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## RIEMANN'S ANALYSIS SITUS, CUSA'S METHOD OF UNFOLDING AND ENFOLDING, AND THE GAMA PRINCIPLE OF COMPOSITION

Reviewing an old discovery and rediscovering it anew

by Pierre Beaudry, September 7, 2023

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### INTRODUCTION

I wish to thank Richard Freeman for reminding me of a Riemannian connecting curve in his class on Bernhard Riemann<sup>1</sup> earlier this month, which actually demonstrates how a biquadratic axiomatic change of curvature takes place in the higher domain of epistemology.

I take this opportunity to recall how I was able to make a similar discovery of LaRouche's time-reversal principle about 27 years ago, albeit from quite a different vantage point, which included incursions into four different domains of knowledge, which I identified with the acronym **GAMA** (Geometry, Arithmetic, Music, and Astronomy).

In the opening paragraph to his doctoral dissertation, [ON THE HYPOTHESES WHICH LIE AT THE FOUNDATIONS OF GEOMETRY](#), Bernhard Riemann remarked: "It is well known that geometry presupposes not only the concept of space but also the first fundamental notions for constructions in space as given in advance."

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<sup>1</sup> [Mastering the Principles of Mankind's Development / The LaRouche Organization](#), August 2, 2023. Statement from Richard Freeman: "The ability to supersede the West's financial economic breakdown, and physically reconstruct the United States and develop the entire world, requires mastery of the principles of mankind's development. At the August 3 Fireside Chat, we will discuss Bernhard Riemann's 1854 Habilitation Paper, and Riemann and Lyndon LaRouche's idea of curvature and manifolds, critical to conceptualize the higher level of economic growth. Please read LaRouche's profound "[On LaRouche's Discovery](#)," which is attached here. Please join me."

After establishing his purpose for clarifying the axiomatic obscurities that such an *a priori* method of knowledge had left unresolved in geometry throughout history from Euclid to Legendre, Riemann began “constructing the concept of a multiply extended magnitude out of general notions of quantity.” Here is the comment he made in the opening page of his doctoral thesis:

“While I now attempt in the first place to solve the first of these problems, *the development of the concept of manifolds multiply extended* [Emphasis added], I think myself the more entitled to ask considerate judgment inasmuch as I have had little practice in such matters of a philosophical nature, where the difficulty lies more in the concepts than in the construction, and because I have not been able to make use of any preliminary studies whatever aside from some very brief hints which Privy Councilor Gauss has given on the subject in his second essay on biquadratic residues and in his Jubilee booklet, and some philosophical investigations of Herbart.”<sup>2</sup>

After reflecting for a while on his “*development of the concept of manifolds multiply extended*”, I began to wonder what would happen if someone were to apply Riemann’s principle to several domains of knowledge, simultaneously, such as in **GAMA**, for example.

As best as I can recall, my first response was to apply this principle to a process of biquadratic residues that Riemann had been studying under Gauss; but, having no knowledge of advanced mathematics, I abandoned the idea of investigating the mathematical domain of complex numbers any further. What I decided to investigate instead was the epistemological nature of this complex domain.

After I first began looking into the Gaussian concept of residues in *Disquisitiones Arithmeticae*, I was naturally tempted to find some cyclical geometric pattern that corresponded to what I thought Gauss had been investigating with biquadratic residues. I discovered that Gauss had not taken that

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<sup>2</sup> [Riemann Habilitation-Dissertation.pdf](#).

pathway, so, it was then, in 1996, that I began to first apply this **GAMA** principle to **Geometry** and **Arithmetic**.

### ARITHMETIC MODULAR WAVES OF BIQUADRATIC RESIDUES

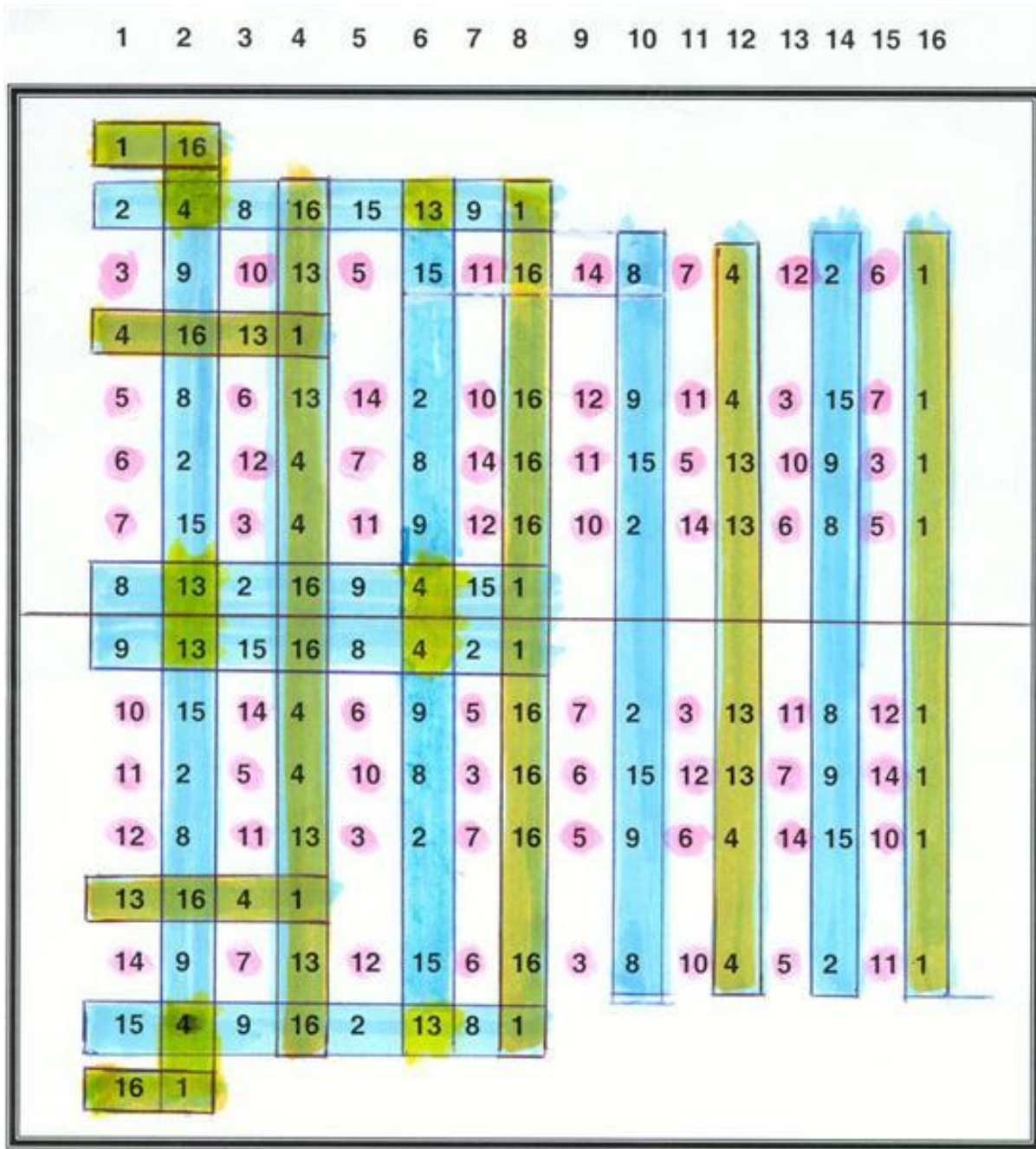


Figure 1. Chiral mirror image of all of the residues of modulo 17

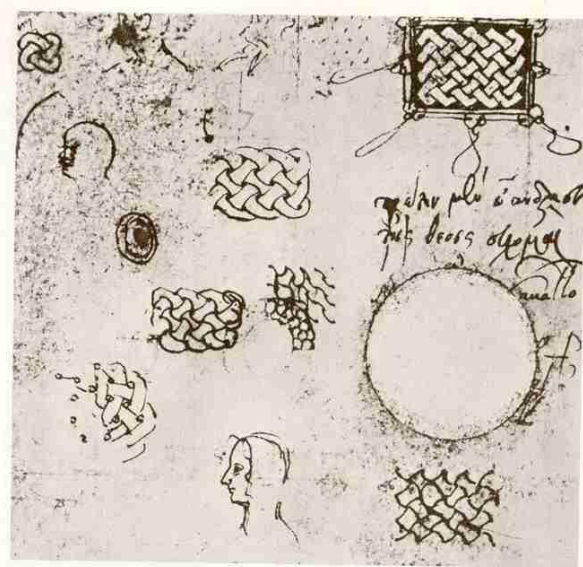
One of my first attempts at understanding the subject of biquadratic residues in the form of circular action came about when I began to examine the series of residues of 3 modulo 17 in the manner that I had ordered them in Figure 1.<sup>3</sup>

Note that the ordering display of quadratic residues modulo 17, [1, 2, 4, 8, 9, 13, 15, 16], forms a chiral mirror image characteristic of the dissymmetry of living processes, as in right and left handedness. Similarly, all of the primitive roots [3 and 6], [5 and 7], [10 and 12], and [11 and 14], taken two by two, are inversions of each other. I had no idea how this applied to modular arithmetic or to knot theory.

I did not pay much attention to quantities as such, but rather to the ordering of directionality. That is when I began to notice a more fascinating aspect of Leibniz's *Analysis Situs* circular action that French mathematician, Louis Poinso<sup>4</sup> (1777-1859) had applied to the residues of primitive roots, and that Euler had been unable to understand; that is, the geometry underlying primitive roots.

As a result, primitive roots began to represent in my mind the idea of change of curvature rather than magnitude and the idea of transformative circular action

instead of the idea of metrical measurement. I knew I was on to something, but I did not know what.



I began to realize that ordinary counting numbers were not based on magnitude but on doubly-connected circular action, similar to planetary orbiting systems. Then, I started to apply Leonardo da Vinci's fascinating design in the lower left side of Figure 2 to the residues of such ordinary counting numbers.

Figure 2. Leonardo da Vinci knots.

<sup>3</sup> See my 1996 video: [Time Reversal Lecture Pierre Beaudry 1996 - YouTube](#). See also my report of June 18, 2023: [ANALYSIS SITUS AND TIME-REVERSAL CAUSALITY IN TEMPORAL ETERNITY](#).

<sup>4</sup> See my report: [FUSION POWER IS NOT DEMOCRATIC](#), section 4- THE ANALYSIS SITUS UNDERLYING ORDERING OF PRIMITIVE ROOTS.

After a few failures in attempting to understand how counting numbers related to cycles of action instead of magnitudes, I succeeded in applying Leonardo's bottom left knot design to the first series of 3 as primitive root of 17. The result is in Figure 3.

### APPLYING THE GAMA PRINCIPLE TO GEOMETRY AND ARITHMETIC

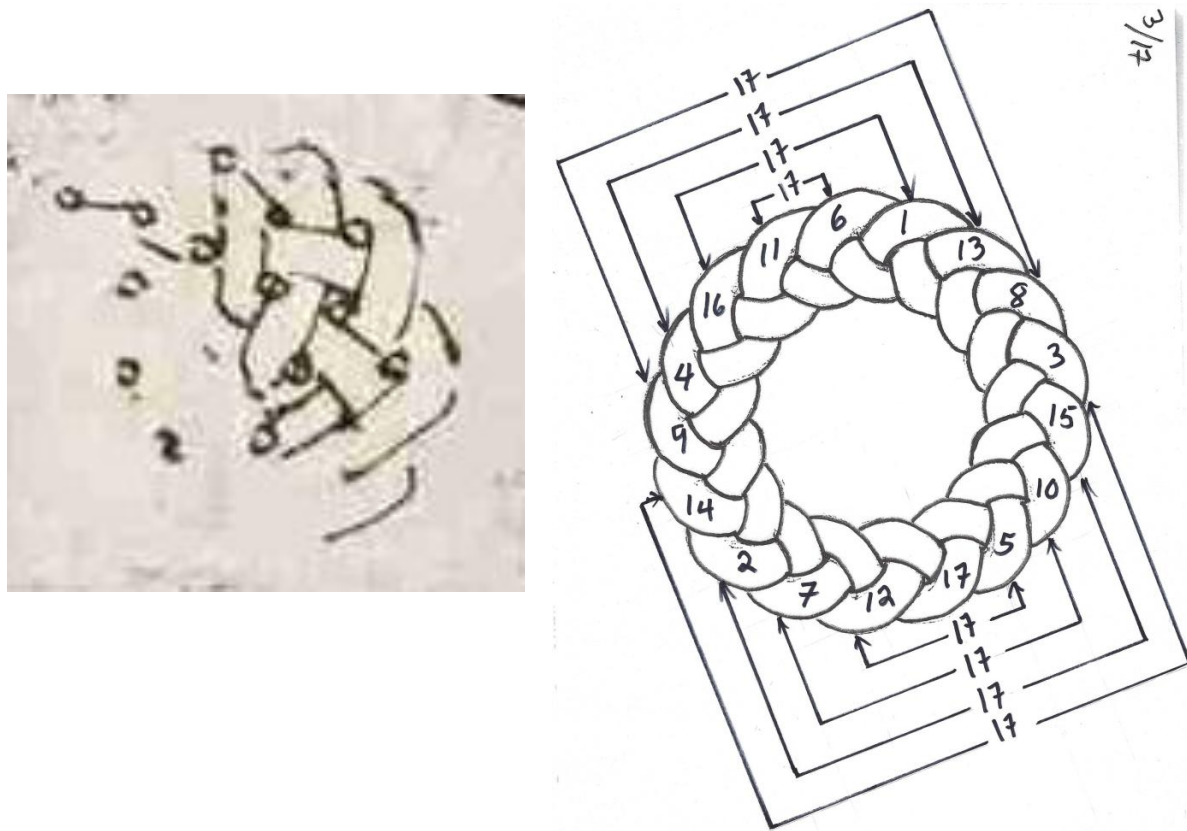


Figure 3. Leonardo's design and the triply-connected modular wave of 3 as primitive root of 17.

Louis Poincot was correct. All I had to do was to apply a doubly-connected circular action to a geometrical wave motion pathway and measure such a motion with ordinary counting numbers in such a manner that the circular results correspond to what the Theory of Numbers calls a primitive root:

*Construct a doubly-connected modular wave of 3 modulo 17. Start counting the waves from 1 to 3 repetitively until you have completed the following series of residues: [3, 9, 10, 13, 5, 15, 11, 16, 14, 8, 7, 4, 12, 2, 6, 1.]*

Imagine this doubly-connected power wave to be a sort of Riemannian “anchor-ring” or torus pathway which begins with 1 and ends by going back to 1, after having gone through the residues of all the powers of 3 modulo 17. How can such a complex ordering of numbers be geometrically so simple? The whole process is ordered by circular action alone without having to make any calculation! The interesting irony of this case, however, is that the counterclockwise wave action counted along the rim of the braids also generates the four biquadratic residues of 17; that is, [4, 16, 13, and 1]. That seemed rather strange to me until I realized that all four biquadratic residues were also located as a fourth power of the total series.

The 16 residues of the Poloidal/Toroidal ratio  $3/17$  are 3, 9, 10, **13**, 5, 15, 11, **16**, 14, 8, 7, **4**, 12, 2, 6, **1**. Note how all of the numbers of Figure 3 are well ordered as reciprocals of 17, starting with [16-1] and ending with [3-14]. Follow all of the numbers by rotating your finger through the braids clockwise with a repetitive motion of going from one residue to the next, step after step, following the 16 residues of 17 in accordance with the above preestablished ordering.

Thus, repeat again and again the series along the edge [1,2,3]; [1,2,3,4,5,6,7,8,9]; [1,2,3,4,5,6,7,8,9,10]; [1,2,3,4,5,6,7,8,9,10,11,12,13]; [ etc.]. This repetition also generates all of the residues of the powers of 3 in sequence with respect to 17 before it closes on itself. Where does such a preestablished harmony come from? It was as if biquadratic residues were meant to move inside of Leibniz's best of all possible worlds. How can this be? Can the best of all possible worlds be expressed by biquadratic residues?

Time went on until, finally, I realized that what I had discovered 27 years ago was based on the same underlying principle that Riemann had discovered by constructing his biquadratic surface of *Analysis Situs*.<sup>5</sup> But, before going into Riemann, let's examine this torus phenomenon a little further.

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<sup>5</sup> David Eugene Smith, *A SOURCE BOOK IN MATHEMATICS*, Dover Publication Book, New York, 1959, pp. 404-410.

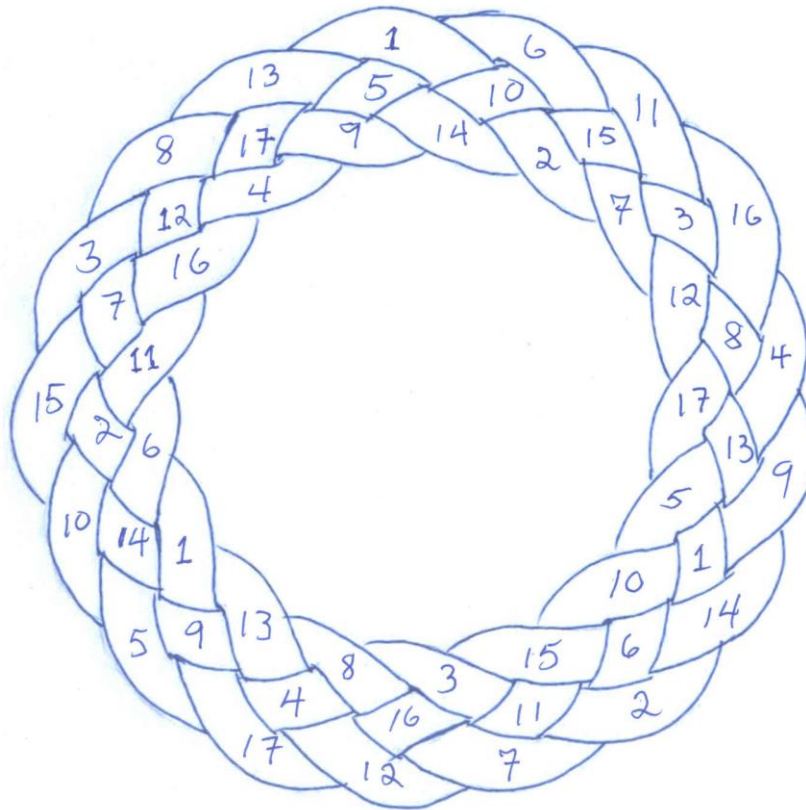


Figure 4. Triply-connected biquadratic Poloidal/Toroidal ratio = 4/17.

The clockwise rotation of Figure 4 only goes through the four biquadratic residues: 4, 16, 14, 1; however, the counterclockwise rotation generates all of the residues of  $P/T + 3/17$  along the rim braids. The limit has to be four because there are only four directions of circular actions changing at ninety degrees.

After several experiments, I soon realized that the application of geometrical circular action to numbers meant that the focus of the work on changing manifolds had to be on change in direction as opposed to change in magnitude. This had a lot of consequences, because the very nature of numbers was changed in the process. Magnitude is like money; it causes pessimism. What you want instead is interconnectedness, because that causes optimism.

You have to be willing to change the very nature of your measurement, which is, for example, what Rabelais insisted upon when he had Panurge come

upon the entrance of the Temple of the Bottle in Lanternland and had him read the Latin transcription that the Greek philosopher, Cleanthes, had composed as a hymn to God which stated: “*Ducunt volente fata, nolente trahunt*” (Fate guides the willing, but drags the unwilling.)<sup>6</sup>

### APPLY THE SAME GAMA PRINCIPLE TO A MUSICAL COMPOSITION

Next, apply the same biquadratic ordering to double Lydians in classical artistic composition and you will generate a similar process of transformation as in the case of Beethoven's Piano Sonata Opus 27, No. 2.



Figure 5. Beethoven double Lydians from Piano Sonata Opus 27, No. 2, first movement, measures 35-36

<sup>6</sup> [The Hymn of Cleanthes \(archive.org\)](http://www.archive.org), p. 13. The statement comes from the end of a hymn by Cleanthes, which states: “Lead me, Zeus, and you too, Destiny, To wherever your decrees have assigned me. I follow readily, but if I choose not, Wretched though I am, I must follow still. Fate guides the willing, but drags the unwilling.”



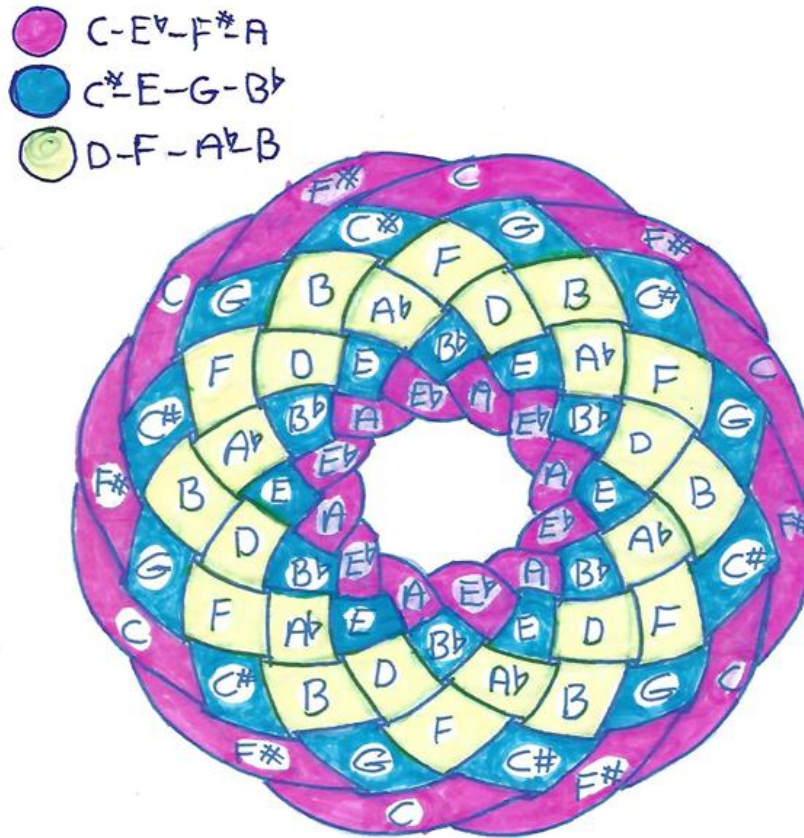


Figure 6. Triply-connected circular action of double Lydians intervals

Take a musical octave and divide it by a geometrical half and by half of the half again. What do you get? You get a double Lydian cluster or spiral action of four minor thirds which expresses a dissonant pathway of unresolved musical intervals which calls for a note that does not yet exist and that the future brings into existence as a resolution.

Isn't this also the function of destiny at work guiding the musician to the appropriate resolution to his investigation, and bringing him the answer to his prayer? However, only an optimistic state of mind can figure out why this is the case. This is the reason why former water-boy and boxer, Cleanthes, knew that his prayer to become a great scholar could be answered if he persisted in his study of philosophy.

If you follow with your finger the pathway of Figure 6, you will note that the Beethoven double Lydian measures 35-36 become resolved into the key of C# Minor, which is the key signature of his Piano Sonata Opus 27, No. 2.<sup>7</sup>

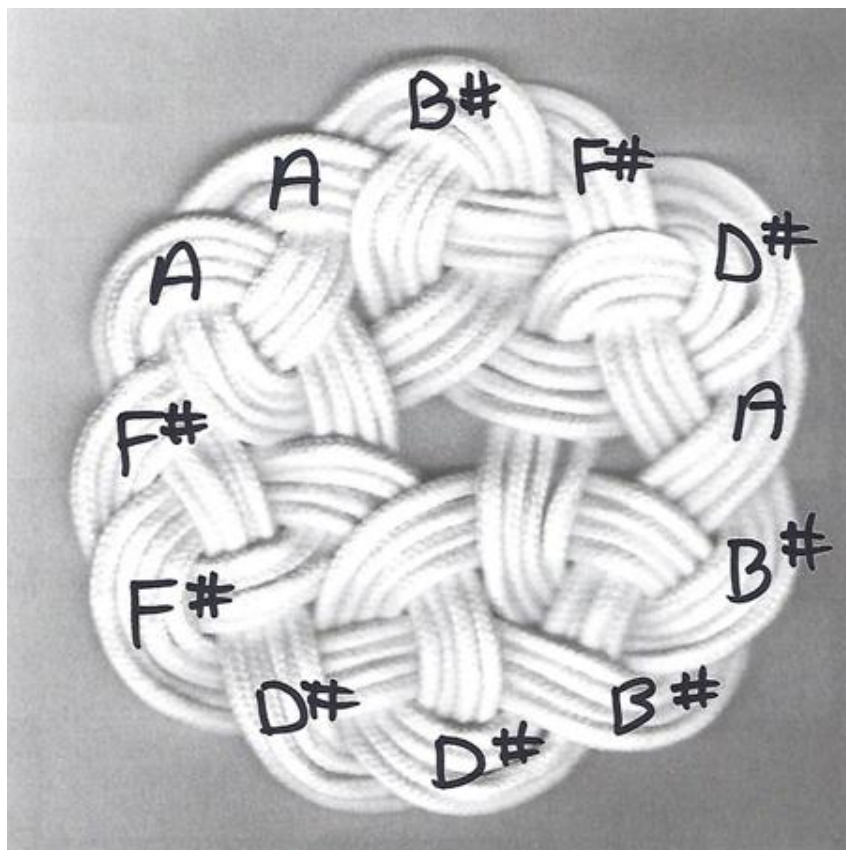


Figure 7. Forward and backward Beethoven double Lydians, Opus 27, measures 35-36

### APPLY THE SAME GAMA PRINCIPLE TO ASTRONOMY

“If you don’t take people into an area of intellectual life, with which they are not familiar, and if you cannot convince them to accept that which is not familiar, then you’re going to lose. So, no more practical arguments! Go to the point of reality; go to the point of scientific reality, exactly as Kepler did, in his design of

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<sup>7</sup> See my report in collaboration with Fred Haight: [THE POWER OF SELF-GENERATING THE FUTURE WITH THE THREE MUSICAL LYDIAN PREESTABLISHED HARMONIC SPIRALS](#)

the Solar System. That's where we start from. We explain everything in terms of the organization of the Solar System." Lyndon LaRouche, February 22, 2015.

When one investigates the principle of causality in the universe, one must take the time to study Kepler's mind and investigate how he was able to discover that there existed a missing planet in our Solar System even before any trace of it had been discovered. How was he able to do that? If you think that knowing the future ahead of time is strange, wait until you see how Kepler knew the past.

However strange this may sound, the question remains: how can one know that something existed in the past without discovering any trace of its having existed? The answer to this is to be found in temporal eternity, because causality, forecasting, and the realization of past intentions are all assembled into one and the same process which reflects truth, directionality, purpose, and timely intention in temporal eternity.

THE PLANETARY ORBITS AND THE EQUAL-TEMPERED MUSICAL SYSTEM							
by WILLIAM BOHDAN							
PLANETS	ASTRO. UNITS	Log. 10X	ADDED CONSTANT	MULTIPLE CONSTANT	CYCLE EQUIVALENT	MUSICAL CYCLES	PLANETS
MERCURY	(P) 0.310	0.5086	+2.496	x 128.8	255.97	C = 256	MERCURY
MERCURY	(A) 0.470	0.3279	" "	" "	279.25	C#=271.22	MERCURY
VENUS	(P) 0.715	0.1457	" "	" "	302.72	D = 287.35	VENUS
VENUS	(A) 0.725	0.1397	" "	" "	303.49	Eb =304.44	VENUS
EARTH	(P) 0.983	0.0074	" "	" "	320.52		EARTH
EARTH	(A) 1.017	0.0073	" "	" "	322.42	E = 322.54	EARTH
MARS	(P) 1.379	0.1396	" "	" "	339.46	F = 341.72	MARS
MARS	(A) 1.661	0.2204	" "	" "	349.86		MARS
ASTEROIDS	(P) 2.2	0.3424	" "	" "	363.32	F#=362.04	ASTEROIDS
ASTEROIDS	(A)3.6	0.5563	" "	" "	393.13	G = 383.57	ASTEROIDS
JUPITER	(P) 4.95	0.6946	" "	" "	410.95	Ab=406.37	JUPITER
JUPITER	(A) 5.45	0.7364	" "	" "	416.33		JUPITER
SATURN	(P) 9.006	0.9545	" "	" "	444.43	A = 430.54	SATURN
SATURN	(A)10.074	1.0032	" "	" "	450.69	Bb=456.14	SATURN
URANUS	(P) 18.288	1.2622	" "	" "	484.05	B = 483.26	URANUS
URANUS	(A) 20.092	1.3030	" "	" "	489.31		URANUS
NEPTUNE	(P) 29.799	1.4742	" "	" "	511.36		NEPTUNE
NEPTUNE	(A)30.341	1.4820	" "	" "	512.37	C = 512	NEPTUNE

Figure 8. Hypothesis for the Kepler ordering of the planetary system in tune with the Lydian divisions of the equal tempered musical system

Kepler's discovery of a missing planet was not something tangible to sense perception; it was a discovery of a universal dissonant causal change that took place millions of years ago. What is implied, here, is that what wasn't there between Mars and Jupiter was not there either between Mercury and Venus nor between Saturn and Neptune. What Kepler discovered was an epistemological gap, an axiomatic missing astronomical interval which separated the Solar System into two proportional parts, which, when he divided them by half again, generated the dissonant intervals of the four Lydian minor thirds of C-Mercury, Eb-Venus, F#-Asteroids, A- Saturn, and C-Neptune:<sup>8</sup>

Although he did not present them in this fashion, Kepler's illustration was even more stunning.

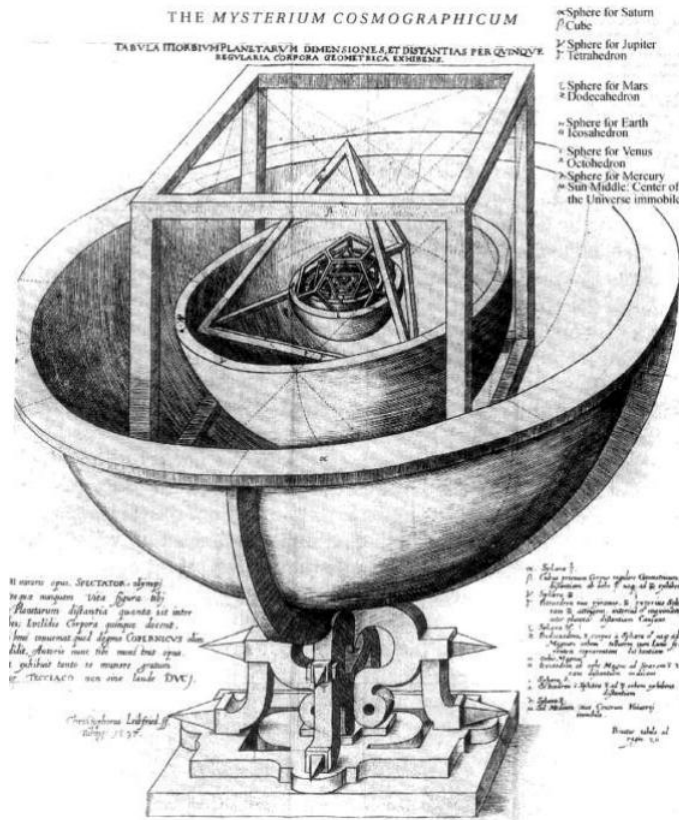


Figure 9. Kepler Platonic Solids Integration of the Planetary System

<sup>8</sup> See my report: [34. CUSA, KEPLER, BACH, AND CAUSALITY.pdf \(amatterofmind.org\)](http://www.amatterofmind.org/34_CUSA_KEPLER_BACH_AND_CAUSALITY.pdf), March 1, 2015.

What Kepler discovered was a dissonance, an anomaly that could not be explained otherwise than by some axiomatic transformation which was caused by the Solar System itself, and for the benefit of the Solar System itself, just as the voice register shift of the well-tempered musical human voice cannot be understood without transforming the human voice for and by itself.

Thus, Kepler rejected all of his previous false axiomatic assumptions about his calculations of the Solar System and replaced his old mathematical measurements with a new Platonic Solid proportionality that he described as follows:

“As an aid to memory, I give you the proposition, conceived in words just as it came to me and at that very moment: ‘The Earth is the circle which is the measure of all. Construct a Dodecahedron round it. The circle surrounding that will be Mars. Round Mars, construct a tetrahedron. The circle surrounding that will be Jupiter. Round Jupiter, construct a cube. The circle surrounding that will be Saturn. Now construct an icosahedron inside the Earth. The circle inscribed within that will be Venus. Inside Venus, inscribe an octahedron. The circle inscribed within that will be Mercury.’ There you have the explanation of the number of planets.”<sup>9</sup>

Now, you should be ready for Riemann’s axiomatic intervention into the same principle of transformation of changing your axioms of measurement.

### **THE ANTI-ENTROPIC RIEMANNIAN (N+1)-FOLD CONNECTED SURFACE AS A LYDIAN AXIOMATIC PARADIGM SHIFT**

The irony in studying Bernhard Riemann is that you don’t need to know complex numbers in order to understand his discovery of principle; all you need is some elementary skills in constructive geometry, a lot of patience, and a close scrutiny of the nature of negative curvature as Lyndon LaRouche understood and explained it. Remember what LaRouche said about the axiomatic change that was required in order to go from positive curvature to negative curvature. This is the

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<sup>9</sup> Johannes Kepler, *Mysterium Cosmographicum*, The Secret of the Universe, Abaris Book., New York, 1981, p. 69.

clue that Richard Freeman gave during his class, which sent me back to reexamine Riemann's discovery of principle more closely. Richard noted that LaRouche said:

"Remember our review of this matter in our study of Kepler's Snowflake paper?" Positive curvature is associated with non-living functions, such as the snowflake, which do exhibit entropy as an included characteristic. However, negative curvature requires a non-entropic ordering cohering with the limiting implications of the Golden Section.

"The point here is that in a universe super-densely packed with spherical bubbles, the envelope of all positive curvatures is a negative curvature. Thus, although some phase-states of our universe are entropic, other phase-states are not."<sup>10</sup>

One needs only to note the underlying axiomatic difference between the three images of Figures 10, 11, 12 and compare them with the singular image of Figure 13 below, in order to capture the conceptual difference required to make a true paradigm shift as LaRouche identified between the two domains of simple sense perception and the domain of creative imagination. Here is how Riemann describes his own process of discovery on this matter from his article:

*"On Riemann's Surface and Analysis Situs:*

[...]

*"An  $(n + 1)$ -fold connected surface will therefore be changed into an  $n$ -fold connected one by means of any crosscut which does not separate it into pieces.*

"The surface arising from a crosscut can be divided again by a new crosscut, and after  $n$  repetitions of this operation an  $(n + 1)$ -fold connected surface will be changed into a simply connected one by means of  $n$  successive non-interesting [non-inter-secting?] crosscuts. To apply these considerations to a surface without boundary, a closed surface, we must change it into a bounded one by the specialization of an arbitrary point; so

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<sup>10</sup> Lyndon LaRouche, "[ON THE SUBJECT OF METAPHOR](#)," *Fidelio* magazine, Vol. 1, No. 3, Fall 1992.

that the first division is made by means of this point and a crosscut beginning and ending in it, hence by a closed curve. For example, the surface of an anchor ring, which is 3-fold connected, will be changed into a simply connected surface by means of a closed curve and a crosscut.

“It will be decomposed into parts by any crosscut, and any closed curve in it constitutes the complete boundary of a part of the surface.

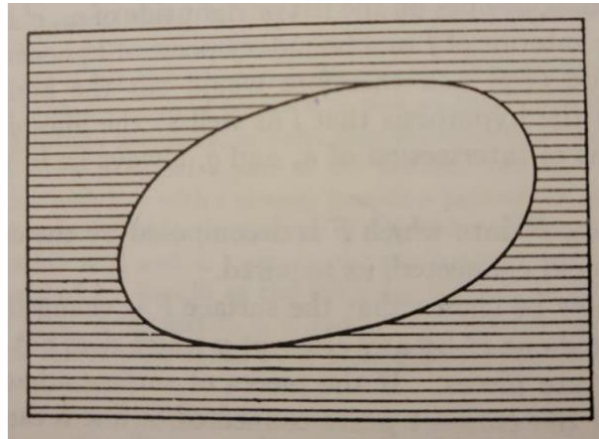


Figure 10. Simply-connected Surface

“It will be reduced to a simply-connected one by any crosscut  $q$  that does not disconnect it. Any closed curve in it can, with the aid of  $a$ , constitute the complete boundary of a part of the surface.

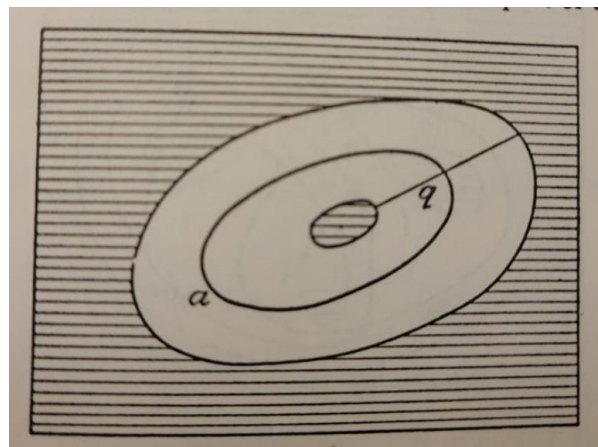


Figure 11. Doubly-connected

“In this surface any closed curve can constitute the complete boundary of a part of the surface with the aid of the curves  $a_1$  and  $a_2$ . It is decomposed into a doubly-connected surface by any crosscut that does not disconnect it and into a simply connected one by two such crosscuts,  $q_1$  and  $q_2$ .”

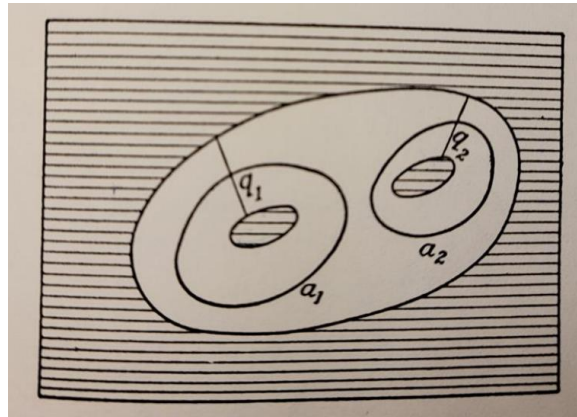


Figure 12. Triply connected

“This surface is double in the region  $\alpha, \beta, \gamma, \delta$ , of the plane. The arm of the surface containing  $\alpha_1$  is imagined as lying under the other and is therefore represented by a dotted line.”<sup>11</sup>

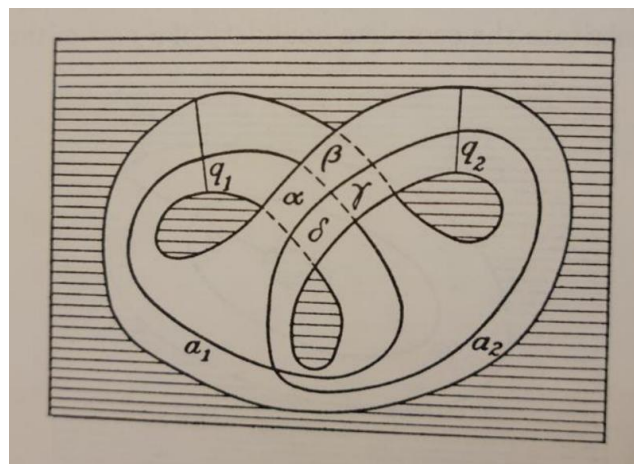


Figure 13. Connecting the curve

<sup>11</sup> David Eugene Smith, *A SOURCE BOOK IN MATHEMATICS*, Dover Publication Book, New York, 1959, pp. 404-410.



I am not sure I understand everything that Riemann is saying here. It seems to me that his assertion that “*An  $(n + 1)$ -fold connected surface will therefore be changed into an  $n$ -fold connected one by means of any crosscut which does not separate it into pieces*” applied to Figure 13 begins an exciting new way of composing a higher form of geometry beyond the span of the Euclidean-Lagrange *a priori* sense perception, which dominates the domain of science. Leibniz and Poinset had also questioned and resolved such an obstacle by initiating a new type of geometry of position that Leibniz called *Analysis Situs*.

What I didn't realize 27 years ago was that by following Riemann's pathway of Figure 13 with my right hand finger, I was actually going through his process of integrating his three previous manifolds (Figures 10, 11, 12), simultaneously, into a single higher manifold; that is, from a continuously changing manifold on a two dimensional plane to a three dimensional plane. Is that what Riemann's multiply-connected idea of an “ *$(n + 1)$ -fold connected surface*” is all about? I don't think so. I think it is a metaphor for his idea of multiply-connectedness.

How can one create a continuously growing change of manifolds which subsume one another? Only God can create such a universe. How does that work in a human world? Take the case of Figure 13, for example. It is definitely different from the other three (Figures 10-11-12), because it can change within itself and the other three cannot:

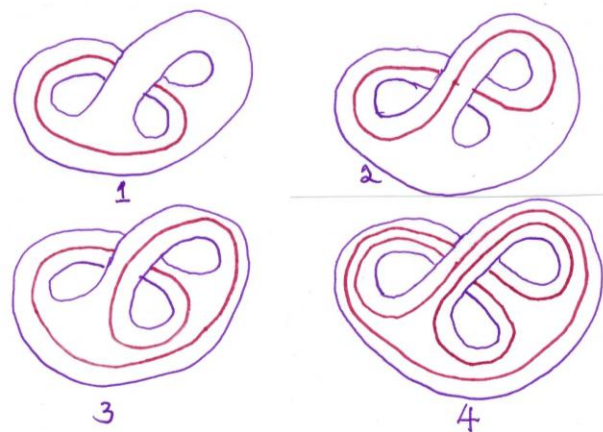


Figure 14 Metaphor of a multiply-extended manifold

Figure 14 shows that there are only four manifolds, as the design of the fourth one portrays the limit. Here, you are looking at the very essence of what happens when you make a discovery of principle. What Riemann has done for you is to show you the pathway of a new sort of surface that had not existed before and which exists only in the higher domain of your imagination. He is showing you the pathway to find your way through a maze, not in order to find your way out, but in order to find your way back to where you started from after a transformation. You only get points for ending where you started from.

That is a metaphor of a multiply-connected circular action which expands and yet closes on itself. This is the higher domain of the creative process that your mind must go to in order to find closure in any discovery of principle that you didn't know already existed. That is where the past, present, and future coincide in temporal eternity.

### **THE NEW BIQUADRATIC PRINCIPLE OF GAMA**

The Riemannian surface you just saw (Figure 13) cannot exist as a "real" three dimensional sense perceived object; yet, it is a conceptual object, a thought-mass, describing the process of an axiomatic change which takes place between different manifolds, and which is more real than if a brick had fallen on your head; because it is a performative mental function which says what it does, and does what it says, at the same time and in the simultaneity of temporal eternity.



Figure 15. Moebius strip

It is the directionality of the motion of multiply-connected circular action that becomes decisive here, and not the nature of the surface itself or its magnitude. The best way to reproduce the hidden discovery behind Riemann's Figure 13 is by rotating the directionality of its composition as a ribbon moving around as in Figure 15. The process of change in direction can be characterized as a Moebius strip which closes by turning on itself and reconnects the top side of the ribbon of one end back onto the underside of the other end.

Thus, the process of the Moebius strip forms a one dimensional manifold as a closed infinite surface. This is the most important singularity of the Riemannian discovery, because it calls for your mind to take a new step through such an inversion, which is to turn back to yourself up-side-down and change the way you used to look at the universe as a whole. Think of your mind as turning inside out and closing back onto the underside of itself. Don't worry, you can't fall; however, you will be stunned because the directionality of everything you know is going to be changed.

This new Riemannian geometrical conception of *Analysis Situs* not only supersedes the limited Euclidean perception in the domains of science and artistic composition, but, also, in the particular domains of epistemology, where each science, taken individually, no longer exists as such, but exists only in a new and higher form of interdisciplinary epistemological manifold, which I identified with the acronym **GAMA** (Geometry, Arithmetic, Music, and Astronomy).

The **GAMA** acronym is merely a useful means of bringing together the ideas that Plato proposed in order to clarify the four different aspects of God's universe, reason (intellection), understanding, belief, and opinion, which Plutarch interpreted as *extension, measurement, harmony, and motion*.

Moreover, Lyndon LaRouche gave this new Riemannian conception the crucial impetus with his investigation into such a multiple-valued function that he properly described as the generative process of a true human economic development process as coming from the future. It is this function of "*Time Reversal in Mathematical Economics*," which causes one to be "stunned" when

going through an axiomatic change. In his essay, “*The Essential Role of time-reversal*,” LaRouche wrote:

“‘When’ is the future? At what point in time? Similarly, what is the beginning-point in time from which to define the cumulative past with which the future is to collide? The answer to this seeming paradox was already known by Plato, by Augustine of Hippo, and, therefore, also, Thomas Aquinas: All time is subsumed under a general regime of simultaneity! The highest expression of change is that lattice of higher hypotheses which expresses the transfinite notion of hypothesizing the higher hypothesis. What underlies that lattice? That lattice is underlain by what Plato distinguishes as the Good. In the *analysis situs* of hypothesis, that Good is ‘simultaneously’ efficient in all times and places which might exist. Thus, in those terms of reference, the past and future, as hypothesis, are existent as efficient agency in each present moment.

“Stunning? Consider, and remove the false assumptions which might be attributed, mistakenly, to what has just been uttered here. Does this signify that each and all events are predetermined-‘predestined?’ No: recall the conditions of *analysis situs* which we have imposed, repeatedly, upon this report's content, from the outset. Everything we have said here on this matter, to the present moment of writing, is premised upon, and delimited to statements respecting the set of relations defined by the general principle of hypothesis, even as Riemann's 1854 habilitation dissertation expresses that Platonic principle as its pivotal foundation. The general set of relations defined by the principle of hypothesis is otherwise describable as relations within a hierarchy of available ‘pathways of change.’ The ordering principle underlying this hierarchy is cardinality, as we have indicated that principle of ordering of Riemannian physical space-time manifolds here. *It is in terms of efficient choices of pathways of change that the future acts upon the present. So, the choice of conception (higher hypothesis) reached with the conclusion of a Classical piece of motivic thorough-composition, determines the potentialities of each subsumed hypothesis, and, thus, of each interval of tolerable counterpoint, within the composition as a whole* (Emphasis added).

“Therefore, we must anticipate the implications of time reversal to be manifest in those instances [where] a change in choice of hypothesis, to one of relatively higher cardinality, is demanded of us, as by the eruption of an undeniable anomaly from within the domain of experimental physics.”<sup>12</sup>

The crucial characteristic of such a discovery of principle is *time reversal*; that is, a twist in physical space-time in your mind where everything becomes transformed and pulled upwards into a higher domain of thinking with your realizing it only after it has occurred. You know something is happening in your mind, but you don't yet understand it. This occurs only because you manifested a willing disposition to change.

What you don't see in the Riemannian Figure 13 is the process of that revolution which turns the surface into a biquadruply-connected imaginary surface of negative curvature, which is being formed by a single directed motion going along under and over itself. Let me explain this process by the following:

Go back to Figure 13: There, the mind is introduced to an axiomatic transformation which forces it to go up-side-down, that is, once by going along right-side-up; then, secondly, by closing back onto itself up-side-down into another quadruple rotation before turning around the whole of itself right-side-up again, back to its starting point. You have gone through a physical space-time inversion of temporal eternity by multiply-connected circular action.

By means of such a self-reflexive inversion of the mind, the whole process is like a higher dimensional Moebius curved pathway where three circular actions move in one direction while a fourth one moves in the opposite direction. The four motions are like the result of three minor third musical Lydian intervals rolled up into what Lyn called “motivic thorough-composition.”

Think of what this new interconnected curvature does to your mind. This is not like a woodpecker waking you up in the middle of the night by knocking at

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<sup>12</sup> Lyndon LaRouche, [\*The Essential Role of 'Time-Reversal' in Mathematical Economics\*](#), RIR Vol. 23, No. 41, October 11, 1996, p. 42.

your bedroom window; this is like a wave motion that is twisting you around and taking you into some new higher dimension of the universe that you have never been in before, and which is telling you that you will never go back to the way you were before. This is the higher Platonic and Pythagorean hypothesis of the creative domain of **GAMA**.

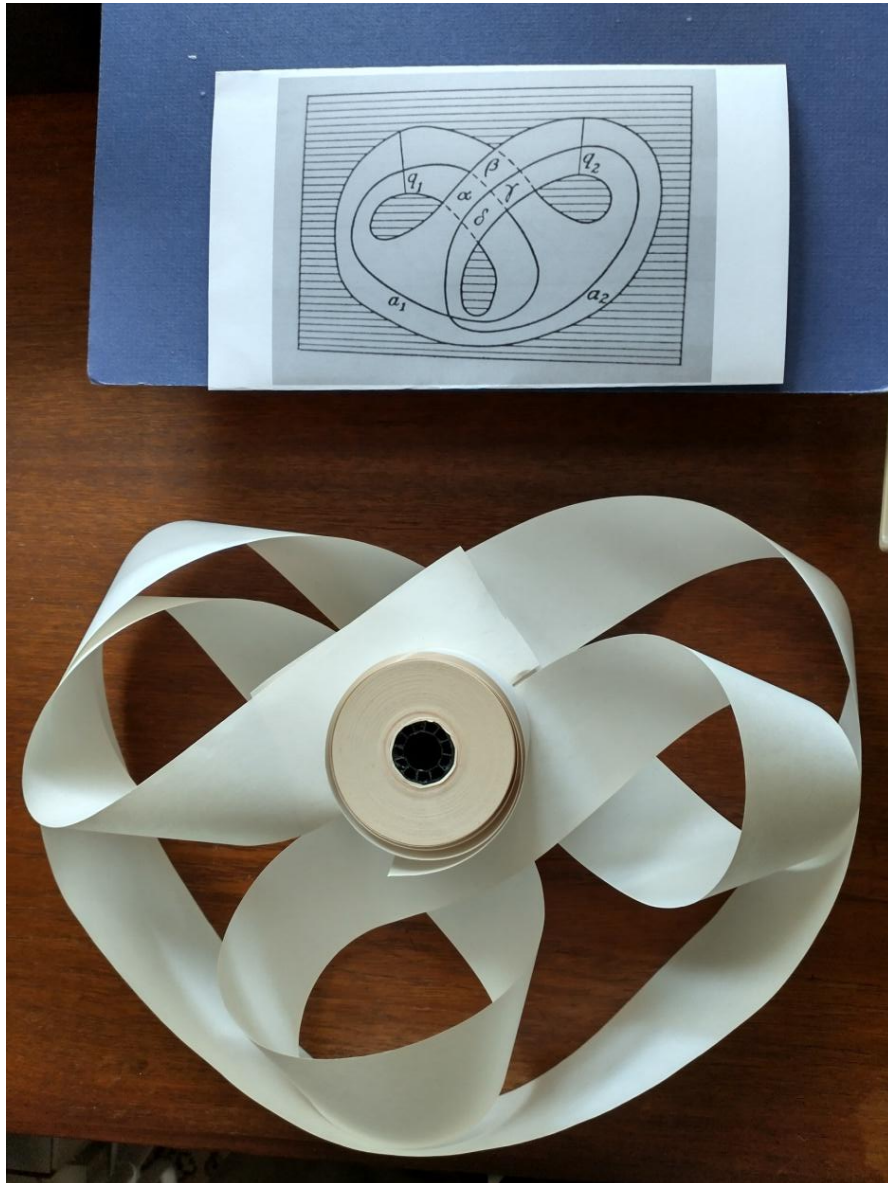


Figure 16. Reproduction of the Riemannian biquadratic surface motion with a calculating machine ribbon rotating continuously 4 times on its outside and 4 times on its inside.

If you follow the ribbon of Figure 16 closely with your finger, you will discover that your finger travels on both sides of the same ribbon, successively, completing a continuous biquadratic motion of 8 rotations on both sides of the ribbon before returning to your starting point. In other words, this is a one dimensional biquadratic imaginary surface which is bounded by 6 clockwise and two counterclockwise rotations (or *visé versa*) following the inside and outside of the same, continuous, and closed paradoxical surface of your mind.

The Riemannian surface orients your mind to discover the new and higher domain that connects the one you started from with a new one that you finished with. The result is the biquadratic change of curvature.



Figure 17. Three-dimensional view of Figure 16.

The fact that such a biquadratic change has three circular actions in one direction and one circular action in the opposite direction, without any discontinuity between them, suggests that such a  $4/3$  positive and negative curvature ratio is very similar to the musical Lydian sub-dominant effect of changing the nature of your emotions inside of your mind with a Beethoven Sonata. But, it goes further.

### **NICHOLAS OF CUSA'S METHOD OF CONSTRUCTING THE FIVE PLATONIC SOLIDS**

It was Nicholas of Cusa who established the isoperimetric method of such a double-sided circular action for constructing the Platonic Solids, as an idea coming in and out of God. However, he wanted us to think of creation as being like a clock where succession is without succession, like a physical eternity which moves both backward and forward within a unitary concept of time where no hour is earlier or later than the other. The concepts he used were *unfolding* and *enfolding*; that is, a doubly-connected motion which moved in and out from the cause to the effect by *unfolding* and from the effect to the cause by *enfolding*. Cusa wrote:

“When I find You to be a power that enfolds all things, I go in. When I find You to be a power that unfolds, I go out. When I find You to be a power that both enfolds and unfolds, I both go in and go out. From creatures I go in unto You, who are Creator—go in from the effects unto the Cause. I go out from You, who are Creator—go out from the Cause unto the effects. I both go in and go out when I see that going out is going in and that, likewise, going in is going out. (By comparison, he who counts unfolds and enfolds, alike: he unfolds the power of oneness, and he enfolds number in oneness.) For creation's going out from You is creation's going in unto You; and unfolding is enfolding. And when I see You-who-are-God in Paradise, which this wall of the coincidence of opposites surrounds, I see that You neither enfold nor unfold— whether separately or collectively. For both



separating and conjoining are the wall of coincidence, beyond which You dwell, free from whatever can be either spoken of or thought of.”<sup>13</sup>

The introduction of this method of double-sided circular action in temporal eternity is also the simplest and most effective method of generating the Five Platonic Solids, which can be found in my January 2, 2023 report: [GENERATING THE FIVE PLATONIC SOLIDS WITH NICHOLAS OF CUSAS METHOD OF FOLDING, UNFOLDING, AND ENFOLDING-1.pdf \(amatterofmind.us\)](#):



Figure 18. The Five Platonic Solids

<sup>13</sup> Jasper Hopkins, [NICHOLAS OF CUSA'S DIALECTIC MYSTICISM](#), THE ARTHUR J. BANNING PRESS, MINNEAPOLIS, 1988, Nicholas of Cusa, *De Visione Dei*, XI, p. 701.

It may appear that all five Platonic solids can be generated by *simple circular action folding*, however, that is not true. Only the tetrahedron, the cube, the octahedron, and the icosahedron can be generated by *simple circular action of folding circles*. *Simple folding* cannot be applied to the construction of the dodecahedron, which requires *unfolding* and *enfolding*.

What is required for the dodecahedron is a *higher hypothesis of doubly-connected self-similar spiral action*. Add to this method the following *higher hypothesis* that Lyndon LaRouche made, in 1983, about the life and death question of “the significance of the Golden Section.” He wrote:

“The rediscovery of what is known today as the isoperimetric theorem of topology, by Cardinal Nicholas of Cusa during the 15th century, was the central feature of Cusa’s work founding modern European science and setting a rigorous physical science into motion among Cusa’s successors. This rediscovery was indispensable for elaborating a rigorous understanding of the contents of Plato’s *Timaeus* dialogue, the elaboration on which the entirety of modern European mathematical science’s fundamental contributions depends.

“The three central features of that *Timaeus* dialogue are, first, the isoperimetric principle, the proof that only five kinds of regular polyhedra can be constructed in visible space, and a principle described by Plato as the *hypothesis of the higher hypothesis*. The formal problem which European science faced in attempting to comprehend the *Timaeus*’s contents, until Cusa’s work, was that this isoperimetric principle was present in the *Timaeus* only by implication, and that Europeans were burdened by the mistaken view that Plato’s principles of geometry were in agreement with the axiomatic, syllogistic structure of the version of Euclid’s *Elements* written more than a century after Plato’s lifetime, in Egypt.

“Cusa’s rediscovery of the isoperimetric principle led in the direction of the elaboration of a non-Euclidean geometry of the type of Prof. Jacob Steiner’s 19th-century elaboration of a synthetic geometry, a geometry

without axioms or syllogistic structures, based solely on the principle of construction starting only from the isoperimetric principle.”<sup>14</sup>

This takes us to the question of how to go beyond the apparent limitations of simple circular action into a higher non-Aristotelian and non-Euclidean geometry; that is, how can you discover the pathway of constructing the dodecahedron from the vantage point of a higher principle of Divine Proportion?

When you are investigating Cusa's action of *unfolding*, you are considering the result of such an action of Divine Proportion; that is, how the effect has been created. However, when you are investigating Cusa's action of *enfolding*, you are looking at the causal process which produced that effect; that is, the creative process itself. Those are the two most important forms of action to be considered together in this constructive method.

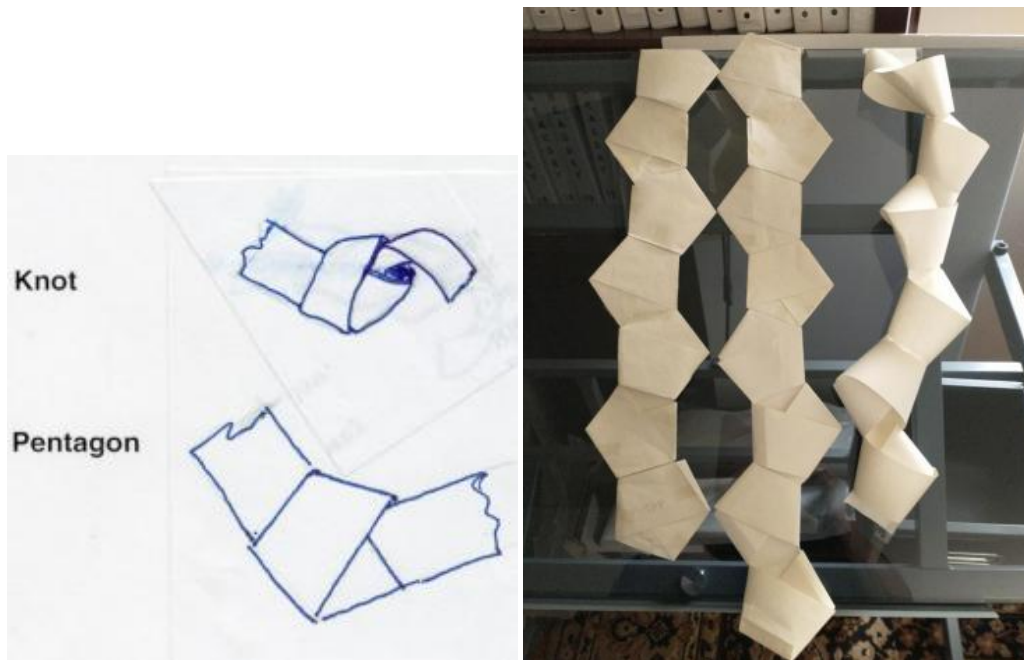


Figure 19. Generating the pentagon

Take the construction of the dodecahedron, for instance. The difficult part is located in the conception of the *unfolding and enfolding actions* which generate the

<sup>14</sup> Lyndon LaRouche, [A Matter of Life or Death](#), EIR, Vol. 49, No. 50, December 23, 2022, p. 39. Originally written in 1983.

Golden Section of Divine Proportion forming the pentagon; that is, in constructing from the effect to the cause by using what is created (the effect) in order to generate what is uncreated (the cause). Going back to the cause from the effect means that what has been caused is going back to its origin by time reversal.

The simplest and most effective way to generate the dodecahedron is to use 3 strips of 7 feet long rolled paper tape and attach all of them together, from end to end, to form 21 pentagons in a series of *enfolding*, *folded*, and *unfolded* Golden Section pentagonal-knots of 6/10 cm each. Each of the 21 Poloidal/Toroidal spiral actions made with a foot long strip of paper is *enfolding* back unto itself to form a continuous transcendental action of Divine Proportion rotation into a closed dodecahedron.



Figure 20. The spiral-enfolded dodecahedron (14 pentagons)



Figure 21. The triangular-folded icosahedron (20 triangles)

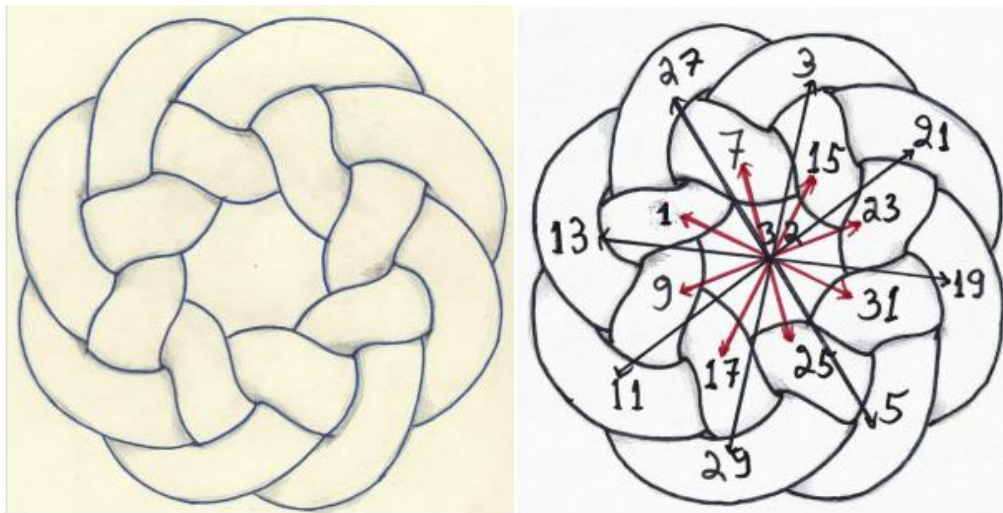
This pedagogical is a test of endurance and patience. By connecting the 21 pentagons into 14 continuous twisted and knotty faces of Divine Proportion, you are able to create a 12 sided dodecahedron through the generative process of the creative method of Nicholas of Cusa's *enfolding coincidence of opposites*. This means that you can now generate something full of beauty by generating the principle that makes it beautiful.

### CONCLUSION

As LaRouche indicated many times, Riemann's 1854 habilitation dissertation served as a Leibnizian pivotal point of temporal eternity for transforming his mathematical notion of time reversal as a new type of measurement for human economic development. What sort of transfinite measurement is that?

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16

1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31



29, 27, 25, 23, 21, 19, 17, 15, 13, 11, 9, 7, 5, 3, 1

17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31

Figure 22. Pathway of odd numbers in temporal eternity: [ANALYSIS SITUS AND TIME-REVERSAL CAUSALITY IN TEMPORAL ETERNITY.pdf \(amatterofmind.us\)](#)

The challenge, here, is for the reader to find the closure of such a principle of measurement by reproducing the numbers of Figure 22 (right) onto the drawing on the left, that is, by starting from 1 somewhere else on the figure. It can be anywhere else provided you follow the same ordering principle of odd numbers.

When you discover the ordering principle behind the odd numbers starting at 1, and you place them anywhere else in the biquadratic pathway (left) following the same ordering principle, you will have counted all of the 31 steps, 31 times, before coming back to 1; that is, you will have followed a process of space-time reversal inversion of *unfolding* and *enfolding* in temporal eternity. Is this what Leibniz meant by “preestablished harmony”?

All eight reciprocals of the 16 units of action balance the unity of the whole system and keep the extremes in check while they rotate around each other into a harmonious unity of space-time reversal. The crucial point is that once you reach 31 after 16 counts, make sure you continue counting up to 31 units of action, because this is where you will discover the inversion of the entire system which is going to bring you back to 1, thus establishing the process of reciprocity of *unfolding* and *enfolding* as being in temporal eternity.

Thus, numbers have not been created for the purpose of expressing magnitudes, but for the purpose of expressing cyclical resolutions of oriented measurements. So, replace numbers by ideas or by sovereign nation-state development relationships and you will be able to get a similar result among all human minds around the planet.

If you don't understand what I have presented, here, it simply means that you haven't yet examined your own underlying assumptions; and as a result, your mind cannot accept the fact that you have to do penitential tumbles of negative curvature with your ass up in the air while laughing silly at yourself.

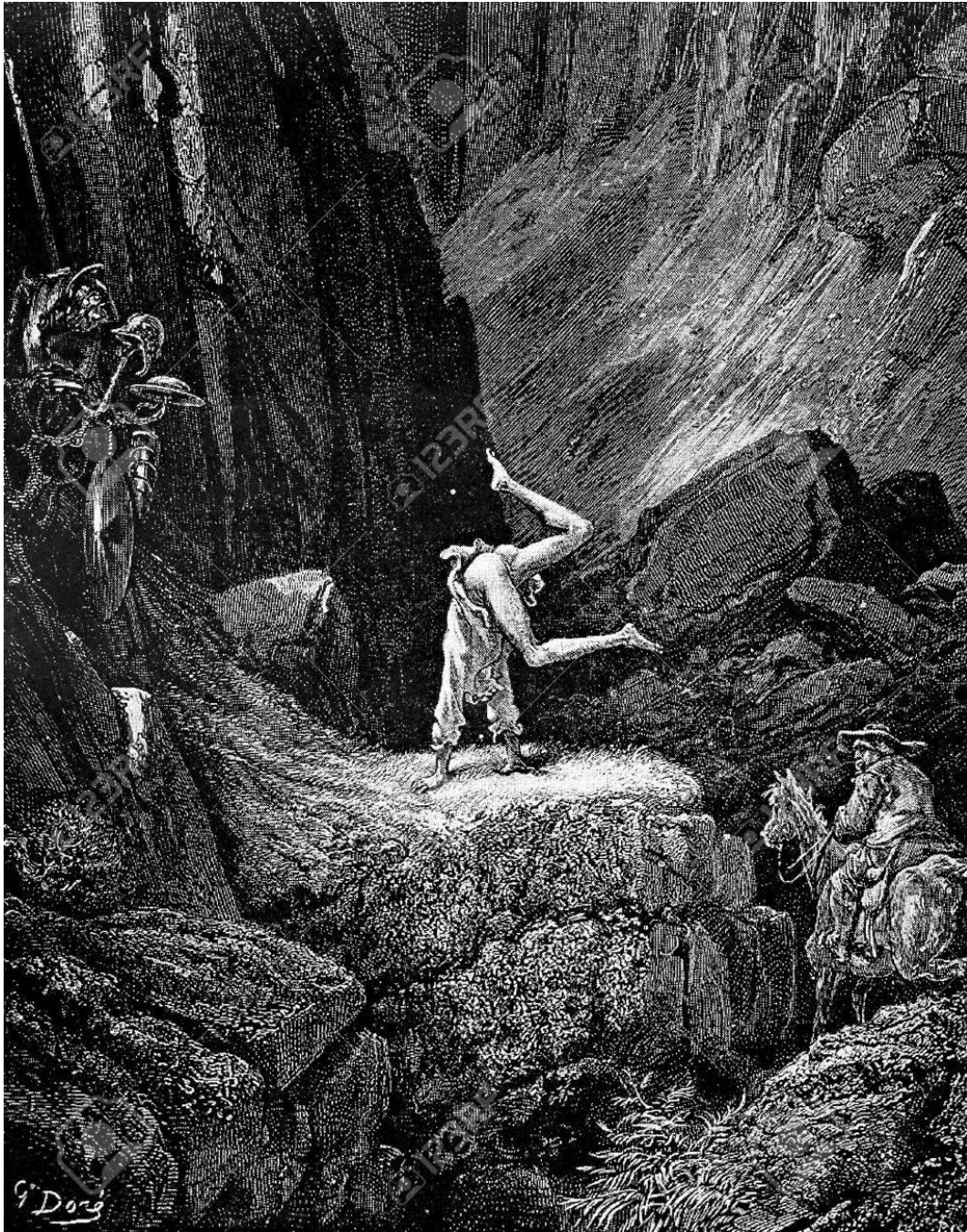


Figure 23. Don Quixote performing penitential tumbles, by Gustave Doré

Seriously, if you don't understand what I mean, don't be impatient. You will just have to read this report all over again, until you get it.

**FIN**