) is aligned with the Sun while transiting furthest from Earth

Prograde: a celestial body is said to be "in prograde mode" when it moves in the same direction as the Sun.

Retrograde: a celestial body is said to be "in retrograde mode" when it moves in the opposed direction of the Sun.

Precession: "precession" is just a fancy word for "drift": in astronomy, a celestial body is said to be "precessing" whenever it is observed to drift over time in relation to other celestial bodies. In the TYCHOS, the stars "precess" over time (in relation to our 'time-keeper', the Sun) as a consequence of Earth's 1-mph-motion. This stellar drift is known as the "equinoctial precession", since the stars are observed to slowly drift (Eastwards) in relation to our terrestrial equinoxes.

Equinox: Please read Wikipedia's "Equinox" entry

Apsidal precession: Please read Wikipedia "Apsidal precession" entry

Binary system: a system wherein two celestial bodies orbit around each other around a common barycentre. Up to 85% (or more) of our visible stars are, in fact, binary systems composed of a large and a smaller object. More often than not, binary systems also feature additional bodies (moons, planets) hosted within or outside of the system (so-called "circumbinary" bodies).

Circumbinary: a circumbinary body circles around any given binary system, as described above.

Epilogue Appendix II

Appendix II — Miscellaneous data for bodies in the TYCHOS system

EARTH orbital Ø: 113,230,656 Mkm (the "PVP" orbit)
Orbital circumference : 355,724,597 km
Diameter at equator: 12,756.3 km
Equatorial circumference: 40,075 km
Orbital speed: 1.601169 km/h or 0.000444 km/s (or 0.00149326% of the Sun's orbital speed)
Rotational period : 23 hours 56 minutes and 4 seconds (or 23.9345 h)
Rotational speed: 1,676 km/h (i.e. 40,075Km + 38.428 Km / 23.9345 h)
Earth moves by 38.428 km each day and by 14035.84 km each year.
Earth "covers 1 arcsecond" of its orbit every 7.1425 days during which it covers 274.47 km
274.47km is 0.00007716% of 355,724,597km (the circumference of Earth's PVP orbit)
and in fact, 0.00007716% of 1,296,000 arcseconds (i.e. 360°) is 1 (or more precisely 0.99999)

MOON orbital Ø : 763,095 km
Orbital circumference : 2,397,333.6 km
Diameter at equator: 3476.2 km (about 27.25% of Earth's Ø or 50% of Mars's Ø or 0.25% of the Sun's Ø)
Equatorial circumference: 10,920.8 km
Orbital speed: 3656 km/h (i.e. 29.3 X slower than the Sun's speed of 107.226 km/h)
Closest Perigee on record: 356,375 km (Jan 4, 1912)
Most distant Apogee (predicted on Feb 3, 2125) : 406,720 km (approx 10 X Earth's circumference)
Average Earth-Moon distance: 381,547.5km
Rotational speed : 16.7 km/h (ca. 10X faster than Earth's orbital speed of 1.601169 km/h and ca. 100X slower than Earth's rotational speed of 1676 km/h)
The Earth-Moon distance is also approximately 10X Earth's circumference
Rotational period (around its axis) : 27.322 days (same as sidereal period of 27.322 days, due to tidal lock)
In 27.322 days, Earth moves by ca. 1050 km (27.322 X 38.428km).
Moon's True Mean Synodic Period (TMSP) : 29.22 days (12 TMSPs : 350.64 days)
Daily distance covered by the Moon: 87,744 km
Earth orbit Ø versus Moon orbit Ø : 113,230,656 km / 763,095 km = 148.38343X larger
Sun is 392.08X further away than the Moon. As it is, 392.08 / 148.38343 = 2.6423 (i.e. the Earth-Sun orbital size difference)

SUN orbital Ø: 299,193,439 km
Orbital circumference: 939,943,910 km (2.6423 X larger than Earth's PVP orbit)
Diameter at equator: 1,392,000 km
Equatorial circumference: 4,373,093 km
Orbital speed: 107.226 km/h (or 29.785 km/s)
Perigee: 152.1 Mkm
Apogee: 147.1 Mkm (Average Earth-Sun distance : 149.6 Mkm or 1 AU)
Rotational speed: 6670 km/h (near-exactly 1/16th of its own orbital speed – and near-exactly 4X Earth's rotational speed)
Rotational period (around its axis): ca. 27.3 days (much like the Moon's 27.322-day rotational / sidereal period)
1 arcsecond of Sun displacement as viewed from Earth = 725.26 km, or 0.00007716% of 939,943,910 (Sun's orbit

circumf.)

MARS orbital Ø: 456,800,000 km
Orbital circumference: 1,435,079,524 km (1.52677 X larger than Sun's orbit or 4.034 X larger than Earth's PVP orbit)
Diameter at equator: 6792.4 km
Equatorial circumference: 21,339 km
Orbital speed: 1,435,079,524 km / 17532h = 81854.866 (or 22.7km/s)
Perigee: 56.6 Mkm
Apogee: 400.2 Mkm (average Mars-Earth distance: 228.4 Mkm)
Perihelion: 206.6 Mkm
Aphelion: 250.2 Mkm (average Mars-Sun distance: 228.4 Mkm)
Rotational speed: 891.55 km/h (or 1.88X slower than Earth's rotational speed.
Mars revolves once around the Sun in 686.9 days, or almost exactly 365.25 days X 1.88)
Rotational period (around its axis): 23.9345 hours, the same as Earth's
PERIHELION CYCLE: current official estimate > 51,000 years (approx 2 X 25344)

VENUS orbital Ø: 216,400,000 Mkm (1.9X larger than Earth's PVP orbit)
Orbital circumference: 679,840,650 km
Diameter at equator: 12103.6 km
Equatorial circumference: 38024.5 km
Orbital speed: 679,840,650 km / 14025.6 hours (i.e. 584.4 days) = 48471.4 km/h
Perigee: 38.2
Apogee: 261 (average Venus-Earth distance: 149.6 Mkm or 1 AU)
Perihelion: 107.48
Aphelion: 108.94 (average Venus-Sun distance: 108.2 Mkm)
NOTE: 108.2 Mkm + 5 Mkm (Sun's perigee/apogee difference) = 113.2 Mkm (i.e. Ø of Earth's PVP orbit)
Rotational speed: 2.711 km/h (ca. 2X slower than Mercury and 6X slower than the Moon)
Rotational period (around its axis): 14025.6 hrs (same as sidereal period, due to tidal lock)

MERCURY orbital Ø : 115,818,454 Mkm
Orbital circumference: 363,854,404 km
Diameter at equator: 4879.4 km
Equatorial circumference: 15,329 km
Orbital speed: 363,854,404 km / 2805.12 h (i.e. 116.88 days) = 129,710.8 km/h – or 36.03 km/s
Perigee : 77.3 Mkm
Apogee: 221.9 Mkm (average Mercury-Earth distance: 149.6 Mkm or 1 AU)
Perihelion: 46.0 Mkm
Aphelion: 69.8 Mkm (average Mercury-Sun distance: 57.9 Mkm)
Rotational speed: 5.465 km/h (ca. 2X faster than Venus and 3X slower than the Moon)
Rotation period (around its axis): 2805.12 hours (same as sidereal period, due to tidal lock)

PHOBOS orbital Ø: 18,756 km (orbits Mars in 459 minutes – or 7.65h)
Diameter: 22.2 km (27×21.6×18.8) km
Orbit circumference: 58,923.66 km
Orbital speed: 58923.66 / 7.65 hrs = 7702.44 km/h

DEIMOS orbital Ø: 46,918 km (orbits Mars in 1818 minutes – or 30.3h)
Diameter: 12.6 km (10×12×16) km
Orbit circumference: 147,397.11 km
Orbital speed: 147,397.11 km / 30.3 hrs = 4864.6 km/h

JUPITER orbital Ø: 1,557,140,000 km (13.752 X larger than Earth's PVP orbit diameter)
Orbital circumference: 4,891,899,584.6 km
Diameter at equator: 142,984 km
Orbital speed: 4,891,899,584.6 km / 105192 h = 46,504.48 km/h
Orbital period: 12 years / 4383 days or 105,192 h
Jupiter's orbit is 5.204 X larger than the Sun's orbit.

SATURN orbital Ø : 2,853,332,844 km (25.2 X larger than Earth's PVP orbit diameter)
Orbital circumference: 8,964,009,501 km
Diameter at equator: 120,536 km
Orbital speed: 8,964,009,501 km / 262,980 h = 34,086.27 km/h
Orbital period: 30 years / or 10,957.5 days / or 262,980 h
Saturn's orbit is 9.536 X larger than the Sun's orbit.

URANUS orbital Ø : 5,744,920,000 km (50.73 X larger than Earth's PVP orbit diameter)
Orbital circumference: 18,048,198,467.5 km
Diameter at equator: 51,118 km
Orbital speed: 18,048,198,467.5km / 736.344 hrs = 24,510.5 km/h
Orbital period: 84 years / or 30,681 days / or 736,344 h
Uranus's orbit is 19.2 X larger than the Sun's orbit.

NEPTUNE orbital Ø : 8,990,120,000 km (79.39 X larger than Earth's PVP orbit diameter)
Orbital circumference: 28,243,294,946.9 km
Diameter at equator: 49.528 km
Orbital speed: 28,243,294,946.9 km / 1.446.390 hrs = 19,526.7 km/h
Orbital period: 165 years / or 60,266.25 days / or 1,446,390 h
Neptune's orbit is 30 X larger than the Sun's orbit.

PLUTO orbital Ø: 11,812,760,000 km (104.32 X larger than Earth's PVP orbit diameter)
Orbit circumference: 37,110,880,034.6 km
Diameter at equator: 2374 km
Orbital speed: 37,110,880,034.6 km / 2,173,968 hrs = 17.070.5 km/h
Orbital period: 248 years / or 90,582 days / or 2,173,968 hours
Pluto's orbit is 39.5 X larger than the Sun's orbit.

Source:

HyperPhysics Planetary Data by Carl R. (Rod) Nave (2000) for Department of Physics and Astronomy at Georgia State University

Appendix I

Appendix III : Bibliography

Appendix III — Bibliography

Preface

Tycho Brahe quote: “Simplicibus itaque verbis gaudet Mathematica Veritas, cum etiam per se simplex sit Veritatis oratio.”
Epistolarum astronomicarum liber primus (1596), General Preface: In J L E Dreyer (ed), Tychonis Brahae Astronomi Dani Opera Omnia 6, 23.
Source URL: http://www-history.mcs.st-and.ac.uk/Quotations/Brahe.html

“Now today we have a very remarkable fact, my dear friends …”
Rudolph Steiner quote from *Third Scientific Lecture-Course: Astronomy*, Schmidt Number: S-4337, Lecture II (Stuttgart, January 2, 1921)
Permalink: http://www.tychos.info/citation/002A_Rudolph-Steiner-Astronomy.htm
Source URL: http://wn.rsarchive.org/Lectures/GA323/English/LR81/19210102p01.html

Foreword

“Tycho Brahe, the most prominent and accomplished …”
Regarding how Tycho Brahe noted the Absurdity of the Copernican Theory regarding the Bigness of Stars, while the Copernicans appealed to God to answer that Absurdity by Christopher M. Graney (December 2011)
Permalink: http://www.tychos.info/citation/003A_Tycho-Noted-Absurdity.pdf
Source URL: https://arxiv.org/ftp/arxiv/papers/1112/1112.1988.pdf

“Rather than give up their theory …”
The Case Against Copernicus by Dennis Danielson and Christopher M. Graney (March 2014) for Scientific American 03/2014; 310(1):72-7
Permalink: http://www.tychos.info/citation/003B_Case-Against-Copernicus.pdf
Source URL: https://physics.ucf.edu/~britt/Geophysics/Readings/R2The%20case%20against%20Copernicus.pdf

“He [Kepler] sought to redirect his religious …”
The Composition of Kepler’s Astronomia Nova by J. R. Voelkel (2001).
Source URL: https://books.google.it/books?id=_NZsb6B8ATkC

“The North Star has been a guiding light for …”
North Star Closer to Earth Than Thought by Andrew Fazekas (December 5, 2012) for National Geographic News
Permalink: http://www.tychos.info/citation/003C_North-Star-Closer.htm
Source URL: http://news.nationalgeographic.com/news/2012/12/121204-north-star-distance-closer-solar-system-space-science/

“Kepler’s Laws are wonderful as a description …”
Kepler’s Laws and Newton’s Laws from a Mount Holyoke College course (Massachusetts)
Permalink: http://www.tychos.info/citation/005A_Kepler-Newton.htm
Source URL: https://www.mtholyoke.edu/courses/mdyar/ast223/orbits/orb_lect.html

Diagram from Lumen Learning online coursework
Source URL: https://courses.lumenlearning.com/earthscience/chapter/introduction-to-the-solar-system/

General information
How long does it take the Sun to orbit the galaxy? by Robert Matthews (July 22, 2009 at ScienceFocus.com)

Permalink: http://www.tychos.info/citation/003C_How-Long-Sun-Orbit.htm
Source URL: http://www.sciencefocus.com/qa/how-long-does-it-take-sun-orbit-galaxy

Chapter 1

"In fact, the majority of stars happens to …"
Binary stars and the VLTI: research prospects by Andrea Richichi and Christopher Leinert (July 2000) from Proc. SPIE Vol. 4006, p. 289-298, *Interferometry in Optical Astronomy*, Pierre J. Lena; Andreas Quirrenbach; Eds.
Permalink: http://www.tychos.info/citation/006B_VLTI-abstract.htm
Source URL: http://adsabs.harvard.edu/abs/2000SPIE.4006..289R

General information
Tycho's Illusion: How it lasted 400 Years, and What that implies about Human Cognition by H. Margolis (1998)
Permalink: http://www.tychos.info/citation/007A_Tychos-Illusion.htm
Source URL: http://www.cogsci.ecs.soton.ac.uk/cgi/psyc/newpsy?article=9.32&submit=View+Article

"In fact, 85% of the stars in the Milky Way galaxy…" and illustration
Binary Stars by Jim Schombert (2018) for University of Oregon Astronomy 122: Birth and Death of Stars
Permalink: http://www.tychos.info/citation/007B_Binary-Stars.htm
Source URL: http://abyss.uoregon.edu/~js/ast122/lectures/lec10.html

ESO imagery of the binary star HIC 59206 imaged without and with adaptive optics correction.
Image credits: ESO, 13 May 2003
Source URL: https://www.eso.org/public/usa/images/eso0313b
Source URL: https://www.eso.org/public/usa/images/eso0313c

General information
Wikipedia entry on "Adaptive Optics"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Adaptive_optics.pdf
Source URL: https://en.wikipedia.org/wiki/Adaptive_optics

Intersecting orbits animation
Source URL: http://www.skymarvels.com/infopages/stellarobjects.htm

"There are many common misconceptions …"
Binary Star Prevalence from BRI
Permalink: http://www.tychos.info/citation/008A_BRI-Prevalence.htm
Source URL: http://www.binaryresearchinstitute.org/bri/research/evidence/prevalence.shtml

"Binary stars are two stars orbiting a common …"
Binary Star Systems: Classification and Evolution by SPACE.com Staff (January 17, 2018)
Permalink: http://www.tychos.info/citation/008B_Space-Binary-Star-Systems.htm
Source URL: https://www.space.com/22509-binary-stars.html

"Binary stars are of immense importance to astronomers …"
Binary Stars by CSIRO Australia Telescope National Facility (2017)
Permalink: http://www.tychos.info/citation/008C_ATNF-Binary-Stars.htm
Source URL: http://www.atnf.csiro.au/outreach/education/senior/astrophysics/binary_intro.html

General information
Understanding Precession of the Equinox by Walter Cruttenden and Vince Dayes (2001)
Permalink: http://www.tychos.info/citation/009A_Understanding-Precession.pdf
Source URL: http://carlotto.us/newfrontiersinscience/Papers/v02n01a/v02n01a.pdf

Illustrations from
p. 6 of *The barycentric motion of exoplanet host stars* by M. A. C. Perryman and T. Schulze-Hartung (2010)
Permalink: http://www.tychos.info/citation/009B_Barycentric-Motion.pdf
Source URL: https://www.aanda.org/articles/aa/pdf/2011/01/aa15668-10.pdf

Chapter 2

Illustration of comparative model
Indian Mathematics and Astronomy by Dr. S. Balachandra Rao (Jnana Deep Publications, 1998)
Source URL: https://books.google.com/books?id=3MzaAAAAMAAJ

Tycho Brahe model illustration
Source URL: http://www.geocentrismdebunked.org/as-the-universe-turns/

Chapter 3

"If the general relativity method is correct …"
The Speed of Gravity — What the Experiments Say by Tom Van Flandern (1998) American Astronomical Society, DDA meeting #30, #10.04
Permalink: http://www.tychos.info/citation/012A_Speed-of-Gravity.htm
Source URL: http://ldolphin.org/vanFlandern/

"Most likely because they are too close …"
Why don't Mercury and Venus have moons? by NASA for Imager for Magnetopause-to-Aurora Global Exploration (IMAGE) Education Center
Permalink: http://www.tychos.info/citation/013A_Astronomy-Answers.htm
Source URL: https://image.gsfc.nasa.gov/poetry/venus/q328.html

"Why Venus doesn't have a moon is a mystery …"
How many moons? By Kristen Erickson (2017) for NASA Space Place
Permalink: http://www.tychos.info/citation/014A_Space-Place.htm
Source URL: http://spaceplace.nasa.gov/how-many-moons/en/

Jupiter and moons orbital resonance animation
from Wikimedia commons via Wikipedia entry on "Io moon"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Io_moon.pdf
Source URL: https://commons.wikimedia.org/wiki/File:Galilean_moon_Laplace_resonance_animation.gif

Chapter 4

First photograph of Sirius A and Sirius B (by Lindenblad — 1973) and "Sirius A and B in 1990"
from *The Dogon and Sirius* by Martin Clutterbuck
Permalink: http://www.tychos.info/citation/015A_Sirius.htm
Source URL: http://www.geocities.ws/martinclutt/testcmab.htm

"The force of gravity on Sirius B is 350,000 stronger …"
Sirius Star, SolarSystemQuick.com (2010)
Permalink: http://www.tychos.info/citation/016A_Sirius-Star.htm
Source URL: https://www.solarsystemquick.com/universe/sirius-star.htm

Sirius dimensional data
and
"In 2005, using the Hubble telescope, astronomers determined …"
Wikipedia entry on "Sirius"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Sirius.pdf
Source URL: https://en.wikipedia.org/wiki/Sirius

"The distance separating Sirius A from its …"
Sirius 2, SolStation.com (1998-2010)
Permalink: http://www.tychos.info/citation/016C_Sirius-2.htm
Source URL: http://www.solstation.com/stars/sirius2.htm#sirius-b

General information
Is Sirius a Triple Star? by Benest and Duvent (1994)

Permalink: http://www.tychos.info/citation/017A_Is-Sirius-Triple-Star.pdf
Source URL: http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?1995A&A…299..621B&data_type=PDF_HIGH&whole_paper=YES&type=PRINTER&filetype=.pdf

Emme Tolo graphic
The Dogons and the Stars of Sirius (EN) by Pacal Votan (2007)
Permalink: http://www.tychos.info/citation/017B_Pacal-Dogon.htm
Source URL: http://www.pacal.de/dogon.htm

General information
The Dogon Tribe: Connection Sirius by Ivan Petricevic (2007)
Permalink: http://www.tychos.info/citation/017C_Dogon-Sirius.htm
Source URL: https://www.ancient-code.com/the-dogon-tribe-connection-sirius/

Chapter 5

"Longomontanus, Tycho's sole disciple, assumed …"
Wikipedia entry on "Christen Sørensen Longomontanus"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Longomontanus.pdf
Source URL: https://en.wikipedia.org/wiki/Christen_S%C3%B8rensen_Longomontanus

"Most scientists refused to accept [Copernicus's] theory …"
The Case Against Copernicus by Dennis Danielson and Christopher M. Graney (March 2014) for *Scientific American* 03/2014; 310(1):72-7
Permalink: http://www.tychos.info/citation/003B_Case-Against-Copernicus.pdf
Source URL: https://physics.ucf.edu/~britt/Geophysics/Readings/R2The%20case%20against%20Copernicus.pdf

Chapter 6

General Information
Kepler's Fabricated Figures – Covering up the Mess in the New Astronomy by W. H. Donahue (1998, for Journal for the History of Astronomy, Vol.19, NO. 4/NOV, P.217)
Source URL: http://articles.adsabs.harvard.edu//full/1988JHA….19..217D/0000217.000.htm

"Done in 1609, Kepler's fakery is one of the earliest known …"
Pioneer Astronomer Faked Orbit Theory, Scholar Says by New York Times (January 23, 1990)
Permalink: http://www.tychos.info/citation/020B_Pioneer-Faked-Theory.htm
Source URL: http://articles.orlandosentinel.com/1990-01-23/news/9001233356_1_johannes-kepler-planets-move-owen-gingerich

"We discuss here a kind of period that we call the empiric sidereal interval (ESI) …"
Ancient Maya documents concerning the movements of Mars by Harvey M. Bricker, Anthony F. Aveni and Victoria R. Bricker (published in Proc Natl Acad Sci U S A. February 2001)
Source URL: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC29390/

"We have seen that Tycho, like Ptolemy and Copernicus, assumed …"
p.346, *Tycho Brahe: a picture of scientific life and work in the sixteenth century* by John Louis Emil Dreyer (1890)
Source URL: http://www.ebooksread.com/authors-eng/j-l-e-john-louis-emil-dreyer/tycho-brahe–a-picture-of-scientific-life-and-work-in-the-sixteenth-century-hci/page-29-tycho-brahe–a-picture-of-scientific-life-and-work-in-the-sixteenth-century-hci.shtml

"Among the planets, Mars is a maverick, wandering off …"
The Ballet of the Planets: A Mathematician's Musings on the Elegance of Planetary Motion by Donald Benson (2012)
Source URL: https://books.google.it/books?id=Z2vhPdfrtXUC&lpg=PT82&dq=mars%2079-year%20cycle&hl=it&pg=PT92#v=onepage&q=mars%2079-year%20cycle&f=false

"De Motibus Stellae Martis" illustration from *ASTRONOMIA NOVA ΑΙΤΙΟΛΟΓΗΤΟΣ, SEU PHYSICA COELESTIS, TRADITA COMMENTARIIS DE MOTIBUS STELLAE MARTIS, EX OBSERVATIONIBUS G.V. TYCHONIS BRAHE. [HEIDELBERG: E. VÖGELIN]*, by Johannes Kepler, Ernst Vögelin, Tengnagel (1609)

Source URL: https://books.google.com/books?id=7H9ZVFpqssIC

“It is suggested that the rule of thumb of stellar age delineation …”
Stellar Metamorphosis by Jeffrey Wolynski & Barrington Taylor (2017)
Permalink: http://www.tychos.info/citation/026A_Stellar-Metamorphosis.pdf
Source URL: http://vixra.org/pdf/1711.0206v1.pdf

Discussion extracted from the “Stellar Metamorphosis” thread at the Thunderbolts.info forum
Permalink: http://www.tychos.info/citation/026B_Thunderbolts-info-Stellar.pdf
Source URL: http://thunderbolts.info/forum/phpBB3/viewtopic.php?f=10&t=5734&start=1650

“Long before Ptolemy, the Babylonians knew that the motion of Mars …”
Further pages from The Ballet of the Planets: A Mathematician’s Musings on the Elegance of Planetary Motion (2012) by Donald Benson
Source URL: https://books.google.it/books?id=Z2vhPdfrtXUC&lpg=PT82&dq=mars%2079-year%20cycle&hl=it&pg=PT82#v=onepage&q=mars%2079-year%20cycle&f=false

Kepler’s Discovery image by anonymous
Permalink: http://www.tychos.info/citation/027B_Three-Hypotheses.htm
Source URL: http://www.keplersdiscovery.com/Hypotheses.html

Image of chart of Mars Oppositions from the years 1950 to 2934
from *Mars Oppositions* by Hartmut Frommert (2008)
Permalink: http://www.tychos.info/citation/028A_Mars-Oppositions.htm
Source URL: http://spider.seds.org/spider/Mars/marsopps.html

Image from *Les Oppositions de la planète Mars* (April 2014) by Gilbert Javaux
Permalink: http://www.tychos.info/citation/029A_Les-Oppositions.htm
Source URL: http://pgj.pagesperso-orange.fr/mars080414.htm

Mars Fact Sheet by Dr. David R. Williams (NASA, December 23, 2016)
Permalink: http://www.tychos.info/citation/059B_Mars-fact.htm
Source URL: https://nssdc.gsfc.nasa.gov/planetary/factsheet/marsfact.html

Chapter 7

Image of Mars retrograde motions in a Copernican model
Source URL: http://ase.tufts.edu/cosmos/print_images.asp?id=36

Images of Copernican solar system model screen grabs from SCOPE planetarium (2017 version)
Source URL: https://www.solarsystemscope.com/

Chapter 8

Image of “The ancients never believed …” extract from
Parallax: The Race to Measure the Cosmos by Alan W. Hirshfeld (May 1, 2001, W. H. Freeman publishing)
Source URL: https://books.google.it/books?id=jUepAAAAQBAJ

General information and source image of P-Type planet orbits
Dynamics and observational prospects of co-orbital planets in double stars by Dr. Richard Schwarz (2017)
Permalink: http://www.tychos.info/citation/046A_Co-Orbital-Planets.htm
Source URL: http://www.univie.ac.at/adg/schwarz/COORBIN/coorbin.html

Chapter 10

General information
Neave planetarium
Source URL: http://www.neave.com/planetarium

Chapter 11

"The periods of Venus' rotation and of its orbit are synchronized …"
Venus from NinePlanets.org
Permalink: http://www.tychos.info/citation/054A_Nine-Planets-Venus.htm
Source URL: http://nineplanets.org/venus.html

"Every 584 days, Venus and Earth come to their point …"
Venus, by ABC Australia Television's The Lab (2017)
Permalink: http://www.tychos.info/citation/054B_ABC-Venus.htm
Source URL: http://www.abc.net.au/science/space/planets/venus.htm

"Whether this relationship arose by chance or is the result …"
Wikipedia entry on "Tidal locking"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Tidal_locking.pdf
Source URL: https://en.wikipedia.org/wiki/Tidal_locking

"Tidal locking of Venus planet: […] so that the Venus …"
Orbital resonance and Solar cycles by P.A. Semi (March 2009)
Permalink: http://www.tychos.info/citation/054D_Orbital-resonance.pdf
Source URL: https://arxiv.org/ftp/arxiv/papers/0903/0903.5009.pdf

Chapter 12

"When an object the size of Mars crashed into the newly formed …"
What Is Earth's Axial Tilt or Obliquity? (TimeAndDate.com)
Permalink: http://www.tychos.info/citation/038A_What-is-Axial-Tilt.htm
Source URL: https://www.timeanddate.com/astronomy/axial-tilt-obliquity.html

Axial tilt images
Source URL: http://data.allenai.org/tqa/seasons_L_0301/

"The northern hemisphere consists of …"
p. 164 from *Big Bang or Big Bluff* by Hans Binder (May 2011)
Source URL: https://books.google.com/books?id=YI9MAgAAQBAJ&lpg=PA164&
dq=is%20earth%20heavier%20at%20the%20northern%20hemisphere%20or%20at%20the%20southern%3F&
pg=PA164#v=onepage&
q=is%20earth%20heavier%20at%20the%20northern%20hemisphere%20or%20at%20the%20southern?&f=false

The chaotic obliquity of Mars by Jihad Touma and Jack Wisdom (*Science, New Series*, Vol. 259, No. 5099, Feb. 23 1996)
Permalink: http://www.tychos.info/citation/044A_Mars-Obliquity.pdf
Source URL: https://groups.csail.mit.edu/mac/users/wisdom/mars-obliquity.pdf

Mars pole view images
Credited to NASA, ESA, and The Hubble Heritage Team STScI/AURA
Source URL: https://www.spacetelescope.org/images/opo0534e/

"It's such a deep-rooted mystery and so difficult to explain …"
and
"The Sun's rotation was measured for the first time …"
Planet Nine may be responsible for tilting the Sun by Shannon Stirone (2016)
Permalink: http://www.tychos.info/citation/056A_Planet-Nine.htm
Source URL: http://www.astronomy.com/news/2016/10/planet-nine-tilting-the-sun

"Scheiner, in his massive 1630 treatise on sunspots entitled …"
"1610: First telescopic observations of sunspots" in *Solar Physics Historical Timeline* by UCAR/NCAR 2018
Permalink: http://www.tychos.info/citation/056B_Solar-physics-timeline.htm
Source URL: https://www2.hao.ucar.edu/Education/solar-physics-historical-timeline-1600-1799

Sunspot imagery from *Rosa Ursina, in Provinciis Austriacis florens, sive illustrissimæ … familiæ Romanæ Ursinæ, traduces in Slavoniam, Carnioliam, Carinthiam, Styriam, Bohemiam propagatæ, etc* by Christoph Scheiner (1630)
Source URL: https://books.google.com/books?id=6TVoAAAAcAAJ

"All of the planets orbit in a flat plane with respect to the sun …"
Curious tilt of the sun traced to undiscovered planet by California Institute of Technology (2016)
Permalink: http://www.tychos.info/citation/057A_Curious-tilt.htm
Source URL: https://phys.org/news/2016-10-curious-tilt-sun-undiscovered-planet.html#jCp

"The Sun's axis tilts almost 7.5 degrees out of perpendicular …"
The Tilt of the Sun's Axis by Bruce McClure (June 2006)
Permalink: http://www.tychos.info/citation/057B_Tilt-of-Suns-Axis.htm
Source URL: http://www.idialstars.com/fipl.htm

General information
Venus Fact Sheet by Dr. David R. Williams, NASA (23 December 2016)
Permalink: http://www.tychos.info/citation/059A_Venus-fact.htm
Source URL: https://nssdc.gsfc.nasa.gov/planetary/factsheet/venusfact.html

General information
Mars Fact Sheet by Dr. David R. Williams, NASA (23 December 2016)
Permalink: http://www.tychos.info/citation/059B_Mars-fact.htm
Source URL: https://nssdc.gsfc.nasa.gov/planetary/factsheet/marsfact.html

"The Sun's tilt causes its poles to nod with respect …"
The Orientation of the Sun and Earth in Space by Australian Space Academy (2017)
Permalink: http://www.tychos.info/citation/060A_Orientation-Sun-Earth.htm
Source URL: http://www.spaceacademy.net.au/library/notes/axialorien.htm

Image of extract from Galileo's writings on Scheiner
from *On Sunspots*, Translations of letters by Galileo Galilei and Christoph Scheiner, University of Chicago Press (2010)
Source URL: https://books.google.it/books?id=-vz1-geXj8IC&pg=PA330&lpg=PA330&dq=this+pig+this+malicious+ass+galileo&source=bl&ots=udBAncnVrz&sig=5Cz7bw7ttuSO0DlwlWM7xwHevBU&hl=it&sa=X&ved=0ahUKEwiTjsC5v9TWAhWBqxoKHV9ZBDAQ6AEIMTAC#v=onepage&q=this%20pig%20this%20malicious%20ass%20galileo&f=false

"After 1610, when Galileo engaged himself fully …"
Galileo in early modern Denmark, 1600-1650 by Helge Kragh
Permalink: http://www.tychos.info/citation/060C_Galileo-in-Denmark.pdf
Source URL: https://arxiv.org/ftp/arxiv/papers/1407/1407.7380.pdf

"Galileo has been called the 'father of observational astronomy' …"
Wikipedia entry on "Galileo Galilei"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Galileo_Galilei.pdf
Source URL: https://en.wikipedia.org/wiki/Galileo_Galilei

Epitrochoid Animated image
Epitrochoid, Epitrochoide by Robert Ferréol, Jacques Mandonnet (2006)
Permalink: http://www.tychos.info/citation/061A_mathcurve.htm
Source URL: http://http://cyrille.nathalie.free.fr/math/mathcurve/epitrochoid.shtml.htm

"The center of mass of our solar system is very …"
Ask an Astronomer: Does the Sun orbit the Earth as well as the Earth orbiting the Sun? (July 2015, Cornell University)
Permalink: http://www.tychos.info/citation/061B_Does-Sun-Orbit-Earth.htm
Source URL: http://curious.astro.cornell.edu/about-us/41-our-solar-system/the-earth/orbit/90-does-the-sun-orbit-the-earth-as-well-as-the-earth-orbiting-the-sun-beginner

"The barycenter (or barycentre) is the center of mass of …"
Wikipedia entry on "Barycenter"

Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Barycenter.pdf
Source URL: https://en.wikipedia.org/wiki/Barycenter

Chapter 13

Swinging Sun, 79-Year Cycle, and Climatic Change by T. Landscheidt from Journal of Interdisciplinary Cycle Research (1981)
Permalink: http://www.tychos.info/citation/063A_Swinging-Sun.htm
Source URL: http://bourabai.kz/landscheidt/swinging.htm

Image
and
Quote: “Master cycle of the solar system. Small circles indicate the position …”
The Golden Section: A Cosmic Principle by Theodor Landscheidt (1993)
Permalink: http://www.tychos.info/citation/064A_Golden-section.htm
Source URL: http://bourabai.kz/landscheidt/consider.htm

Image
from p. 44 of *Sun-Earth-Man: a Mesh of Cosmic Oscillations* by Theodor Landscheidt
Permalink: http://www.tychos.info/citation/070A_Sun-Earth-Men.pdf
Source URL: http://plasmaresources.com/ozwx/landscheidt/pdf/Sun-Earth-Men_116_p_1989.pdf

“We apply our results in a novel theory of Sun-planets …”
Dynamical Characterization of the Last Prolonged Solar Minima by Rodolfo Gustavo Cionco and Rosa Hilda (2010, Compagnucci Wolff and Patrone)
Permalink: http://www.tychos.info/citation/064B_Dynamical-Characterization.pdf
Source URL: https://arxiv.org/ftp/arxiv/papers/1207/1207.5436.pdf

Chapter 14

Wikipedia entry on “Asteroid Belt”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Asteroid_belt.pdf
Source URL: https://en.wikipedia.org/wiki/Asteroid_belt

Asteroid belt image credited to NASA/JPL-Caltech/R.Hurt
Source URL: https://online.science.psu.edu/astro140_fawd001/node/11763

“Why does our solar system have an Asteroid Belt? …”
Asteroid Belt, University of Michigan Student Astronomical Society Astrophysics inreach at Cornell University (2006)
Permalink: http://www.tychos.info/citation/065A_Asteroid-Belt.htm
Source URL: http://www.astro.cornell.edu/~randerson/Inreach%20Web%20Page/inreach/asteroids.html

Sheer Edge animated image from BRI
Permalink: http://www.tychos.info/citation/066A_BRI-Sheer-edge.htm
Source URL: http://www.binaryresearchinstitute.org/bri/research/evidence/sheeredge.shtml

Image of “Debris disc” around binary system Fomalhaut
from Wikipedia entry on “Fomalhaut”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Fomalhaut.pdf
Source URL: https://en.wikipedia.org/wiki/Fomalhaut

“The discovery of an asteroid belt-like band of debris …”
Telescopes find evidence for asteroid belt around Vega by Jet Propulsion Laboratory (2013)
Permalink: http://www.tychos.info/citation/066C_Telescopes-Asteroid.htm
Source URL: http://www.astronomy.com/news/2013/01/telescopes-find-evidence-for-asteroid-belt-around-vega

“FOLLOW THE WATER : More and more research suggests …”
Where Did Earth’s Water Come From? By Jesse Emspak (“Live Science”, 2016)
Permalink: http://www.tychos.info/citation/067A_Earths-Water.htm
Source URL: https://www.livescience.com/33391-where-did-water-come-from.html

"Of course, this leaves the question of whether water transport via …"
Flinging Asteroids into the Habitable Zone by Anson Lam (Jun 23, 2015)
Permalink: http://www.tychos.info/citation/067B_Flinging-Asteroids.htm
Source URL: https://astrobites.org/2015/06/23/flinging-asteroids-into-the-habitable-zone/

General information
Asteroid flux towards circumprimary habitable zones in binary star systems: I. Statistical overview by D. Bancelin, E. Pilat-Lohinger, S. Eggl, T.I. Maindl, C. Schäfer, R. Speith, R. Dvorak (June 29, 2015)
Permalink: http://www.tychos.info/citation/067D_Water-transport.pdf
Source URL: https://arxiv.org/pdf/1506.00993.pdf

Chapter 17

"Long term calculations of Earth's orbital eccentricity show …"
from a discussion on geological cycles at the Thunderbolts.info forum
Permalink: http://www.tychos.info/citation/071A_Thunderbolts-info-Eccentricity.pdf
Source URL: http://www.thunderbolts.info/forum/phpBB3/viewtopic.php?p=58110&
sid=ddcd6142451be0a0428f99f01ec1bc55#p58110

"Only a few modeled planetary motions are stable …"
Precision and Accuracy of the ATS, Earth Time (2006)
Permalink: http://www.tychos.info/citation/072B_Earth-time.htm
Source URL: http://www.earth-time.org/precision.html

"Milankovitch cycles identified in sedimentary successions are …"
A Survey of Paleozoic Cyclostratigraphy presentation by Linda A. Hinnov, George Mason University for The Geological Society of America (GSA) Conference 2017
Permalink: http://www.tychos.info/citation/072A_Milankovitch-cycles.htm
Source URL: https://gsa.confex.com/gsa/2017AM/meetingapp.cgi/Paper/307204

General information
Time-calibrated Milankovitch cycles for the late Permian by Huaichun Wu, Shihong Zhang, Linda A. Hinnov, Ganqing Jiang, Qinglai Feng, Haiyan Li & Tianshui Yang (13 September 2013) for *Nature Communications* volume 4
Source URL: https://www.nature.com/articles/ncomms3452

General information
Hunting for the 405-kyr eccentricity cycle phase at the Cretaceous-Paleogene boundary in the Aïn Settara section (Kalaat Senan, central Tunisia) by Michel Hennebert (May 21, 2012)
Source URL: http://paleopolis.rediris.es/cg/CG2012_A05/

"Astronomers have discovered nine new transiting exoplanets …"
Turning planetary theory upside down: Nine new exoplanets found, some with retrograde orbits by ESO (2010)
Permalink: http://www.tychos.info/citation/073A_Star-spin.htm
Source URL: https://www.sciencedaily.com/releases/2010/04/100413071749.htm

"In just two decades, we have gone from knowing one …"
Stars with planets on strange orbits: what's going on? by Brett Addison and Jonti Horner (2016)
Permalink: http://www.tychos.info/citation/073B_Strange-orbits.htm
Source URL: https://phys.org/news/2016-05-stars-planets-strange-orbits.html

Chapter 18

Conventional illustration of "Lunisolar wobble"
Precession of the Equinoxes by Roy Taylor (December 1, 2008)
Permalink: http://www.tychos.info/citation/075A_Precession.htm
Source URL: http://www.decodingmythology.com/precession/precession1.html

Conventional illustration of "Lunisolar wobble"
and later in the chapter

Quote: “When Earth spins on its axis in West to East direction …”
Orbital Spin: A New Hypothesis to Explain Precession of Equinox—The Third Motion of Earth
by Rama Chandra Murthy Mothe (2014)
Permalink: http://www.tychos.info/citation/076B_Orbital-Spin-New.htm
Source URL: http://file.scirp.org/Html/4-4500241_43414.htm

“Precession only occurs relative to objects outside the solar …” (p. 8)
and later on
“In summary, a number of independent groups, all studying …” (p. 2)
Comparison of Precession Theories: An Argument for the Binary Mode by Walter Cruttenden (August 12, 2003)
Permalink: http://www.tychos.info/citation/075C_Comparison-of-Precession.pdf
Source URL: http://studyres.com/doc/16341584/comparison-of-precession-theories–an

“Lunisolar wobble required the pole to move by about one …”
Understanding Precession of the Equinox by Walter Cruttenden and Vince Dayes (2001)
Permalink: http://www.tychos.info/citation/009A_Understanding-Precession.pdf
Source URL: http://carlotto.us/newfrontiersinscience/Papers/v02n01a/v02n01a.pdf

“If the slow wobble of Earth’s axis causes the …”
p.40, *Our Sun: Biography of a Star* by Christopher Cooper (2013)
Source URL: https://books.google.it/books?id=xGj0AwAAQBAJ&lpg=PA40&ots=e9QUhpncFU&dq=The%20only%20objects%20that%20follow%20precessional%20movement%20are%20those%20outside%20the%20Solar%20System&hl=it&pg=PA40#v=onepage&q=cyclical%20basis&f=false

“The Earth’s changing orientation to inertial space …”
Understanding Precession of the Equinox: Evidence our Sun may be part of a long cycle binary system by Walter Cruttenden and Vince Dayes (2003)
Permalink: http://www.tychos.info/citation/099B_BRI-Evidence.pdf
Source URL: http://www.binaryresearchinstitute.org/bri/research/papers/BRI-Evidence.pdf

“The Copernican system, [Tycho Brahe] proclaimed, with its …”
Tycho Brahe’s critique of Copernicus and the Copernican system by Ann Blair (1990), in *Journal of the History of Ideas* 51(3): 355-377
Permalink: http://www.tychos.info/citation/076F_Brahes-Critique.pdf
Source URL: https://dash.harvard.edu/bitstream/handle/1/3373453/blair_brahe.pdf?sequence=2

Wikimedia image of Copernican Earth motion
Wikipedia (IT) entry on “Precessione degli equinozi”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Precessione_degli_equinozi.pdf
Source URL: https://it.wikipedia.org/wiki/Precessione_degli_equinozi

Chapter 19

Image from *Professor Mahoney’s Astronomy Website* by Robert Mahoney (2016)
Permalink: http://www.tychos.info/citation/078A_Earth-Precession.pdf
Source URL: https://sites.google.com/site/oakastroflash/Home/the-solar-system/the-earth/precession-of-the-earth

Image of extract from p.74, *The Methodology of Scientific Research Programmes: Philosophical Papers Volume 1 (Book 1)* by Imre Lakatos, Cambridge University Press (November 28, 1980)
Source URL: https://books.google.it/books?id=RRniFBI8Gi4C&lpg=PA74&ots=2mHybhOICr&dq=%22quite%20small%20enough%20entirely%20to%20refute%20Fresnel%27s&hl=it&pg=PA74#v=onepage&q=quite%20small%20enough%20entirely&f=false

Chapter 20

“There must be a cause why snowflakes have the shape …”
In retrospect: On the Six-Cornered Snowflake by Philip Ball (21 December 2011) for *Nature* 480, 455
Permalink: http://www.tychos.info/citation/085A_Kepler-Snowflake.htm
Source URL: https://www.nature.com/articles/480455a

General information
Wikipedia entry on “Hexagon”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Hexagon.pdf
Source URL: https://en.wikipedia.org/wiki/Hexagon

Chapter 23

Wiktionary definition of “unphysical”
Permalink: http://www.tychos.info/citation/_WIKT-Feb-2017_Unphysical.pdf
Source URL: https://en.wiktionary.org/wiki/unphysical

“an object of diameter 725.27 km at a distance of 1 AU …”
Wikipedia entry on “Angular diameter”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Angular_diameter.pdf
Source URL: https://en.wikipedia.org/wiki/Angular_diameter

Kyle’s Converter image and calculation from
Source URL: http://www.kylesconverter.com

Conventional illustration of sidereal and civil day lengths
The Solar and Sidereal Days by “A-star Maths/Physics Tuition/Tests/Notes”
Permalink: http://www.tychos.info/citation/096A_Sidereal-Civic.htm
Source URL: https://astarmathsandphysics.com/university-physics-notes/planetary-science/1514-the-solar-and-sidereal-days.html

Chapter 24

General information compiled by Arizona State University professor of philosophy (Michael J. White)
Permalink: http://www.tychos.info/citation/099A_Perturbed-Years.pdf
Source URL: http://www.public.asu.edu/~mjwhite/Sidereal%20and%20tropical%20years.pdf

“Sidereal vs. Solar Time: Why is the delta (time difference) between …”
Understanding Precession of the Equinox: Evidence our Sun may be part of a long cycle binary system by Walter Cruttenden and Vince Dayes (2003)
Permalink: http://www.tychos.info/citation/099B_BRI-Evidence.pdf
Source URL: http://www.binaryresearchinstitute.org/bri/research/papers/BRI-Evidence.pdf

“The anomalistic year is usually defined as the time between …”
Wikipedia entry on “Year”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Year.pdf
Source URL: http://www.public.asu.edu/~mjwhite/Sidereal%20and%20tropical%20years.pdf

“On the anomalistic year: the year called the anomalistic …”
p.48, *The Elements of Astronomy: Designed for the Use of Students in the University* by Samuel Vince (1811)
Source URL: https://books.google.it/books?id=SagRAAAAYAAJ

“The perihelion of the earth’s orbit, and of all the planets, is moving …”
p.131, *Foot Steps of the Ancient Great Glacier of North America: A Long Lost Document of a Revolution in 19th Century Geological Theory* by Harold W. Borns Jr. and Kirk Allen Maasch (Jan 27, 2015)
Source URL: https://books.google.it/books?id=md5sBgAAQBAJ

Chapter 25

“In the Gregorian calendar, years that are divisible by 100 …”
Wikipedia entry on “February 29”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_February_29.pdf
Source URL: https://en.wikipedia.org/wiki/February_29

“The Sidereal year of 365.25636 days is only valid …”
Wikipedia entry on “Sothic cycle”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Sothic_cycle.pdf
Source URL: https://en.wikipedia.org/wiki/Sothic_cycle

Chapter 26

Drunken clock image
Source URL: http://tvtropes.org/pmwiki/pmwiki.php/Main/StoppedClock

Analemma photography from Anthony Ayiomamitis
Permalink: http://www.tychos.info/citation/106B_Solar-Analemma-anim.htm
Source URL: http://www.perseus.gr/Astro-Solar-Analemma-102816.htm
Source URL: http://www.perseus.gr/Astro-Solar-Analemma-110000-animated.htm

“The Sun’s movement against the starry background …”
p.20, *Parallax: The Race to Measure the Cosmos* by Alan W. Hirshfeld (May 1, 2001, W. H. Freeman publishing)
Source URL: https://books.google.it/books?id=jUepAAAAQBAJ

Analemma graphic
Source URL: http://www.scialp.it/topografia/5.htm

Image
and
“The equation of time is the east or west component …”
Wikipedia entry on “Equation of time”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Equation_of_time.pdf
Source URL: https://en.wikipedia.org/wiki/Equation_of_time

Image of Trochoid types
Wikipedia entry on “Trochoid”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Trochoid.pdf
Source URL: https://en.wikipedia.org/wiki/Trochoid

“Calculations of the orbit of Mars, whose published values …”
Wikipedia entry on “Kepler’s laws of planetary motion”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-017_Keplers_laws_of_planetary_motion.pdf
Source URL: https://en.wikipedia.org/wiki/Kepler%27s_laws_of_planetary_motion

Image of Proxima’s traced path
from *Hunting for Planets Around Proxima Centauri* by David Dickinson (January 25, 2016) for *Sky and Telescope* Magazine
Permalink: http://www.tychos.info/citation/113A_Proxima-Centauri.htm
Source URL: http://www.skyandtelescope.com/astronomy-news/hunting-for-planets-around-proxima-centauri-0126201667/

Tracing software screenshot
from *Heliocentric parallax* by Michael Richmond (2014) for the Rochester Institute of Technology
Permalink: http://www.tychos.info/citation/114A_Vega.htm
Source URL: http://spiff.rit.edu/classes/phys440/lectures/helio_para/helio_para.html

Chapter 27

“To summarize, then, the Toltec Sunstone is an image …”
p.6, *The Aztec Calendar Stone is not Aztec and it is not a Calendar* by Douglas L. Bundy (November 13, 2012)
Permalink: http://www.tychos.info/citation/115A_Aztec-Calendar-Stone-Paper.pdf
Source URL: http://www.voicesfromthedust.org/wp-content/uploads/2013/06/Aztec-Calendar-Stone-Paper.pdf?hc_location=ufi

“The Carrington rotation number identifies the solar …”
p. 55, *The Sun and How to Observe It* by Jamey L. Jenkins (2009)

Source URL: https://books.google.it/books?id=4-0kLdeb4JAC

Image of extract from p. 13, *Equatorial Electrojet* by C Agodi Onwumechikli (1998)
Source URL: https://books.google.it/books?id=kwCFPH4C3tEC

“The saros is a period of approximately 223 synodic …”
Wikipedia entry on “Saros astronomy”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Saros-astronomy.pdf
Source URL: https://en.wikipedia.org/wiki/Saros_(astronomy)

General information
Wikipedia entry on “Exeligmos”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Exeligmos.pdf
Source URL: https://en.wikipedia.org/wiki/Exeligmos

“The Mesopotamians, and in particular the Babylonians …”
On the Saros by Kevin Clarke (1999), InconstantMoon.com
Permalink: http://www.tychos.info/citation/119A_On-the-Saros.htm
Source URL: http://www.inconstantmoon.com/cyc_ecl3.htm

General information
Wikipedia entry on “Full moon cycle”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Full_moon_cycle.pdf
Source URL: https://en.wikipedia.org/wiki/Full_moon_cycle

Major Axis of Moon’s Orbit image
Source URL: http://dcsymbols.com/future/school.htm

“Note that the lunar perigee precesses in the direction …”
A Modern Almagest: An Updated Version of Ptolemy’s Model of the Solar System by Richard Fitzpatrick (2010)
Permalink: http://www.tychos.info/citation/121A_Almagest.pdf
Source URL: http://farside.ph.utexas.edu/Books/Syntaxis/Almagest.pdf

Chapter 28

A Chinese diagram of the apsidal precession of our Moon’s Apogee
from p.393, *Science and Civilisation in China, Volume 3: Mathematics and the Sciences of the Heavens and the Earth* by Joseph Needham (1959)
Source URL: https://books.google.it/books?id=jfQ9E0u4pLAC

“Einstein showed that general relativity agrees closely with …”
Wikipedia entry on “Tests of General Relativity”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Tests_of_general_relativity.pdf
Source URL: https://en.wikipedia.org/wiki/Tests_of_general_relativity

“Einstein’s paper devoted to the GR prediction of Mercury’s …”
Einstein Paper on the Perihelion Motion of Mercury from GRT by A.A. Vankov (2011)
Permalink: http://www.tychos.info/citation/124A_Vankov-Relativity.pdf
Source URL: http://www.gsjournal.net/old/eeuro/vankov.pdf

“It is thus proven that Einstein’s Mercury correction …”
The Incorrect Theory of Mercury’s Anomalous Precession by Roger Rydin (2010?)
Permalink: http://www.tychos.info/citation/124B_Incorrect-Precession.pdf
Source URL: http://gsjournal.net/Science-Journals/Research%20Papers-Astrophysics/Download/5901

General information
Anomalous Precessions from Reflections on Relativity by Kevin Brown (2017)
Permalink: http://www.tychos.info/citation/125A_Math-Anomaly.htm
Source URL: http://www.mathpages.com/rr/s6-02/6-02.htm

“There are significant arguments that General Relativity …”
The Theory of Mercury’s Anomalous Precession by Roger A. Rydin (2011) from *Proceedings of the NPA* 8 501-506
Permalink: http://www.tychos.info/citation/126A_Mercury-Precession.pdf
Source URL: http://worldnpa.org/abstracts/abstracts_6066.pdf

Chapter 29

General information on planets
Planetary Fact Sheet by David R. Williams, NASA
Permalink: http://www.tychos.info/citation/128A_Planet-fact.htm
Source URL: https://nssdc.gsfc.nasa.gov/planetary/factsheet/

General information on planets
Wikipedia entry on “Neptune”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Neptune.pdf
Source URL: https://en.wikipedia.org/wiki/Neptune

Chapter 30

“At present, signs and constellations are about one calendar …”
What is the zodiac? by Christopher Crockett (2016) for EarthSky
Permalink: http://www.tychos.info/citation/131A_Zodiac.htm
Source URL: http://earthsky.org/space/what-is-the-zodiac.

“Hipparchus was the first person to notice the earth’s …”
Hipparchus. Famous Scientists. famousscientists.org. (August 26, 2016)
Permalink: http://www.tychos.info/citation/131B_Hipparchus.htm
Source URL: https://www.famousscientists.org/hipparchus/

“Some time around the middle of the second century BC, Hipparchus …”
Wikipedia entry on “Great Year”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Great_Year.pdf
Source URL: https://en.wikipedia.org/wiki/Great_Year

“The constant seems to work for a while until a close …”
Response to The Precession Dialogues – BAUT Forum post by Walter Cruttenden at BRI blog (July 16, 2009)
Permalink: http://www.tychos.info/citation/133A_BRI-Constant.htm
Source URL: http://binaryresearchinstitute.com/bri/response-to-the-precession-dialogues-baut-forum-post/

“Astronomers who studied the timing of eclipses over many centuries …”
Ask an Astronomer: Is the Moon moving away from the Earth? When was this discovered?
(July 18, 2015, Cornell University)
Permalink: http://www.tychos.info/citation/134A_Moon-Moving-Away.htm
Source URL: http://curious.astro.cornell.edu/about-us/37-our-solar-system/the-moon/the-moon-and-the-earth/111-is-the-moon-moving-away-from-the-earth-when-was-this-discovered-intermediate

“Long gave three possible explanations for the observed acceleration …”
Ancient Astronomical Observations and the Study of the Moon’s Motion (1691-1757) by John M. Steele (2012)
Source URL: https://books.google.it/books?id=iWkVd8Ir3akC&pg=PA138&lpg=PA138&dq=halley+moon+accelerating+dunthorne&source=bl&ots=Z7b7VhB4uo&sig=3j3W3cwvH6GBr9BUCGbUuCXkhjs&hl=it&sa=X&ved=0ahUKEwjGorep58HUAhUExxQKHSf6CsIQ6AEIPzAD#v=onepage&q=halley%20moon%20accelerating%20dunthorne&f=false

“was proving an embarrassment to theoretical astronomers …”
p. 153, “Appendix I. Secular accelerations of the Sun and Moon” in *Models and Precision: The Quality of Ptolemy’s Observations and Parameters* by John Phillips Britton (Garland, 1992)
Permalink: http://www.tychos.info/citation/136A_Britton-Acceleration-Sun-Moon.pdf
Source URL: http://www.caeno.org/pdf/Britton_Acceleration%20of%20sun%20and%20moon.pdf

“There are no satisfactory explanations of the accelerations …” (p.179)
and
“We are seriously lacking in mechanisms to explain the non-gravitational …” (p.199)
Astronomical Evidence concerning Non-gravitational Forces in the Earth-Moon System by R.R. Newton (1972) for *Astrophysics and Space Science*, Volume 16, Issue 2, pp.179-200
Source URL: http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?bibcode=1972Ap%26SS..16..179N&db_key=AST&page_ind=0&plate_select=NO&data_type=GIF&type=SCREEN_GIF&classic=YES

“It should be noted however, that when it was discovered …”
p. 306, *The Determination of the Accelerations and Fluctuations in the Motions of the Sun and Moon* by J.K. Fotheringham (1932) for *The Observatory*, Vol. 55, pp. 305-316
Source URL: http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?bibcode=1932Obs....55..305F&db_key=AST&page_ind=1&plate_select=NO&data_type=GIF&type=SCREEN_GIF&classic=YES

“The Martian equinoxes also precess, returning to an initial …”
p. 60, *A Change in the Weather* by Michael Allaby and Richard Garratt (2004)
Source URL: https://books.google.it/books?id=MnrrLHI4a4gC

“The season of perihelion follows the ~51,000-yr Martian …”
p. 1050, *Mars: Maps* edited by Hugh H. Kieffer (University of Arizona Press, 1992)
Source URL: https://books.google.it/books?id=ze27j5sSJVEC
“As a combined effect of the precession of the spin axis …”
p. 200, *The Planet Mars: A History of Observation & Discovery* by William Sheehan (1996)
Source URL: https://books.google.it/books?id=qSy6Hhbpjw4C

Chapter 31

General information
Wikipedia entry on “Gregorian calendar”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Gregorian_calendar.pdf
Source URL: https://en.wikipedia.org/wiki/Gregorian_calendar

“The Gregorian calendar aims to keep the vernal …”
Wikia commons article on “Year”
Permalink: http://www.tychos.info/citation/_WIKIA-Feb-2017_Year-Calendar-Wiki.pdf
Source URL: http://calendars.wikia.com/wiki/Year

“The real motivation for the Gregorian reform was not …”
Wikipedia entry on “Tropical year”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Tropical_year.pdf
Source URL: https://en.wikipedia.org/wiki/Tropical_year

“The aged Earth is slowing down in its daily rotation …”
and
“The computed path of a solar eclipse that occurred 2000 …”
Leap Seconds from National Time Service Center, Chinese Academy of Sciences (October 28, 2011)
Permalink: http://www.tychos.info/citation/141A_Leap-seconds.htm
Source URL: http://english.ntsc.cas.cn/rs/psk/201110/t20111028_76988.html

“The US has supported dropping the leap second for quite …”
The Plan to Lose Leap Seconds Would Throw Our Clocks Out of Sync With the Earth by Victoria Turk (June 6, 2016) for *Motherboard*
Permalink: http://www.tychos.info/citation/142A_Lose-Leap-Seconds.htm
Source URL: https://motherboard.vice.com/en_us/article/jp55vy/abolishing-leap-seconds-would-change-how-we-tell-the-time

Chapter 32

Population information
Source URL: http://brilliantmaps.com/human-hemisphere/

“Do our Science teachers tell us of the genius of the …”
Education, Chicano History site by Manuel (2003)
Permalink: http://www.tychos.info/citation/146A_Chicano-history.htm
Source URL: http://www.oocities.org/chicanohistory/education.htm

“Our Maya people created the most accurate calendar in …”
Identity, Chicano History site by Manuel (2003)
Permalink: http://www.tychos.info/citation/146C_Chicano-identity.htm
Source URL: http://www.oocities.org/chicanohistory/identity.htm

“Thus, the wise Sosigenes not just re-introduced the ancient …”
p. 8, *Sirius and precession of the solstice* by Uwe Homann (2005)
Permalink: http://www.tychos.info/citation/146D_Sirius-Precession-of-Solstice.pdf
Source URL: http://www.binaryresearchinstitute.com/srg/The%20Sirius%20Research%20Group%20-%20Original%20Files/Sirius%20&%20Precession%20of%20the%20Solstice.pdf

“Then, during the late 16th century work of the 6th century …”
Chairman’s Report August 2001 by Bob Solly for The Sole Society (2001)
Permalink: http://www.tychos.info/citation/146E_Solly-Longest-Day.htm
Source URL: http://www.sole.org.uk/0801chai.htm

Chapter 33

“For it is remarkable that owing to the precession of the …”
Sacred Science: The King of Pharaonic Theocracy by R.A. Schwaller de Lubicz (1982, Inner Traditions Reprint)
Source URL: https://books.google.com/books?id=cI8FHAAACAAJ

“The fact that Sirius seems to maintain its position relative …”
Karl-Heinz Homann (April 29, 1933 – April 23, 2008) by Walter Cruttenden for BRI’s Sirius Research Group
Permalink: http://www.tychos.info/citation/147B_Karl-Heinz-Homann.htm
Source URL: http://www.binaryresearchinstitute.org/srg/SiriusResearchIntro.shtml

“’Sirius remains about the same distance from the equinoxes …”
p. 13, *Sirius and precession of the solstice* by Uwe Homann (2005)
Permalink: http://www.tychos.info/citation/146D_Sirius-Precession-of-Solstice.pdf
Source URL: http://www.binaryresearchinstitute.com/srg/The%20Sirius%20Research%20Group%20-%20Original%20Files/Sirius%20&%20Precession%20of%20the%20Solstice.pdf

Heliacal rise image
from p. 50, *The heliacal rise of Sirius and ancient Egyptian chronology* by Bradley E. Schaefer for *Journal for the History of Astronomy*, Vol. 31, Part 2, p. 149 – 155, Yale University
Source URL: http://adsabs.harvard.edu/full/2000JHA….31..149S

“The Sothic cycle is a period of 1,461 Egyptian civil years …”
Wikipedia entry on “Sothic cycle”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Sothic_cycle.pdf
Source URL: https://en.wikipedia.org/wiki/Sothic_cycle

“Experts at the International Astronomical Union (IAU) are in an uproar …”
The Precession Paradigm by Uwe Homann (May 2000)
Permalink: http://www.tychos.info/citation/149A_Precession-Paradigm.htm
Source URL: http://www.poleshift.org/from%20Hom-Precession.html

Chapter 34

“James Bradley, (born March 1693, Sherborne, Gloucestershire …”
James Bradley — English Astronomer by Gerald S. Hawkins (2017) for From Encyclopædia Britannica
Permalink: http://www.tychos.info/citation/150A_James-Bradley.htm
Source URL: www.britannica.com/biography/James-Bradley

"James Bradley's discovery of stellar aberration …"
pp. 16-17, *Tycho Brahe* by Wikipedians, from compiled Wikipedia articles about Tycho Brahe and related subjects
Source URL: https://books.google.it/books?id=uW4Oq2al8oYC&lpg=PA14&dq=tycho%20brahe%20mars%20intersecting&hl=it&pg=PA16#v=onepage&q=tycho%20brahe%20mars%20intersecting&f=false

"The aberration of starlight was discovered in 1727 by the astronomer …"
Stellar Aberration from Reflections on Relativity by Kevin Brown (2017)
Permalink: http://www.tychos.info/citation/150C_Aberration.htm
Source URL: http://mathpages.com/rr/s2-05/2-05.htm

Extract from p. 13, *The Sky at Einstein's Feet* by William C. Keel (2006)
Source URL: https://books.google.it/books?id=cRv4Kro_krUC&lpg=PA13&dq=star%20annual%20motion%2040%20arcseconds&hl=it&pg=PA13#v=onepage&q=%2040%20arcseconds&f=false

"For instance Polaris, the pole star, seemed to travel annually …"
and
Image
from *From Stargazers to Starships — 22a. The Aberration of Starlight* by Dr. David P. Stern (2006)
Permalink: http://www.tychos.info/citation/151A_Apparent-Displacement.htm
Source URL: https://www-spof.gsfc.nasa.gov/stargaze/Saberr.htm

"It is important to notice that the early attempts were at …"
p. 222, *The Historical Search for Stellar Parallax (Continued)* by J. D. Fernie, from *Journal of the Royal Astronomical Society of Canada*, Vol. 69, pp.222-239
Source URL: http://adsabs.harvard.edu/full/1975JRASC..69..222F

Chapter 35

"In the absence of any observed stellar parallax, Tycho …"
Tycho Brahe's Critique of Copernicus and the Copernican System by Ann Blair (1990)
from *Journal of the History of Ideas* 51(3): 355-377.
Permalink: http://www.tychos.info/citation/153A_Blair-Brahe.pdf
Source URL: http://nrs.harvard.edu/urn-3:HUL.InstRepos:3373453

"The farthest star we can see with our naked eye …"
What is the distance to the farthest star we can see with our naked eye? by Sudeep Dutt (2016) for Socratic.org
Permalink: http://www.tychos.info/citation/153B_Farthest-Star.htm
Source URL: https://socratic.org/questions/what-is-the-distance-to-the-farthest-star-we-can-see-with-our-naked-eye

General information
Wikipedia entry on "Luminosity"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Luminosity.pdf
Source URL: https://en.wikipedia.org/wiki/Luminosity

General data
and
Star size comparison image
Wikipedia entry on "Alpha Centauri"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Alpha_Centauri.pdf
Source URL: https://en.wikipedia.org/wiki/Alpha_Centauri

"A blue-white supergiant, Deneb is also one of the most …"
Wikipedia entry on "Deneb"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Deneb.pdf
Source URL: https://en.wikipedia.org/wiki/Deneb

Chapter 36

"Hipparchus of Nicaea (2nd century BC) is the first known …"

and
“The annual parallax is the tiny back-and-forth shift …”
The techniques of astronomy by James Evans (2017, Encyclopædia Britannica)
Permalink: http://www.tychos.info/citation/156A_Techniques-of-Astronomy.htm
Source URL: https://www.britannica.com/science/astronomy/The-techniques-of-astronomy

A graphic from the Encyclopædia Britannica entry on “Parallax”
and later on in the chapter the quote
“The introduction of the photographic method by American astronomer Frank Schlesinger …”
Parallax by Kaj Aa. Strand and The Editors of Encyclopædia Britannica (2018)
Permalink: http://www.tychos.info/citation/160B_Parallax-Britannica.htm
Source URL: https://www.britannica.com/science/parallax

Image of extract from *Popular Astronomy* by Simon Newcomb (1878)
Source URL: https://books.google.it/books?id=ZX7-nyXyy_cC

Wikipedia entry on “Hipparcos”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Hipparcos.pdf
Source URL: https://en.wikipedia.org/wiki/Hipparcos

“The Hipparcos and Tycho Catalogues are the primary products …”
The Hipparcos and Tycho Catalogues, ESA (1997)
Permalink: http://www.tychos.info/citation/157C_ESA-claim.htm
Source URL: http://cdsarc.u-strasbg.fr/viz-bin/Cat?I/239#sRM2.13

“The Hipparcos Catalogue stars, about 118,000 stars …”
and
“As a matter of fact, about half the average values …”
Research on Red Stars in the Hipparcos Catalogue by Vittorio B. Goretti (2013)
Permalink: http://www.tychos.info/citation/157D_Red-Stars-Goretti.pdf
Source URL: http://www.vittoriogoretti-observatory610.org/2nd-research-2010-2012-pub-jan-2013/

“If you have a list of parallaxes of very distant objects, so …”
Extract from SpaceBanter Forum thread in December 2016
Permalink: http://www.tychos.info/citation/ 159A_Space-Banter-negative-parallax.pdf
Source URL: http://www.spacebanter.com/showthread.php?t=218020&highlight=negative+parallax

“I believe that conventional astronomical community are in …”
Negative Stellar Parallax Proof of Geocentrism and a Smaller Universe at forums.catholic.com (May 2010)
Permalink: http://www.tychos.info/citation/159B_Catholic-negative-parallax.pdf
Source URL: https://forums.catholic.com/t/negative-stellar-parallax-proof-of-geocentrism-and-a-smaller-universe/199954

“The Hipparcos satellite recorded that 50% of the parallax …”
Please provide a Geocentric diagram at The Thinking Atheist Forum (February 2013)
Permalink: http://www.tychos.info/citation/159C_ThinkingAtheist-negative-parallax.pdf
Source URL: http://www.thethinkingatheist.com/forum/Thread-Please-provide-a-Geocentric-diagram?pid=363622#pid363622

“Over 1 million objects are listed in the Tycho Main Catalogue, and …”
Amateurs measuring parallax at the CosmoQuest X Forums (February 2014)
Permalink: http://www.tychos.info/citation/159D_Cosmoquest-parallax.pdf
Source URL: https://forum.cosmoquest.org/showthread.php?149459-Amateurs-measuring–parallax&p=2196185#post2196185

“Parallax : The trigonometric parallax pi in units of …”
Hipparcos Main Catalog, NASA (2012)
Permalink: http://www.tychos.info/citation/159A_NASA-Hipparcos.htm
Source URL: https://heasarc.gsfc.nasa.gov/W3Browse/all/hipparcos.html

“Then there are occasional stars for which the different …”
Recent Determinations Of Stellar Perallaxes By Photographic Methods. A Review by Robert G. Aitken

for Astronomical Society of the Pacific (Vol. 33, No. 191, February, 1921)
Permalink: http://www.tychos.info/citation/160A_Classic-Negative-Parallax.htm
Source URL: https://www.jstor.org/stable/40670901?seq=1#page_scan_tab_contents

General information
Background: Parallax by Lindsay Clark (2000)
Permalink: http://www.tychos.info/citation/161A_Princeton-Cassini.htm
Source URL: https://www.astro.princeton.edu/~dns/teachersguide/ParBkgd.html

Image of Copernican method for measuring distances of stars
Source URL: https://socratic.org/questions/how-stellar-parallax-is-measured

"At the end of 1838, Bessel announced that over a period …"
p.71, *Measuring the Universe: The Cosmological Distance Ladder* by Stephen Webb (1999)
Source URL: https://books.google.it/books?id=ntZwxttZF-sC

General planetary information
Distances Between Planets from ThePlanets.org (2018)
Permalink: http://www.tychos.info/citation/163A_Planets-org.htm
Source URL: https://theplanets.org/distances-between-planets/

"It was one of Tycho Brahe's principal objections to …"
Wikipedia entry on "Parallax"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Parallax.pdf
Source URL: https://en.wikipedia.org/wiki/Parallax

"…The solar system itself has a velocity of 20km/s …"
p. 10, *Cross-Calibration of Far UV Spectra of Solar System Objects and the Heliosphere* edited by Eric Quémerais, Martin Snow and Roger-Maurice Bonnet
Source URL: https://books.google.it/books?id=FWdDAAAAQBAJ

"…the mean motion of the Solar system at 20 km/sec …"
The ABC's of Distances by Edward L. Wright (2011)
Permalink: http://www.tychos.info/citation/164C_Distances-Wright.htm
Source URL: http://www.astro.ucla.edu/~wright/distance.htm

"The average radial velocity of the stars is of the order …"
p. 113, *The Motion of the Stars* by J. S. Plaskett (1928) for *Journal of the Royal Astronomical Society of Canada*, Vol. 22, p.111
Source URL: http://adsabs.harvard.edu/full/1928JRASC..22..111P

"The Sun's peculiar velocity is 20 km/s at an angle of about …"
Spiral Galaxies by Dmitri Pogosian (2018) for University of Alberta, Astronomy 122: Astronomy of Stars and Galaxies
Permalink: http://www.tychos.info/citation/164E_UA-Spiral-Galaxies.htm
Source URL: https://sites.ualberta.ca/~pogosyan/teaching/ASTRO_122/lect24/lecture24.html

"The Sun is moving towards Lambda Herculis at 20km/s. This …"
What is the speed of the Solar System? by Deborah Scherrer, Hao Tai and J. Todd Hoeksema (2017)
for Stanford University Solar Center
Permalink: http://www.tychos.info/citation/164F_Stanford-Sol-Speed.htm
Source URL: http://solar-center.stanford.edu/FAQ/Qsolsysspeed.html

"The speed of the Sun towards the solar apex is about 20 km/s …"
Wikipeda entry on "Solar apex"
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Solar_apex.pdf
Source URL: https://en.wikipedia.org/wiki/Solar_apex

Image of extract from *The Motion of the Stars* by J.S. Plaskett (April 1928)
Source URL: http://articles.adsabs.harvard.edu/cgi-bin/nph-iarticle_query?bibcode=1928JRASC..22..111P&db_key=AST&
page_ind=7&data_type=GIF&type=SCREEN_VIEW&classic=YES

“The point on the celestial sphere, in the constellation …”
Solar Apex by David Darling (2017, daviddarling.info)
Permalink: http://www.tychos.info/citation/165B_Solar-Apex.htm
Source URL: http://www.daviddarling.info/encyclopedia/S/solar_apex.html

Astronomical definitions from *An Etymological Dictionary of Astronomy and Astrophysics* by M. Heydari-Malayeri (dictionary.obspm.fr)
Permalink: http://www.tychos.info/citation/165C_Antapex.htm
Source URL: http://dictionary.obspm.fr/index.php/index.php?showAll=1&formSearchTextfield=apex

Appendices

Wikipedia entry on “Right ascension”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Right_ascension.pdf
Source URL: https://en.wikipedia.org/wiki/Right_ascension

Wikipedia entry on “Declination”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Declination.pdf
Source URL: https://en.wikipedia.org/wiki/Declination

Wikipedia entry on “Equinox”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Equinox.pdf
Source URL: https://en.wikipedia.org/wiki/Equinox

Wikipedia entry on “Apsidal precession”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Apsidal_precession.pdf
Source URL: https://en.wikipedia.org/wiki/Apsidal_precession

General planetary information
HyperPhysics Planetary Data by Carl R. (Rod) Nave for Department of Physics and Astronomy at Georgia State University (2000)
Permalink: http://www.tychos.info/citation/172A_Planetary-Data.ht
Source URL: http://hyperphysics.phy-astr.gsu.edu/hbase/solar/soldata2.html

Further Reading

“The solar system is indeed very flat, the orbits of all …”
Ask an Astronomer: Plane of the solar system (January 2014, University of Cambridge)
Permalink: http://www.tychos.info/citation/039A_Plane-of-Solar-System.htm
Source URL: http://www.ast.cam.ac.uk/public/ask/3088

Image source for online animated simulator
Source URL: http://astro.unl.edu/classaction/animations/coordsmotion/eclipticsimulator.html

Image source for Sun’s path among the stars
Source URL: http://www.nakedeyeplanets.com

General information
“The main long-term cycle causes [Earth’s] axial tilt to fluctuate …”
Wikipedia Schools entry on “Circle of latitude”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Circle_of_latitude.pdf
Source URL: http://schools-wikipedia.org/wp/c/Circle_of_latitude.htm

“The elliptical orbit of Jupiter is inclined 1.31° compared to Earth.”
Wikipedia entry on “Jupiter”
Permalink: http://www.tychos.info/citation/_WIKIP-Feb-2017_Jupiter.pdf
Source URL: https://en.wikipedia.org/wiki/Jupiter

Appendix II
Table of Contents