

COMMENTS ON THE LYM ANIMATIONS OF KEPLER'S NEW ASTRONOMY

Class with Bogotá and Buenos Aires LYM.

by Pierre Beaudry

3. WEDNESDAY, OCT. 25, 2006. {*New Astronomy*}, Chapter 1 to 5, ON KEPLER'S MEAN AND APPARENT OPPOSITIONS.

CONSTRUCTIVE GEOMETRY OF PYTHAGOREAN SPHERICS: THE PYTHAGOREAN SOLAR HYPOTHESIS OR HOW TRUTH CAN BE REACHED THROUGH THE FAILURES OF SENSE PERCEPTION

"{**Make me thy lyre, even as the forest is:"
What if my leaves are falling like its own!**}"
Shelley, {*Ode to the west wind*}.

The following report on Pythagoras is part of a pedagogical that I did in 2003 and which was published in the Germany {*New Solidaritat*}. The central idea was to relive the experimental discovery of the {*Solar Hypothesis*} as Pythagoras must have discovered it, during the 6th century BC, and which is the crucial experiment that Kepler relived and restated in the {*New Astronomy*} as the discovery of the Mars anomaly by the mean and apparent oppositions of the sun.

In the earlier efforts of mankind to discover the truth about Man, Nature, and God, Pythagoras was the first Greek philosopher to lay the basis for a science of astronomy, which he had derived from the discovery of a principle of proportionality between God the creator, Nature, and man, and which he expressed by a constructive geometry of {*Sphaerics*} that became known as the {*Harmony of the Spheres*}. I will demonstrate here that the crucial development of classical geometry adopted by Pythagoras and his school represented a pre-Euclidean form of constructive geometry which was centered on the study of crucial paradoxes that emphasized the examination of anomalies associated with the problems of relationships between sense-perception and a provable physical principle of proportionality within the Celestial Sphere of the universe.

During the middle of the sixth century BC, Pythagoras (c.580-504 BC), had developed a constructive geometry based on the Sphaerics of astronomical observations, which had been derived from earlier Egyptian Pyramid observations, as well as from an earlier civilization of transoceanic navigators. I will reconstruct here the essential steps

that went into the making of what became the first *{Solar Hypothesis}* on record, and whose proof of discovery was made through a series of unique astrophysical observations of the complex plane relative to the motions of the planets.

The ordering principle of the multiply connected circular action involved in these observations of, especially the outer planets, Mars, Jupiter, and Saturn, involved what was later to be called epicycloids, which represented the apparent retrograde and prograde motions of the planets, as they appeared to orbit around the Earth. These are the singularities of back looping, or retrogression, which can be observed with the naked eye in the annual orbits of those three planets.

It is these anomalies which we must identify as the crucial features of the pre-Euclidean forms of spheroid constructive geometry, and which formed, for the first time in human history, a body of doctrine based on the universal principle of harmonic proportionality within the solar system as a whole, and which were later to become the basis for the discovery of the principle of gravitation by Johannes Kepler. However, in order to understand that Pythagorean doctrine, a number of difficulties have to be overcome.

First of all, the yearly occurrence of retrograding, which was observed in all three planets, caused an obstinate resistance on the part of the priesthood and credulous believers of ancient times against the Pythagorean *{Solar Hypothesis}*. The question was raised: "Why do all of the periods of the Mars, Jupiter and Saturn planetary cycles always conjugated with the timing of the Earth, that is, more or less 365 days each year?" The priesthood of the Oracle of Delphi answered this question by saying that *{seeing is believing}*, and that, since all of the back looping cycles of Mars, Jupiter, and Saturn, were in such a close correspondence with Earthly years, this confirmed that all of the planets orbited around the non-moving Earth, and thus was established the obstinate "empirical proof" that Earth was the center of the world. This sophistry of *{seeing is believing}* was established by Aristotle in his treatise on the Heavens. Here is the key stumbling block of Aristotle, which is in complete opposition to the entire Platonic tradition of Pythagoras, Plato, Cusa, Kepler, Leibniz, Gauss, Riemann, and LaRouche. The central axiomatic issue that Aristotle raised was the question of universal change. Aristotle wrote about the perfection of the universe:

{What is divisible in parts that are themselves always divisible, is a continuum. What is divisible according to all dimensions is a body. In magnitudes, the one that is extended in a single dimension is a line; the one that is extended in two dimensions is a surface; the one that is extended in three dimensions is a body. There are no other dimensions than those, for the reason that {three} is the equivalent in {all} and that three times is equivalent to {totality}}.[...]

{On the other hand, here is a point that is clear: it is not possible to go from the body to a higher type of magnitude, as we can do it by going from line to surface, and from surface to body, because if such an operation were possible, the body would stop being a perfect magnitude. Of all necessity, in fact, the passing from one species to a

higher species cannot occur because something would be defective in the species we started from; so, since it is not possible that something perfect have any defect: it is therefore totally perfect.}” (268 a)

As you can see, these definitions and syllogisms exclude totally the possibility of the complex domain and of the Riemannian {*Geistesmassen*} idea of relationship between a {*continuous manifold*} and a {*discrete manifold*}. This means that there cannot exist a higher dimensionality than that of three-dimensional sense perception objects. That is absolutely true for sense perception, but it is not true for the human mind. There is more. In the same book on the Heavens, Aristotle added the following statement against the principle of change.

{Others pretend that everything is becoming and flowing, that nothing is fixed, but that only one thing subsists, and that is, the natural transformation of everything as the source of change into everything else. This is what Heraclites of Ephesus seems to imply, among others.

{There are also those who attribute the generation of all bodies to the composition and decomposition of surfaces.

{I postpone the discussion of the first theory for another time. As for the partisans of the second – those who say that bodies are composed of surfaces – a superficial examination will show that they are in contradiction with mathematics on several points. We have no right to ignore that science, unless one is supported by more convincing reasoning than its axiomatic fundamentals. Besides, the same intellectual process will obviously require constituting solids by means of surfaces, surfaces by means of lines, and lines by means of points. Under those conditions, the part of a line will necessarily cease to be a line.}” (Aristotle, {*On the Heavens*}, III, I, 298b.)

So, if a line is composed by an infinity of points, and if lines compose surfaces from which solids are made, then everything is reducible, axiomatically, to mathematical points as self-evident things in themselves. That is pure sophistry. Even a child could take this Aristotelian argument apart, simply by asking: “where does this axiomatic self-evident point come from? How is it generated?” Aristotle never answered that question except to say that the point is given to you axiomatically, as a necessary unquestionable self-evident starting point. In other words, knowledge must start from something that is given. Knowledge cannot start from creativity.

Now, how would Plato respond to that question? Plato would first reject axioms, postulates and definitions, as Riemann and LaRouche did, and would propose a hypothesis; that is, the hypothesis of a universal physical principle. In his {*Timaeus*}, Plato hypothesized that God had created the universe as a {*finite and self-bounded*} process of multiply connected spherical action. Let me give you an example of this type of process.

1. Start with simple circular action closing on itself. What have you generated that did not exist before? A circle.
2. Rotate that circle on itself, again, by folding it on itself by half. What have you generated that did not exist before? A straight-line diameter.
3. Fold the half circle, again, on itself a third time. What have you generated that did not exist before? A central point.

Thus, the point is generated by a triply connected spherical action, just as everything else is generated from the self-folding and unfolding of the higher domain of *{Sphaerics}*. It is not the point that is self-evident; it is the process of the physical self-reflective circular action. That was the most elementary thing that Aristotle refused to understand about the science of *{Sphaerics}* of Pythagoras, Heraclites, and Plato. He simply refused to develop his own powers of self-consciousness. Any questions?

Secondly, another difficulty appeared to be caused by the fact that no writings of Pythagoras were ever found, and most of his students and commentators have left us with a mish-mash of mystical garbage instead of a scientific method. We must, therefore, resort to reestablishing the truth, not based on original documents, but based on what an astute investigator and a creative mind was able to establish as truthful, given only his discoveries of principle and his observations of the anomalies of the heavenly bodies. From this vantage point, we can begin investigating the Pythagorean doctrine of the *{Harmony of the Spheres}*.

PYTHAGOREAN {SPHAERICS}: THE HIGHER HYPOTHESIS OF THE INVISIBLE CELESTIAL SPHERE

Pythagoras hypothesized that a transparent-non-visible Celestial Sphere, which was represented by the canopy of the stars, projected the shadows of a false image of the universe onto the *{sensorium}* of our visual perception, but that such a projection was harmonically proportional to the orbiting Sphere of the Earth, which was also transparent and non-visible. How was Pythagoras able to interpret the significance of those spherical shadows, and discover that they were *{lies}*, that is, mere deformed traces of astronomical truths that were left behind by the pathways of the apparent motions of the planets and stars, a situation much like looking at the heavens as into Plato's Cave. It is interesting to note that the Greek word for cave *{koila}* also means heavens (ciel) in French.

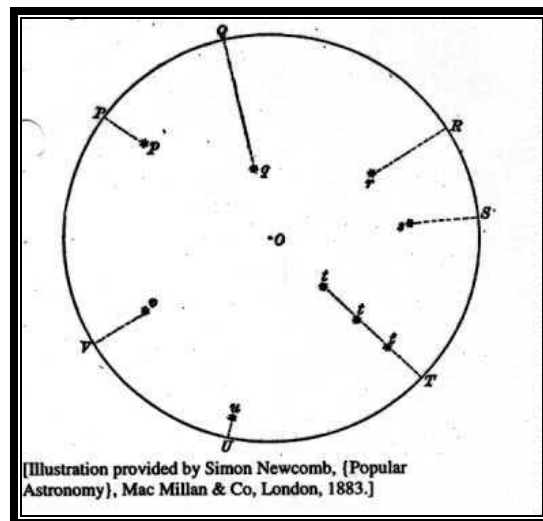
As Plato had emphasized in his *Timaeus*, the significance of such an investigation of the heavens lies in the discovery of such a proportionality, which exists between the apparent movement of the stars and the movements of human reason created in the image of God. Plato stated the principle of proportionality as follows:

“... {God created and bestowed vision upon us so that we, contemplating the orbits of intelligence in the heavens, might put them to use by applying them to the orbits of our reason, which are related to them}...” (Plato {The Timaeus}, 47 b.)

Pythagoras did precisely that, and, as far as we know, became the first astronomer, in recorded history, to understand the ordering principle of the planets moving within the heavens, as if from the inside of a series of concentric transparent or crystalline spheres, the largest of which had an extremely large diameter and appeared to contain thousands of fixed stars. Inside of that larger sphere were seven other concentric spheres, one for the orbit of each planet, including the Sphere of Earth's orbit.

There was such coherence between those spheres that Pythagoras, like Plato and Kepler after him, attributed musical harmonic proportions between them that became known as the *{Harmony of the Spheres}*, a music that could only be heard by our minds. Such harmony of proportionality was implied because the visible traces of the stars seemed to be traveling everywhere on the inside of these surfaces without interfering with each other, as if they were all well ordered harmonically from the same invisible axis of rotation, or the same universal principle.

Let us imagine the way in which the relationship between the *{orbits of intelligence in the heavens}* relates to the *{orbits of our reason}*, and discover how, in that process, Pythagoras organized a relationship between his perceptions of the stars with a physical principle of their motions. Conceiving himself as a central source of light projecting rays outward, everywhere inside of the sphere of the fixed stars, Pythagoras perceived those stars as mirrors, rotating daily around a Polar Star, all of which reflected back to the center of the sphere where he stood, and projected their shadows, from their diverse positions in space, onto some location on the Celestial Sphere behind them. See **Figure 1**. [Illustration provided by Simon Newcomb, *{Popular Astronomy}*, Mac Millan & Co, London, 1883.] The complex domain of Pythagorean *{Sphaerics}* can be summed up into three fundamental steps.

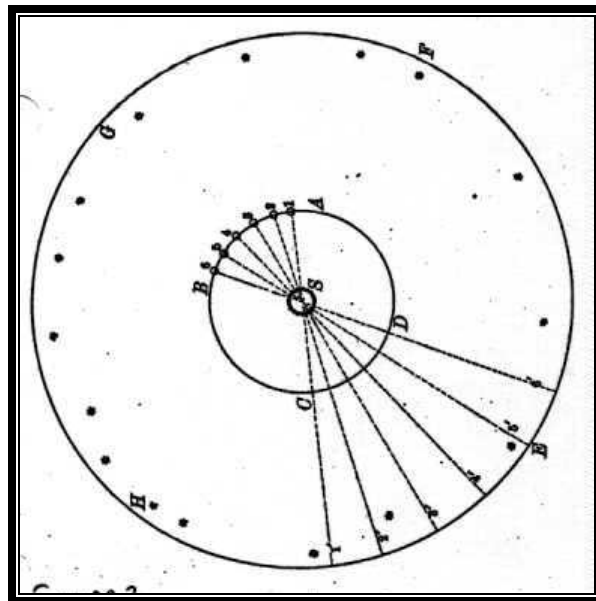


STEP ONE [Figure 1.]

In a first step, Pythagoras projected himself observing the stars from the center of the Celestial Sphere, on Earth. Seeing oneself in the process of discovering is a most

important feature of the discovery itself, because, contrary to the prevailing school of thought, the human element is, in fact, an essential component of the principle of discovery involved. A scientific discovery is always subjective and never objective. No true discovery could ever be made without the inclusion of the observer.

From that vantage point, Pythagoras imagined himself embracing the whole of creation, from its center, as if he were acting in imitation of the Creator. In that capacity, which is in the image of {*Capax Dei*}, he required several things, which are always essential for such scientific experiments. [See **Figure 1.**] He required: 1) a subject of the observation, standing on Earth as the center of the universe at **O**; 2) the object of study, the stars marked **p, q, r, s, t, u, v**, located at different distances; 3) the shadows of those stars as they appear projected to sense perception, at **P, Q, R, S, T, U, V**, onto the surface of the Celestial Sphere; and 4) the relationship connecting those shadows to the sphere as a whole, **p-P-O, q-Q-O, r-R-O, s-S-O, t-t-t-T-O, u-U-O, v-V-O**, and to the observer in particular.



STEP TWO [Figure 2.]

In a second step, which also includes the first step, Pythagoras realized that, as an observer, he could transport himself, to the Sun, and from there, he could look back to the Earth and observe, in an opposite direction to his first observation, and project the reflected image of the Earth onto the Celestial Sphere, a projection which would not only be diametrically opposite to that from which he previously saw the Sun, but which would also include all of the conditions that were implied in that first set of observations, but in reversed order. [Figure 2.] This is how Pythagoras began to understand the complex domain by inversion, self-consciously, since the truth always struck him as being the inversion of what appeared to be true to sense perception. This step is very important, because it represents what can be called a {*Self-Conscious Inversion*}. It acts as a sort of pivoting function between Step One and Step Three.

STEP THREE

A third step, which included the two previous steps, was required to complete the epistemological conditions validating this Pythagorean principle of proportionality. This third step represented the boundary condition, the closure of the entire process. Imagine that, from outside of the Celestial Sphere, Pythagoras had been observing himself determining his observations from the Earth as center, and from the Sun as center. These are the two positions that Kepler related to in his *{New Astronomy}*. In other words, he was observing the whole from both inside and outside of the Celestial Sphere, simultaneously. He was both the central generative principle and the encompassing principle of his experiment, as from a vision of God, who is everywhere the center and the circumference. An example of such a projection is given in **[Figure 2]**, which establishes the apparent annual motion of the Sun against the interior of the Celestial Sphere in proportion with the Sphere of the Earth.

In this projection, Pythagoras located the Sun in the center at **S**, and the apparent motion of different observations from the Earth, which is moving in the orbit **ABCD** around the Sun, and is marked by the numbers **1, 2, 3, 4, 5, 6**. These observations, registered at intervals of about every 15 days, made the Sun appear in six different, but inverted positions, as in a mirror image, at points **1', 2', 3', 4', 5', 6'**, on the surface of the Celestial Sphere, **EFGH**. This gives the observer on Earth the impression that the sun moves from East to West, while it is the Earth, which moves from West to East, as everything else does in the sky. Pythagoras was able to ascertain that during each of the two-week intervals, between observations, the apparent motion of the Sun had moved against the Celestial Sphere by an angle proportional to the actual angular motion of the Earth around the Sun. From his inside-outside position of the Celestial Sphere, Pythagoras was able to determine that his successive observations had established that the annual motion of the Earth around the Sun was proportional to the annual motion of the Sun around the Celestial Sphere as seen from the Earth. Thus, the Celestial Sphere was understood to be proportional to the Sphere of the Earth.

Under such circumstances, Pythagoras would have been able to establish what can be called an *{Self-Conscious Inversion}*, that is a function of truth by which the principle of proportionality abolished, before its time, the Ptolemaic system of epicycloids and established that all of the planets orbit around the Sun, including planet Earth. This *{self-conscious inversion}* is a process that Aristotelians have a lot of problems with. This is why Aristotle rejected the motion of the earth.

THE INVISIBLE ARM OF PYTHAGORAS

Outside of the apparently fixed patterns of stars, rotating around the region of the Pole Star, there are seven other celestial bodies, which are moving in apparent "wandering" motions across the sky. The apparent motions of the sun and of the moon,

among the stars, describe what also appeared to be circular motions, inside of the celestial sphere, from East to West during the period of a day, a month, and a year, respectively. Their motions are always forward, and in the same direction, but this is not what appears to be the case for the motions of the five other planets: Mercury, Venus, Mars, Jupiter, and Saturn. At certain periods, they move faster than other stars, and they go through the anomaly of retrograding.

Mercury and Venus appear to “oscillate”, while Mars, Jupiter and Saturn appear to form the pathways of cycloidal motions, back looping motions, which include a prograde motion, and a retrograde motion, plus two apparent stationary positions between the two opposing motions, every year, during the course of one full cycle. There is no doubt that Pythagoras was able to make the following observations of Mars, Jupiter, and Saturn with the naked eye, and make a record of it:

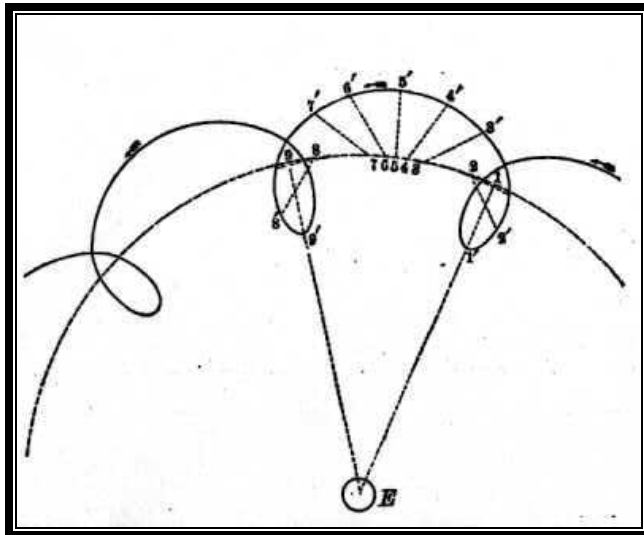


Figure 3. [The apparent orbit of Jupiter inside of the celestial sphere during a period of 365 days as perceived by an observer on earth.]

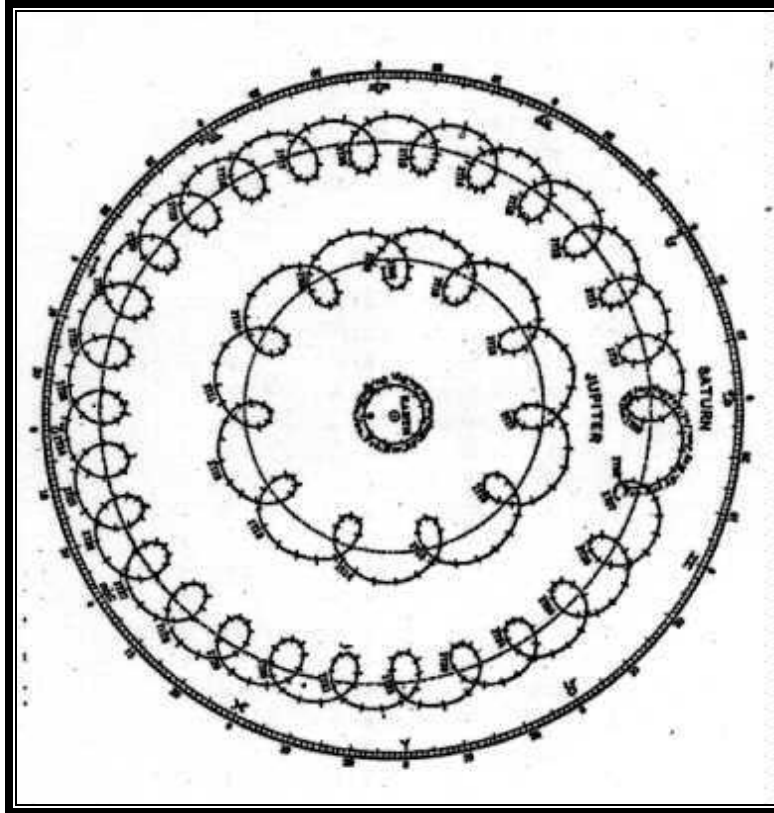


Figure 4. [The complete orbits of Mars, Jupiter, and Saturn as perceived by an observer on Earth, from 1708 to 1737, according to Jacques Cassini.]

The pedagogical drawings represent the orbits of Mars, Jupiter, and Saturn, spanning the period of 1708 to 1737. They were made during the declining years of the Colbertian Royal Academy of Sciences to which Gottfried Leibniz had participated, during his youth. They were the fruit of a collaboration between Leibniz, Christian Huygens, Oli Roemer, and the Cassini brothers. Francois Arago reproduced these drawings when he was astronomy professor at the French Ecole Polytechnique and director of the Observatory of Paris.

Observe that Jupiter, [Figure 3], appears to be making a series of loops around an ideal circle marked by 1, 2, 3, 4, 5, 6, 7, 8, 9, and that the planet, in the different apparent positions of 1', 2', 3', 4', 5', 6', 7', 8', 9', seems to be carried by the radius of an **INVISIBLE ARM** whose center is rotating around the circumference of this ideal circle [dotted circular line]. This arrangement illustrates the special relationship between the sense perception anomalies of the observations, that is, their shadow effects of universal gravitation inside of the solar system as a whole, with the constructive geometry that typify the effects of a universally unseen cause. These can be usefully compared with the Kepler construction in his {*New Astronomy*}, p. 119.

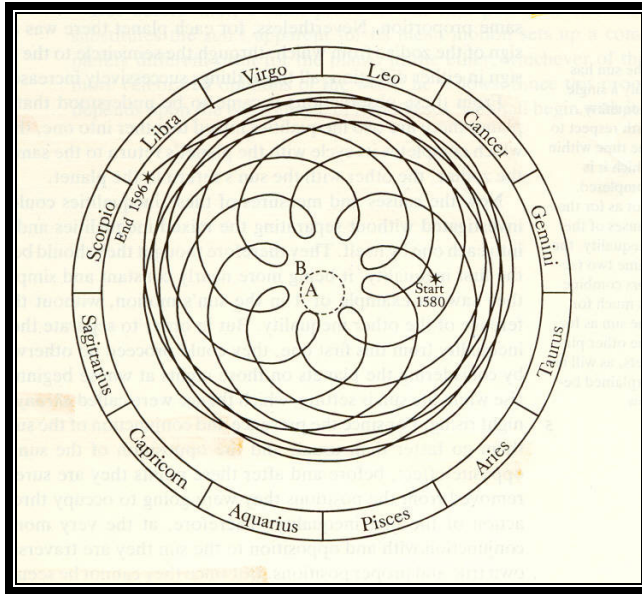


Figure 5. [Kepler's Mars Cycle from New Astronomy]

The question that Pythagoras must have raised at that point was: "What is the principle that moves that **INVISIBLE ARM**, and directs it into generating this apparent pathway of Jupiter in the night sky?" The answer is not self-evident, but we shall see that it has something to do with the triple relationship between the Earth, Jupiter, and the Sun. Follow the changing position of the radius from **2-2'** to **3-3'**, and so forth, until you reach the position of **9-9'**. On the one hand, the small portion of change from **2 to 3**, on the ideal circle, represents the non-linear segment of about forty days along the fictitious pathway of Jupiter around the sun, which is not perceived. [Dotted circular path] This is going to be useful for you, if you wish to make observations, mark them down, and date them.

On the other hand, the epicycloidal portion **2'-3'**, represents the same period of the apparent pathway of Jupiter around the earth, which is perceived by the observer on Earth. This situation creates a very special kind of anomaly, which causes an ambiguity between the circle and the epicycloid, that is to say, between the observation made from the Sun (not perceived), and the observation made from the Earth (perceived).

What does that mean? Someone might have an objection here and interject: "You can't make an observation from the sun!" That objection might imply that the only place you can make observations from is Earth. That is called empiricism, or passive religious belief, but it is not science. That objection implies that if you are not there to see it, "with your own eyes", it does not exist. So, let's restate the question: "***What is the difference between making an observation from the Sun or an observation from the Earth?***" The answer is: "***The difference is the same as between believing and knowing.***"

What is the problem here? An empiricist can only believe the truth when he sees it, he cannot know it when he does not see it. *{Seeing is believing}*. An empiricist does not see those relationships of proportionality with his mind. That was the *{crucial handicap}* within the scope of early man's observation of the seven planets. Furthermore, how can the lie of the *{apparent motions of the planets}* lead you to the truth of the so-called *{true motion of the planets}*? If you don't realize that your senses deceive you, and lie to you, then you cannot do astronomy. This is why Aristotle was never able to do astronomy. Again, the question underlying this objection is: "How can I think in terms of harmonic proportionality as opposed to sense perception?" This is the central question of Kepler: how can you conceive of the harmonic ordering of the universal principle of gravitation as the causal motion of the planets?

The multiply connected motions between the circle and the epicycloid [Figure 3] create an anomaly such that the direction of the **INVISIBLE ARM**, between those two positions carries the actual proof of the *{Solar Hypothesis}*, which represents the first coherent proof of the harmonic ordering leading to the discovery of universal gravitation by Kepler. That is to say, the discovery that the radius of curvature of the epicycloidal pathway of a planet is always pointing to the Sun during the entire period of its orbit. This could have been experimentally verified even in the days where no sophisticated astronomical instruments existed. In other words, Mars, Jupiter and Saturn will appear to be orbiting around the earth, but as if an **INVISIBLE ARM** were carrying them from a direction which is always oriented away from the Earth and toward the Sun! This is a very curious, but crucial anomaly, which requires a significant moment of reflection.

Let us look more closely at Figure 3. First of all, take note of the position of the **INVISIBLE ARM** at **1-1'-E**. This is the most important moment of observation during the entire cycle. Why? Because it is the only one of two times during the entire cycle of the planet when the apparent position of the planet on the epicycle at **1'** is also in line with the Earth and the position of the **INVISIBLE ARM** on the circle at **1**. The only other position showing that is **9-9'-E**. No other position shows that. Now, why is this significant? What is so special about that position which occurs only twice during the entire cycle of one year, at the beginning and at the end of the cycle. Those two periods of observations always occur at the time when the planet is in opposition with the Sun, that is, when the Earth comes between the planet and the Sun.

Thus, in the case of Jupiter, when the **INVISIBLE ARM** points in the direction of the Earth, as shown in the positions of **1-1'-E**, and **9-9'-E**, the Sun is also lined up behind the Earth. However, whenever the planet is in conjunction with the Sun, that is, when the Sun is between the Earth and the observed planet, the **INVISIBLE ARM** points everywhere away from the Earth.

Pythagoras was able to derive two things from this. One is that the planetary cycle begins and ends at approximately the same place in the night sky. The other is that the complete cycles of Mars, Jupiter, and Saturn invariably occurred at a time when the Sun was in opposition to the planet. Thus, he was able to calculate that the moments of opposition of a planet with the Sun were defining a calendar: that the year of Mars was 1

Earth year and 322 Earth days, that the year of Jupiter was about 11 Earth years and 317 Earth days, and that the full cycle of Saturn took 29 Earth years and 174 Earth days. We shall demonstrate later that this calendar is what determined the name and the order of the days of the week. It was from these crucial observation of opposition that Pythagoras was able to assert that the earth and the outer planets were actually orbiting around the Sun, and that the epicycloids of those planets were not their real motions, but were entirely dependent on the moving position of the Earth with respect to the Sun and the planets.

The secret of the first understanding of the universal role of gravitation in the Solar System, thus came to be, when the centering direction of the **INVISIBLE ARM** of Pythagoras, that is when the radius of curvature of the epicycloids of the planetary orbits around the Sun, reflected proportionality between sense perception and an efficiently unseen physical principle that always caused the same relationships between the Planets, the Sun and the Earth to occur. Pythagoras then had to come to the most truthful, but unbelievable, conclusion that it was the Earth, which was moving around the Sun, and not the Sun moving around the Earth.

The simple fact that the two apparent positions of the radius at **1-1'-E**, and **9-9'-E**, of **Figure 3**, indicate that the sun and the outer planets, Mars, Jupiter, and Saturn are in opposition only twice during their respective cycle, is a sufficient proof that there exists a universal principle of gravitation and harmonic ordering for the solar system as a whole, and that this principle is based on proportionality, and not on the belief that the Earth is at the center of the world. In other words, the geometrical nature of the epicycloidal motion is so well ordered, even when it is deformed, that if merely two of the positions of the **INVISIBLE ARM** of each of the three planets, Mars, Jupiter and Saturn, are observed to be directed toward the Earth, cycle after cycle, at the same time that they are directed towards the Sun, it is sufficient to conclude that all other positions which are directed away from the Earth during the rest of the time, must be, in fact, directed toward the sun. That is how the lies of the deformed shadows of our sense perception in relationship with a non-visible principle of universal harmonic gravitation of the planets, reflect the truth of Heliocentrism. This is how you can derive truth from lies.

Note, on the other hand, that observations of the inner planets of Mercury and Venus yielded different results. The center of their motions around which they appear to oscillate is also entirely in the direction of the Sun. While Mercury appears to oscillate from 16 to 29 degrees from the Sun, during a period of about 88 days, Venus appears to oscillate at about 45 degrees, on each side of the Sun, during a period of about 225 days. The ancient Egyptians, the Chinese, as well as the Hindus also made these observations as far back as 3,000 BC, and were able to determine the ordering of the weekdays from them. See if you can figure out the reason for the apparent absurdity of the weekdays: Soleil, Lune, Mars, Mercure, Jupiter, Venus, Saturn.

This must have been a very exciting discovery for Pythagoras, because, in each of those observations, the three outer planets seem to come to a dead stop for a significant amount of time, as if to alert the observer and warn him: "Hey, wake up! There is a crucial discovery to be made here." Thus, the **INVISIBLE ARM** of Pythagoras

demonstrates that the {*Solar Hypothesis*} is geometrically constructible, for all of the planets, from the vantage point of only two yearly observations for each of the outer planets, and can be made by any astute ancient astronomer from the Sphere of the Earth concentric with the Celestial Sphere.

GRAVITATION AND THE THREE-BODY PROBLEM.

Let's look at the same problem in a different way: "How do we know this Pythagorean construction reflects the true motion of the heavens?" The **INVISIBLE ARM** of Pythagoras has implied the existence of three different motions. The first motion was a circular motion, which represented the fictitious pathway of the planets, Mars, Jupiter, or Saturn, moving around the Earth, and which was marked in **Figure 3** by numbers **1, 2, 3, 4, 5, 6, 7, 8, 9**. The second motion was the epicycloidal motion of the same planets representing their apparent pathways, also around the Earth, and marked by numbers **1', 2', 3', 4', 5', 6', 7', 8', 9'**. Neither of these pathways, taken separately or together, is real, and Pythagoras knew that. They are both lies as Kepler demonstrated the sophistries of Ptolemy, Copernicus, and Brahe in his {*New Astronomy*}. However, the two motions taken together are actual reflections of deformed shadows showing how the lies point to the truth, by suggesting a third motion, which is not visible. In other words, we are dealing here with three motions, a fictitious motion, an apparent motion, and an invisible real motion.

The great merit of Arago's pedagogical constructions for Jupiter and Saturn, which are replicas of Kepler's model for Mars, resides in the fact that it allows you to think about these three motions together as a single one; that is, as the single motion of an invisible sweeping and rotating arm, one end of which points to a planet, say, Jupiter, which appears to be going around the Earth, and is visible only at night, the other end points at the Sun moving along the ecliptic, which is visible only during the day, and the third motion is the rotating of the arm as a whole, which reflects the motion of the Earth, which is invisibly rotating and orbiting around the Sun. Viewed from that triple vantage point, the arabesque of the prograde and retrograde motion of Jupiter is merely the effect of the orbiting motion of the Earth around the Sun with respect to Jupiter. The Solar Hypothesis becomes fully discovered when you are able to locate the principle expressing the proportionality of these three motions implied in the **INVISIBLE ARM** of Pythagoras.

The sweeping and rotating **INVISIBLE ARM** has the effect of acting as the metaphor of the harmonically proportional relationship of a triple motion between: 1) the observed Planet with respect to the Earth; 2) the same Planet with respect to the Sun; and 3) the Earth with respect to the Sun and that planet. In other words, when the Earth and the outer planets are on the same side of the Sun, their motions are in the same direction. However, when the Earth passes on the other side of the Sun from that planet, the motion of the planet appears to be moving in the opposite direction. Between these two directions there is an apparent stationary point where the observed planet appears to stop moving altogether, and that is when the Earth passes on the opposite side of the Sun with respect to that planet. Thus, Pythagoras was able to establish the motion of the Earth

around the Sun by realizing that the back looping of a planet simply meant that the Earth was passing from one side of the Sun to the other with respect to the planet. This **INVISIBLE ARM** is nothing else but the shadow of the curvature of the astrophysical relations between the earth, the Sun and the outer planets. Thus, the three-body problem is resolved in such a way that the *{lies}*, which they make up, reflect harmonic recurrence that causes them to be constantly proportional to one another. This is the anomaly of the *{opposition}* that Kepler developed extensively in his *{New Astronomy}*. Now, let us see the LYM animation on the subject.

FIN October 25, 2006