A pedagogical experiment in universal history PART I

**THE EGYPTIAN SCIENCE OF SHADOW RECKONING
AND THE DOUBLING OF THE CUBE.
BY CONIC FUNCTION**

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**INTRODUCTION: HOW UNIVERSAL HISTORY CAN BE PROJECTED
THROUGH DISCOVERIES FROM PLATO'S CAVE**

Since we cannot assign dates to the imaginary events of ancient mythologies, simply because they never existed, we should establish a chronology of ancient time based on the relevant contributions to discoveries of principle and their ordering sequence in accordance with what Lyn called {*necessary predecessors*}. That is the only form of chronology that can be truthful about history and which would not get lost into the fog of sophistry represented by dateless fables and fallacies of composition. Therefore, the question is, for instance, when did the idea doubling the cube come into existence? Under what circumstance could such a problem arise, if at all, before the discovery of Archytas? What kind of knowledge would be required by the Egyptian predecessors of Archytas, for example, in order to ascertain that such a contribution to a discovery of universal physical principle was possible in the first place at such a remote period of time? Is it possible to construct the necessary steps leading to a discovery of principle without making that discovery of principle itself? These are some of the questions that I will attempt to answer in this class. And thus, the method of {*necessary predecessors*} that I will use will establish the historical specificity of Egyptian contributions to discoveries of principle in a way that should reflect the least action principle of universal history. Thus, the great proportionality that I will prove to you in this class will be: {*The height of the Great Pyramid is to its apothem as two mean proportionals are to the doubling of the cube*.}

On June 6, 2006, Lyn reported in the Morning Briefing that the way to understand the idea of the {*arithmetic-geometric mean*} was to solve the problem of the doubling of the cube of Archytas by using the ancient method conic function. He wrote his answer in response to Sebastien's question from France:

"{*Q: Yeah, Lyn, this is Sebastien from France. I had a question about the doubling of the cube. Because we worked on that a little bit, and concerning one thing, which is, when you want to go through that, you have to develop this idea of geometric mean, and arithmetic mean. And the problem is that often, people don't really understand this principle of geometric mean and arithmetic mean. Because it's like a*}

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definition coming on the table; and then you have to go through that, to understand the doubling of the cube - and people stop to these concepts. And I was wondering, because the fact is that looks like definition, actually.

And I was wondering also, we were discussing about music, also, and the fact that in Greek culture, science and music were very related. And the fact that all these ideas of geometric mean and arithmetic mean came from this idea of music. It was just something I was wondering. So, I don't know if you can elaborate on that , and my question is, because this reflection bring to me the idea that maybe geometry comes from music. I don't know if it's actually, but it's something very real for me.
So, if you can develop--.

"{LAROUCHE: All right, go back and – don't try to interpret it from the standpoint of the subject of geometric and arithmetic mean, as ordinarily discussed. That's something in there, but don't focus on that. Like the first question that came in today, on this question of the emotion in music. It's the same problem.
Now, the best way to do this, is again, like the Rabelais problem: you must situate your mind and your emotions in the right place, and you must put your ideas and your emotions together in the right place of reference.

Now, let's take this case of this arithmetic-geometric mean, not as such, but lets take the case of the doubling of the cube, as such. Now, you have a case, in which the last great praise of this work of Archytas in doubling the cube, in ancient times, was by Eratosthenes of Egypt. Now, Eratosthenes came from a culture which is a maritime culture, on the coast of what was then Egypt, and he studied and was a product of the Platonic Academy. He went back to Egypt as a tutor to the candidate for the pharoahship, and became the leading scientist in the world at that time.

Now, he was the one who praised the significance of the Archytas doubling of the cube, of the Delian problem. Now, how did he do that? How did he see this? Well, he had a predecessor who delt with conical functions. Ahhhh!!! Of course, the conic function is the key to the doubling of the cube. And always focus on that. It's the conic function.

Because what's the difference between a spherical or a {Sphaerics} function, a four-square function, such as a Euclidean function, and the ability to solve that problem? You cannot solve this problem with Euclidean geometry. You can only solve it within the domain of {Sphaerics}. Now, what's the key? The function of the conical function. That's the pivot of this.}"

"{Now}, you come forward. You come into modern times. You have the beginning of modern science as a reflection of Classical Greek science by Cardinal Nicholas of Cusa, beginning, in particular, that is, in written works as apart from his sermons, which are also written, but in written works in his {De Docta Ignorantia} and following writings.

Now, you have followers of Cusa, such as Luca Pacioli was typical – also friends of Nicholas of Cusa. You have also Leonardo da Vinci. And this leads to the great follower of Nicholas of Cusa, so professed, which is Johannes Kepler. And Kepler is the transformation.

Now following Kepler's work, in that same period, you have the work of Fermat, another great genius, who developed the concept of action, this concept of action, which was in terms of refraction/reflection, of quickest time. No, quickest time is very significant. First of all, you had Kepler who defined the idea of the infinitesimal, in terms of his discovery of gravitation. He was the one who posed the question of elliptical functions, not as ellipses drawn on a piece of paper, or on a blackboard, but of elliptical (functions), that is, a {physical} function which has a natural elliptical pathway. And he said: Okay, we've got to do two things. We've got to master a calculus which enables us to deal with this problem of elliptical functions, that is, the infinitesimal calculus, which Leibniz developed that. You have to deal, also, with what are called the elliptical functions. Now an elliptical function, as I said, is not something drawn on the blackboard or a piece of paper. : it's a rate of action, in which the rate of action, and the elliptical pathway, are coherent.

Then, from this, you get the follower is Pascal. And Pascal takes up the question of conic functions. Now much of Pascal's works obviously disappeared, because much of it was not published, and Pascal had enemies. But while Leibniz in the 1670's, was in Paris, as a protégé of Jean-Baptiste Colbert, he had privileged access to the household and library of Pascal. And some of the world he had access to has been lost since then, because of the destruction of some of these documents, particularly the private ones. I looked at much of what did survive back in the 1970's.

But, so, if you look at the significance of the doubling of the cube, from the standpoint of the view of this problem by Leibniz, and then by Gauss and Riemann, and Abel, and so forth later, and look at it from that standpoint, {now} it falls into place as a concept. And then, instead of trying to interpret the concept by arithmetic conceptions which might be interpreted in a different way, as most people interpret this question of arithmetic-geometric mean, and look at it from this standpoint, now you understand what Gauss means by arithmetic-geometric mean, which is {not} what the teacher at the blackboard will tell you.

So, I think the key here on this and related subjects, is to look at any subject of this type historically. How did the idea come into existence? What was the crucial point of discovery at which it was possible to understand this? Thus when you look at the conic functions as understood from the work of his immediate predecessors by Eratosthenes, {now} look back at what has been done by Archytas earlier, {now} it becomes clear to you.

So, focus on the conic function rather that just looking at the arithmetic-geometric mean. And look at the arithmetic-mean from a conic function in terms of a

characteristic {elliptical} function, as delt with by Abel, and delt with later by Riemann.}"

I think that is the best way to start this class because everything we need is included in both the question of Sebastien and Lyn's complete answer. What Lyn is emphasizing here is that the only competent method for rediscovering the crucial discoveries of principle of the past is to seek the {***necessary predecessors***} to those who have made such discoveries. Thus, {***necessary predecessors***} become the milestones to discoveries of principle throughout universal history.

Now, when you look into universal history, especially through the lenses of ancient Egypt and ancient Greece, and through Lyn's eyes, you find that you have very little documented evidence to go by and whatever small evidence you do have is so distorted by sophistry of historians and commentators that there seems to be no way to find the truth except through very small angles. So, look for those small angles that stand out like sharp anomalies. The point is that you cannot discover the truth of universal history through physical documented evidence alone. You must seek the truth with a powerful searchlight of the universal principle of love and justice that Plato and Saint Paul called love of mankind, {***agape***}.

Then, if you project through the continuity of universal history the different shadows of truth that were cast from the beacon of that principle, from ancient Egypt until today, you can begin to discern how the enemy of mankind has been using sophistry to distort these truths, dumb-down the youth of every generation, and capture the sleeping people of every period in history, all the way down to our present time. The discovery of the Khazar Kingdom that I have made recently, for example, is exemplary of this process.

At the turn of the 9th century, the Jewish Radanite ambassador-merchants of the Charlemagne and of Harun al-Rashid had created an ecumenical philosopher king, whose name was King Bulan, who converted to Judaism and ruled over the Khazar Kingdom. Those Jewish Khazar leaders had developed a {***gift-exchange***} form of economics that excluded usury and was completely the opposite of the Venetian usurious banking system. You see, during the Carolingian Renaissance, Jewish people were not usurious moneylenders; they were farmers, merchants, carpenters, blacksmiths, etc. They were not like the Nazi-banker, Felix Rohatyn, of today.

The Khazars and the Radanite merchants had control of an extensive Eurasian Landbridge, in which the three great religions, Christianity, Judaism, and Islam had banned the practice of usury. Their trade route went from the Northern countries, England, France and Germany to Khazaria, in the Eastern part of what is today Ukraine. Then, the Radanite route went through the Black Sea, the Caspian Sea, to Baghdad, through the Mediterranean Islamic countries, to India, the Far East, all the way to China and back.

You can imagine the deadly threat that such an ecumenical alliance represented for the usurious central bankers of Venice. Therefore, soon after the death of

Charlemagne and his three sons, and right after the death of Harun al-Rashid and his sons, Venice took a terrible vengeance against the Radanite and Khazar Jews. They were completely eliminated and all documentation about their ecumenical civilization was destroyed, at the exception of a few shadows, a few traces, that I will show you later. It was at that time that the Jews were systematically banned from having any normal job in every country of Europe, and were forced to become exclusively usurious moneylenders at the service of the Ultramontane Church of Rome and the Venetians bankers. The very first Jewish Ghetto was created in Venice during the 10th century, and from thence, Venice initiated a massive anti-Semitic campaign.

I will show you later, if we have some time, how there was recently discovered, in the North Sea and in the Baltic Sea, important numismatic evidence that prove the existence of this ecumenical civilization between the Jews, the Muslims, and the Christians, which had its high point between about 780 until 830 AD.

[**Figure 1**. **Map of Khazaria**.]

The tragedy here is that this Jewish State of Khazaria was completely eradicated by the Venetians and the Byzantine Empire. There exists no historical documentation to speak of about their existence, though the country, itself, lasted over two hundred years between the 8th century and the 10th century. I will send you a copy of my report probably next week, as soon as I have completed a first draft.

The point that I want to make about the discovery of the Khazar Kingdom, and what it came to represent for me, is precisely like a discovery of principle. Its reality has been hidden for centuries and could only be perceived through a few footprints that were left in the sands of the Baghdad Caliphate of Harun al-Rashid. But, because the universal physical principle of {*agape*} does exist throughout universal history, and because a single Islamic document of the period reported that the Khazar Kingdom had a Supreme court that ruled the country with seven judges, two Jews, two Muslims, two Christians, and one pagan, this became the singular anomaly that gave the whole story away about the ecumenical kingdom of the Khazars. When you find a singularity of that sort, don't

ever drop it. Hang on to it as if your life depended on it, and then, dig, dig, and dig some more, until you discover the whole truth. This is a special kind of singularity, just like the intersection of three surfaces in the Archytas doubling of the cube.

You see, a universal physical principle is everywhere present and you can always discover it through the cracks of the universe, through special congruence of events. That is how you discover that the greatest gift that God ever gave to man was to teach the principle of Plato's Cave as a conic transcendental function, that is to say, to teach someone the joy of breaking with his chains by means of {*agape*} and make him discover the principle of happiness at the highest level of ideas. This is what Plato wrote about the principle underlying that transcendental function in his dialogue, {*The Republic*}, and which he related to his method of axiom busting that he called dialectics. Thus, the idea of {*higher hypothesis*} at the end of Book VI**:**

"{*I understand, said he, that you are speaking of what falls under geometry and kindred arts.*
Understand then, what I mean by the other section of intelligible realities. I mean that which reason itself lays hold of by the power of dialectic [axiom busting], treating its assumptions not as absolute principles but literally as hypothesis, underpinnings, footings, and springboards, so to speak, to enable itself to rise to the principle of all, which admits of no hypothesis. After attaining that level, reason descends by taking hold of all of the consequences that depend on this principle, until the very last conclusion, without ever making use of any object of sense perception, but only by going from idea to idea, to end with an idea*.}"** {REPUBLIC, 511-B***.} That is the method of cognition by that we are going to be following throughout this class.

1. THE EGYPTIAN CONSTRUCTION FOR THE DOUBLING OF THE CUBE. HOW THE EGYPTIANS WERE ABLE TO DISCOVER THE DOUBLING OF THE CUBE BY CONIC FUNCTION AND SHADOW RECKONING

In order to find two mean proportionals between two extremes, which must be in a ratio of two to one, the Archytas construction for the doubling of the cube required a cone, a torus, and a cylinder. However, this Greek discovery was based on a more ancient construction known to the Egyptians who were able to solve that problem only with their knowledge of shadow reckoning applied to the science of {*Sphaerics*}. In other words, the Egyptians were able to find two mean proportionals between two extremes from their spherical construction of the Great Pyramid of Khufu-Cheops at Giza, and by way of astrophysical angular measurements alone. Anyone who tells you that the sphere does not have the ability to generate those two means by itself is misleading you. The following experiment will show you how much trouble you can cause by proving it by construction, that is, by reliving this Egyptian discovery of the doubling of the cube. [This is an experiment that could also be executed from Houston, Texas, which is at latitude 29.97 degrees.]

1. First of all, situate yourself on the plateau of Giza, in Egypt, at the time of the construction of the Great Pyramid, and imagine yourself projecting through the celestial North Pole A of a transparent sphere ABC, an imaginary light ray AB, whose length is ½ of the diameter AC of that sphere, and where BAC must form an angle of 60° degrees.
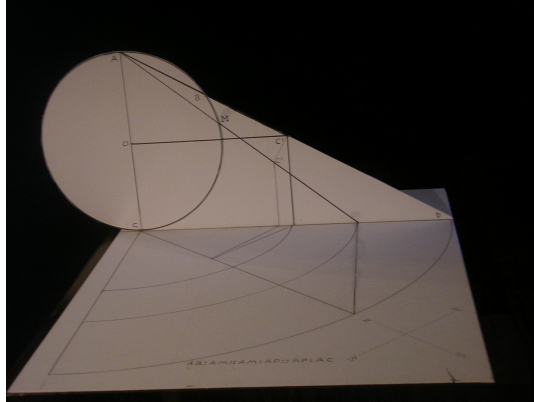
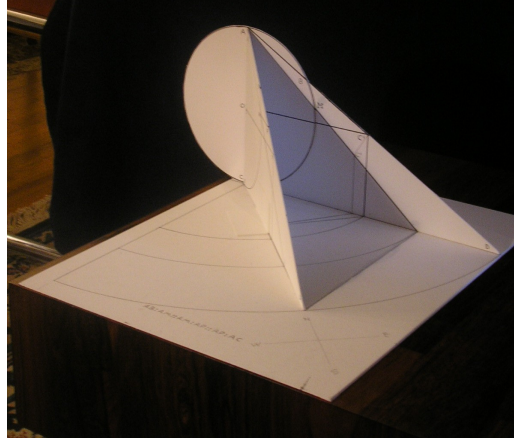2. [**Figure 2. The projection of the scalene triangle of 60, 30, 90 degrees**.]

    This is also the basic triangular building block that Plato used in his Timaeus for the construction of three regular solids. The triangle must have a hypotenuse twice the length of its smallest side.

    [Construct a baseboard 33 cm by 43 cm, and a scalene triangle of 18 cm x 31 cm x 36 cm. The triangle must be the perfect half of an equilateral triangle. Glue triangle ACD behind or in front of a circle of diameter AOC of 18 cm. Mark on the circle line AB, which is half the length of AC, and where the angle OAB is 60 degrees.]

3. The simple reconstruction of this important astrophysical event is crucial for two reasons. One, the projection of a ray from the celestial North Pole A to point B represents the angular elevation of the North Pole, which determines the latitude of the Great Pyramid of Khufu, on the plane of Giza. By doing this, the Egyptians had established their precise astrophysical location with respect to the moving Axis of the Universe as a whole. Two, this event also represents an elementary partitioning of the sphere into six equal parts, from which may be generated three of the five Platonic Solids: the cube, the octahedron, and the tetrahedron. By continuing the projection of that ray, AB, through the sphere and extending it to the level of the plane at D, the basis for the greatest astrophysical observatory in history is locked into position from that latitude of 30° degrees. (See Pierre Beaudry, {*Pythagorean Sphaerics: The Missing Link Between Egypt and Greece*}, {*21st Century*}, Summer 2004.) Thus, the science of

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astrophysical shadow reckoning began in Egypt by establishing the subjective position of the scientific observer with respect to the universe as a whole. So, from the standpoint of astrophysics, this projection is necessarily Egyptian in character.

4. Secondly, rotate the scalene triangle, ACD, by an angle corresponding to $1/8^{th}$ of the sphere (a biquadratic function), that is, by 45° degrees in the plane, making sure that the image triangle ACD' has pivoted on the hinge, AC.
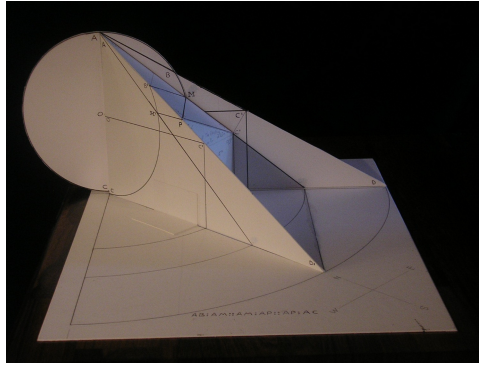

[**Figure 3. Projection of the 45-degree rotation of the original scalene triangle.**]

Here, an apparent insignificant non-visible event occurs, a minuscule anomaly, which causes a perplexing paradox. The angles formed between the two triangles, at the level of the plane and at the level of the hypotenuse, are axiomatically different. This axiomatic difference represents two different levels of power. This is the anomaly that locates, within a single shadow, the non-visible axiomatic difference of passing from the doubling of the square to the doubling of the cube.

[Construct a second scalene triangle of the same size and mark it ACD'.]

5.

Thirdly, project a second light source perpendicular to triangle ACD' at an angle of 66.5° degrees of latitude against it, as if from the Sun itself at the limit of the Ecliptic, and cast a shadow from such a preassigned position, at an angle of 23.5 degrees against triangle ACD.

[**Figure 4**. **Projection of shadow of the Great Pyramid of Egypt.**]

When D'CD forms an angle of 45° degrees in the plane, PAM forms an angle of 38° degrees at the level of the hypotenuse. This ambiguous transformation of a 45° degree angle into a 38° degree angle results in the creation of a right triangle, which corresponds to half of the meridian triangle of the Great Pyramid of Egypt. This confirms that the meridian design of the great pyramid itself embodies the solution for doubling the cube. This is the unique angle at which the shadow of the Great Pyramid determines the orthographic position of the sought for two mean proportionals for doubling the cube. This is the non-visible singularity which makes the leap between doubling the square and doubling the cube.

[Construct the five-sided solid shadow of the Great Pyramid. The angular base of the shadow must be 45 degrees and the angular summit of the shadow must be 38 degrees.]
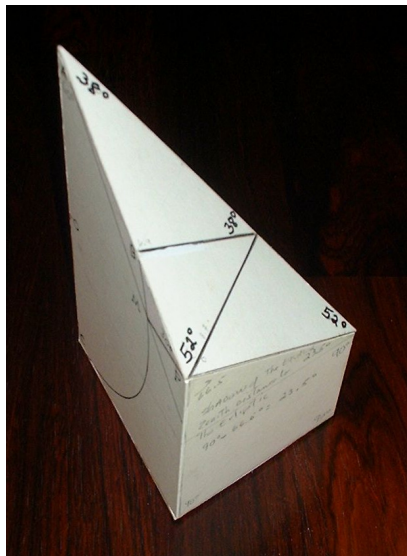
[**Figure 5. Solid shadow**.]

Thus, the construction is simply derived from a double conical projection: one from the Celestial Pole of the heavenly sphere, and the other from the angle of the Sun at the ecliptic. The two conic projections generate the frame-shadow of the Great Pyramid whose triangular meridian angle, PAM, shows that the two proportional segments, AM and AP, respectively represent the sides of cubes which double and quadruple the volume of a cube whose side is equal to AB. Consider that this is how the compass and the angle divider were invented in ancient Egypt as conic functions. Those are the two mean proportionals that had to be discovered between the two extremes AB and AC, which are in a ratio of two to one.

Therefore,   **AB : AM :: AM : AP :: AP : AC.**

Ironically, this Great Pyramid triangular frame-shadow of 90°, 52°, and 38° degrees, with its harmonically conjugated segments, AB, AM, and AP, not only reflects the power of successively doubling the cube, but also reflects the golden section and the Great Pyramid paradox of squaring the circle, and the principle behind the well-tempered musical system. Thus, {*the height of the Great Pyramid is to its apothem as two mean proportionals are to the doubling of the cube*}. The values that I have used for this model are respectively AB = 9 cm, AM = 11.34 cm, AP = 14.29 cm, and AC = 18 cm.

. Moreover, the shadow reckoning method of Egyptian Sphaerics represents the principle of constructability of the Great Pyramid in accordance with Khufu, the Regular Solids in accordance with Plato, the Doubling of the Cube in accordance with Archytas, and the constructability of the astrolabe in accordance with Hipparchus. Can you find a better way to celebrate this Egyptian discovery than by determining, from the ancient Egyptian calendar of 360 days, at what day of the year such an angular shadow of the Great Pyramid would have been cast at high noon?

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