THE LONG AND SHORT WAVES OF EQUAL AND LEAST TIME

How LaRouche, Riemann, Poinsot, and Leibniz, can help you transform your mind by changing from measuring magnitudes to measuring change.

Pierre Beaudry 7/18/18

INTRODUCTION

In October 1996, I was introduced by Lyndon LaRouche to a fascinating problem of geometry of position (*analysis situs*) which led me to discover a geometrical application of what Lyn had identified as the *principle of axiomatic transformation of the human mind*. The characteristic of such a principle corresponds to what Leibniz and Bernoulli had identified as the *principle of least action*, or as the *principle of equal and least time*. A record of this discovery was made in video format: **Time Reversal Lecture Pierre Beaudry 1996**

The physical and epistemological discovery of principle that Lyn had developed from Riemann took me back to a number of discoveries that I had made, myself, during the years prior to that time and which had become totally transformed from the way I had understood them before. To my surprise, I had discovered *a way* to change the past; that is to say, I had discovered not only that everything I knew before had changed, but that *the way* I was thinking about everything else had also completely changed and I discovered how I had to modify my way of thinking in the future.

What had changed was that I no longer measured and evaluated things by their magnitude, but rather by the way they were being transformed; it was as if my mind had gone from evaluating things according to their weight and size to evaluating things according to their purpose and orientation. Geometrically *speaking, this meant that I was no longer counting things as quantities but instead as they were changing by intervals of least action.*

Furthermore, the way I was thinking was no longer in some abstract way independent of space and time; things became dependent on the situation they found themselves in and on the direction of motion they took. I no longer considered that things had self evident existences, in and of themselves: *things existed by changing and by being changed in the space and time they were moving from and into through least action.* In other words, I had lost the algebraic notion of empty space. Time was no longer the same either; the process of change was no longer going from the past to the future like clock-time, but instead backward from the future to the past, like a memory function of recollection. I began to discover that everything that had to be changed was located in the past, because the past as I knew it, was no longer valid. In other words, if I wanted to have a future, I had to change the past, because I was caught in a sort of paradoxical state where *the only future I saw in front of me consisted in changing everything that had existed before*.

From that day forward, my model became similar to the experiment that Socrates described to Simmias in the *Phaedo*: ***"…for if anyone should come to the top of the air or should get wings and fly up, he could lift his head above it and see, as fishes lift their heads out of the water and see the things in our world, so he would see things in that upper world; and, if his nature were strong enough to bear the sight, he would recognize that that is the real heaven and the real light and the real earth."***[1]

THE IMPORTANCE OF MEMORY WAVES IN A DISCOVERY OF PRINCIPLE

The discoveries I had made before the 1980s and the discoveries I made since then are very different; and the difference is that the ones before the 1980's are simply passive to be added on top of each other, while the discoveries that came afterwards are discoveries of principle; that is, they changed everything that existed before and during that time. The previous discoveries I had made had been

[1] Plato, ***Phaedo,*** 109e.

accumulating simply from past to future; the new discoveries worked in reverse by changing everything from the future to the past. (See Figure 1)

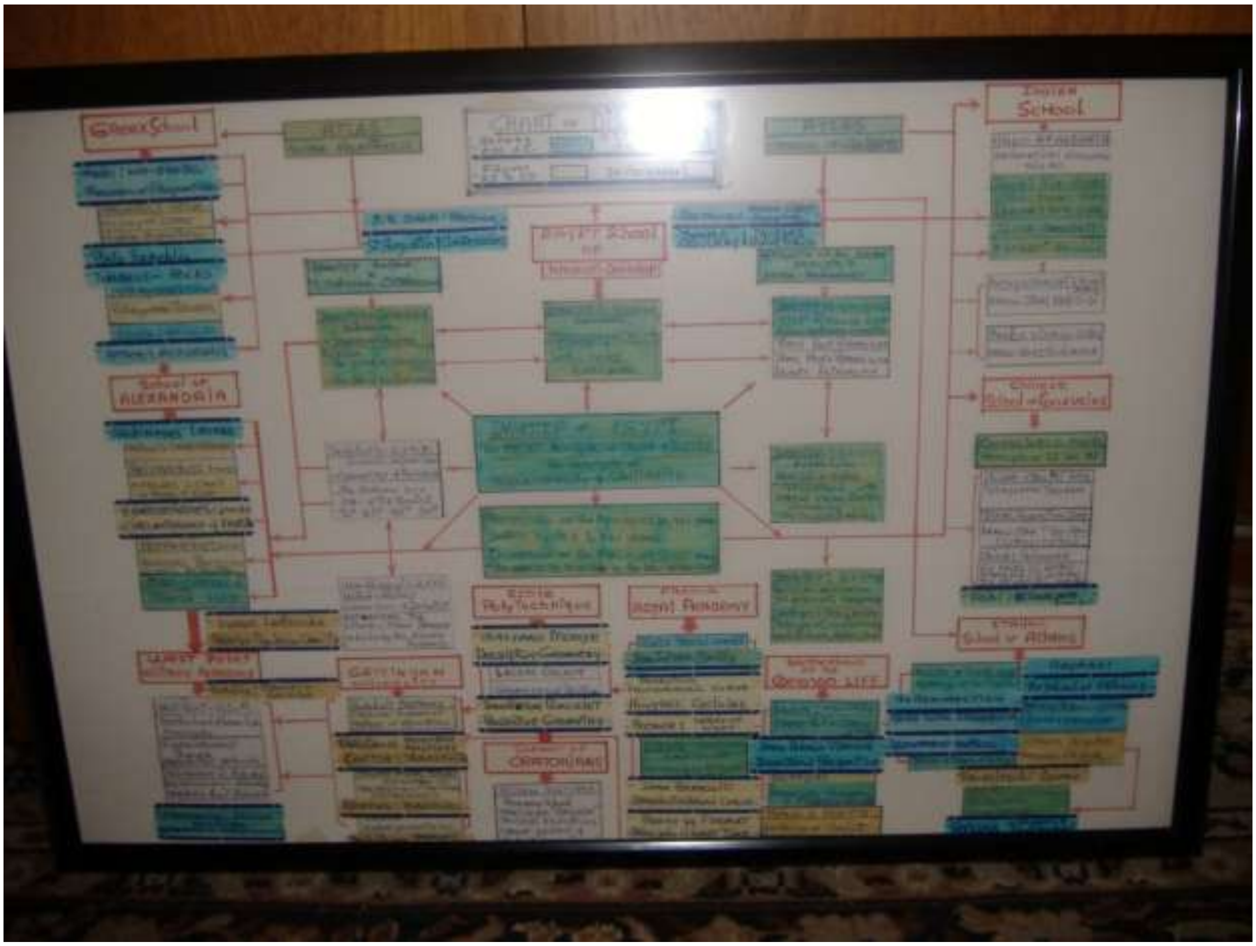


Figure 1 Chart of my discoveries of ideas during 30 years prior to the early1980's.

What triggered this axiomatic transformation in my mind was primarily Leibniz's letter to Huygens written on September 8, 1679, revealing that he had found a method which went far beyond his studies of "Quadratures, the inverse method of tangents, the irrational roots of equations, and the arithmetic of Diophantus." What Leibniz was referring to in that letter was his discovery of the geometrical method of *analysis situs*, which Carnot later called the "geometry of position;" that is, a geometry based on *measuring physical or mental change directly*. Leibniz described the new method briefly to Huygens:

"…but is spite of the progress which I have made in these matters, I am still not satisfied with algebra, because it does not give the shortest methods or the most beautiful constructions in geometry. This is why I believe that, so far as geometry is concerned, we need still another analysis, which is distinctly geometrical or linear and which will express *situation* [*situs*] directly as algebra expresses *magnitude* directly."[2]

"The shortest methods" means the shortest distance and the shortest time. That statement was just sitting there, waiting for me to pick up and generate from it a new epistemological paradigm shift. The discovery was as simple and as elementary as this. Leibniz had made the decision to break with his former axioms of algebraic magnitude. As he said: "Algebra is the characteristic for undetermined numbers or magnitudes only, but it does not express situation, angles, and motion directly." In other words, Leibniz was describing to Huygens the fact that he had broken with the previous underlying axiomatic assumptions of Euclidean geometry and was determined to establish a constructive form of geometry which "cannot fail to give the solution, the construction, and the geometric demonstration, all at the same time…"[3] Take the case of Figure 2 and consider this innocent little construction as representing a complete revolution in understanding the scientific method. This is also the condition under which Riemann broke with the axiom whereby our concepts relating to objects have existence independently of situation.

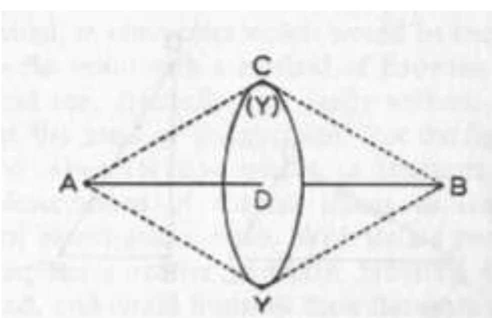


Figure 2 How to construct the circle: "Given three points A, B, C, to find a fourth point Y which has the same situation as C in relation to AB. I assert that there is an infinite number of points which satisfy that condition and that the locus of all these points is a circle." [4]

[2] Gottfried Leibniz, **Philosophical Papers and Letters**, Editor Leroy E. Loemker, Kluwer Academic Publishers, Volume 2, Boston, 1989, p. 248-49.
[3] Gottfried Leibniz, Op. Cit., p. 250.
[4] Gottfried Leibniz, Op. Cit., p. 252.

Leibniz constructed the circle by a simple form of circular action which rotated object C from two fixed and opposite ends, A and B. What you see in Figure 2 is simply a snapshot of the rotary motion of C generated from the *coincidence of opposites*. This was Leibniz's way of solving the Cusa's paradox of the *coincidence of opposites*.

Next, take this little experiment a step further, and a step higher. Imagine that you are you are sitting in a swivel chair which is rotating clockwise and you are rotating some object C which is attached to the mid-point of a string AB which you are also rotating clockwise with your two hands. What situation are you describing by that doubly-extended circular action?

This is the simplest demonstration of a rotating planet orbiting around a Solar System. This doubly-extended motion of rotation and traction generates the *analysis situs* of a torus. It may not have all of the complexities of a real planetary orbit, but it minimally illustrates the principle of the composition of motion which is involved in the orbit of the Earth around the Sun and gives a crude example of gravitation.

The experiment shows how to go from simple circular action to double circular action by opposing the two motions at right angle to one another. In Riemannian terminology, what this demonstrates is the axiomatic transition between a simply-extended manifold and a doubly-extended manifold. As the new added dimension changes the situation of the objects in space, these objects become dependent on their positions in space-time. Riemann explained this as an anti-Euclidean approach to geometry:

> "These conditions (the Euclidean assumption that lines are independent of position) in the first place can be expressed thus: that the measure of the curvature in every point is equal to zero in three directions of surface; and therefore the metric relations of the space are determined when the sum of the angles in a triangle is everywhere equal to two right angles.
>
> "In the second place if one assumes at the start, like Euclid, an existence independent of situation not only for lines but also for bodies, then

it follows that the measure of curvature is everywhere constant; and then the sum of its angles in all triangles is determined as soon as it is fixed for one triangle.

"In the third place, finally, instead of assuming the length of lines to be independent of place and direction, one might even assume their lengths and direction to be dependent of place. Upon this understanding the changes in place or differences in position are complex quantities expressible in three independent units."[5]

Next, imagine a case where the situation changes again, in a directed and ordered way, with the addition of a third circular motion. Such a triply-extended manifold would correspond to the Galactic motion of our Solar System. This is what Riemann described when he extended the concept of an n-fold manifold to an n+1 manifold:

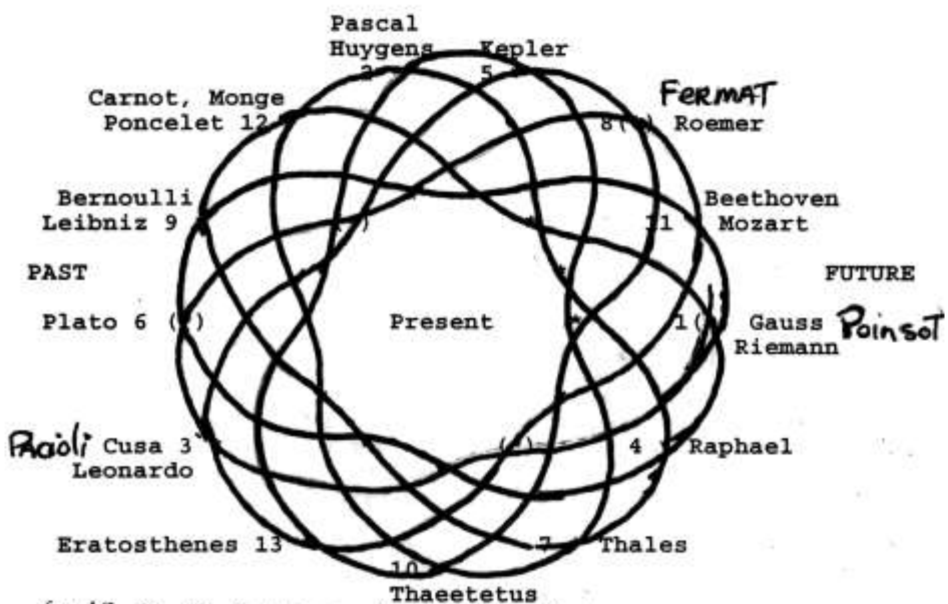
"In a concept whose various modes of determination from a continuous manifold, if one passes in a definite way from one mode of determination to another, the modes of determination which are traversed constitute a simply extended manifold and its essential mark is this, that in it a continuous progress is possible from any point only in two directions, forward and backward. . If now one forms the thought of this manifold again passing into another entirely different, here again in a definite way, that is in such a way that every point goes over into a definite point of the other, then will all the modes of determination thus obtained, form a doubly extended manifold. In a similar procedure, one obtains a triply extended manifold when one represents to oneself that a double extension passes over in a definite way into one entirely different, and it is easy to see how one can prolong this construction indefinitely. If one considers his object of thought as a variable instead or regarding the concept as determinable, then this construction can be characterized as a composition of a variability of n + I dimensions out of a variability of n dimensions and a variability of one dimension."[6]

[5] Bernhard Riemann, *On the Hypotheses which Lie at the Foundations of Geometry*, Source Book in Mathematics, by David Eugene Smith, Dovers Publication, 1959, p. 422.
[6] Bernhard Riemann, Op. Cit., p. 413-14.

Thus, the Riemannian epistemological transformation from an n manifold to an n+1 manifold is found in the Leibniz change from algebraic magnitude to Analysis situs.

ANALYSIS SITUS OF THE HIGHER HYPOTHESIS

How to go from a Eucledian manifold
to a Riemannian manifold?



6, 10, 8, 9, 2, 12, 7, 3, 5, 4, 11, 1

PAST

[6] Plato
[Ontological paradox]

[3] Cusa, Leonardo
[Isomerimetric Theorem]

[13] Eratosthenes
[curvature of Earth]

[10] Thaeetetus
[Five Platonic solids]

[7] Thales
[Thales theorem]

[4] Raphael
[School of Athens]

[1] Gauss, Riemann
[Biquadratic residues]

FUTURE

[1] Gauss,Riemann
[Biquadratic residues]

[11] Mozart, Beethoven
[Lydian modality]

[8] Roemer FeRMAT
[speed of light]

[5] Kepler
[harmonic field]

[2] Pascal, Huygens
[conics, isochronicity]

[12] Carnot, Monge, Poncelet
[projective geometry]

[9] Leibniz, Bernoulli
[Brachistochrone curvature

Figure 3 Discoveries of principle ordered according to a Riemannian doubly-extended manifold. See my **Time-Reversal Video**, October 14, 1996. **http://www.amatterofmind.us/video-class/.**

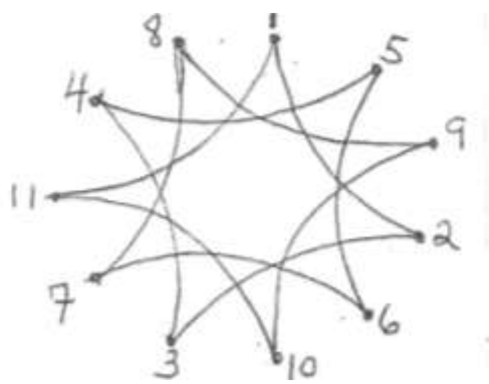
The irony here, however, is that the mind develops the same way as the Solar System did by composing discoveries of principle through a similar *geometry of position* in which each discovery causes changes to take place in every other discovery. It becomes necessary, therefore, that what exists can no longer be considered as independent of position and must necessarily change axiomatically each time a new dimensionality is introduced. Change becomes identical with change in position and direction by means of measuring through a complex motion.

However, when one considers that the curvature of physical space-time changes with each new discovery of principle, as in the cases of the change from positive curvature to negative curvature, and from what is unlimited to what is finite, then it becomes necessary that bodies no longer be considered as independent of position, because the change in position becomes identical with an axiomatic transformation. Thus, *new ideas, as in the case of physical things, become determined by the locus of change; that is, they become dependent on the situation of the manifold itself which becomes measurable only by means of intervals of least action. Then, the measure of curvature becomes everywhere discontinuous.* (See Figure 3)

HOW AN AXIOMATIC TRANSFORMATION TAKES PLACE

Lyndon LaRouche was the prime mover of this discovery, Leibniz and Poinsot provided the geometrical constructive means, and Riemann provided the confirmation that Leibniz was right. The primary condition for making such a discovery is to have the right disposition for it. The rest is nature's way. And, the right disposition is to fully despise the axioms that prevented you from making a hypothesis for the new discovery.

The apparent specific problem in my case involved a way to properly solve the geometrical nature of primitive roots in the manner that Louis Poinsot had resolved, quite beautifully, the problem of prime numbers by means of his theory of cycloidal polygons. He wrote:



““If you have N points arranged in a circle, and you join them from h to h, h being prime to N, you will necessarily pass through all of the N points before returning to your starting point, and you will necessarily have covered h times the entire circumference.” [7]

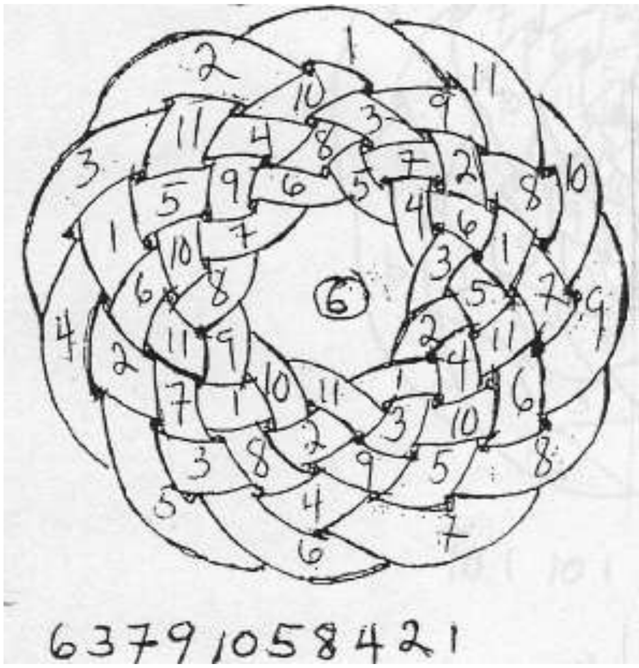
Figure 4 Poinsot theorem for prime number relationships.[8]

Take N to be 11 and the interval h to h to be 3. Thus, Poinsot demonstrates that when you joined all of the 11 N points such as a, b, c, d, etc., taken 3 by 3, into a rotation clockwise, you cannot return to your initial starting point 1 without failing to go through each and every points of N. This process establishes the most elementary geometrical ordering of prime numbers. To put this differently, Poinsot argues that when there is no common divisor, except for 1, between the number N and the *interval of action h to h*, all of the N points shall be covered by simply-extended circular action, and h shall necessarily be prime to N.

From here, one can jump to a higher dimensionality and hypothesize that what determines this elementary geometrical ordering of primes is the same principle which orders primitive roots by means of the *analysis situs* of the torus. The question therefore becomes: how do you go from the lower manifold to the next higher manifold? You cannot. You can only go from a higher manifold to a

[7] Louis Poinsot, **Réflexions sur les Principes Fondamentaux de la Theorie des Nombres**, Journal de mathématiques pures et appliquées, 1ere série, Tome 10,1845, p. 1-101.
[8] Louis Poinsot, Op. Cit., p. 46. See my report: **ANALYSIS SITUS OF WHOLE NUMBER RECIPROCITY AND HOW TO MAKE AN AXIOMATIC CHANGE**. 2/22/18.

lower one. The following theorem will show you how to proceed by ordering all of the primitive roots of any prime number. Now, let's reformulate the Poinsot theorem as follows:



If you have T points arranged in a torus, and you join them from P to P, P being a primitive root of T, you will necessarily pass through all of the T points before returning to your starting point, and you will necessarily have covered the entire circumference of the Torus the sum total value of the residues.

Figure 5 When T = 11 and P = 6, (6 being the first primitive root of 11), then, the sum total of least action poloidal residue waves is 55.

You can derive the series of residues 6,3,7,9,10,5,8,4,2,1, from the module of T = 11 simply by *counting each poloidal wave as an interval of action* whose value is P = 6. However, you can take a shortcut by taking the residue of a power to complete the cycle, thereby expressing least-time-equal-time. Each residue represents the number of waves you must count to obtain congruence among any three numbers.

The two Poloidal and Toroidal motions are paradoxically united together as a "*coincidence of opposites*," in accordance with Nicholas of Cusa's condition for introducing a higher dimensionality. This point is very important because one cannot reach out to a higher dimensionality without solving a paradox. It is the solution to a paradox which establishes the bridge between two successive dimensionalities. [9]

It was the solution to this problem that led me to go beyond the geometrical limitation of *simple circular action*. Originally, the perplexing question this problem posed to me was: how can cycloids cross the barrier of simple circular action by means of the "composition of two movements" as Personne de Roberval had identified in his original construction of the "roulette." [10] Therein lies the secret of discovering the *principle of equal and least time*.

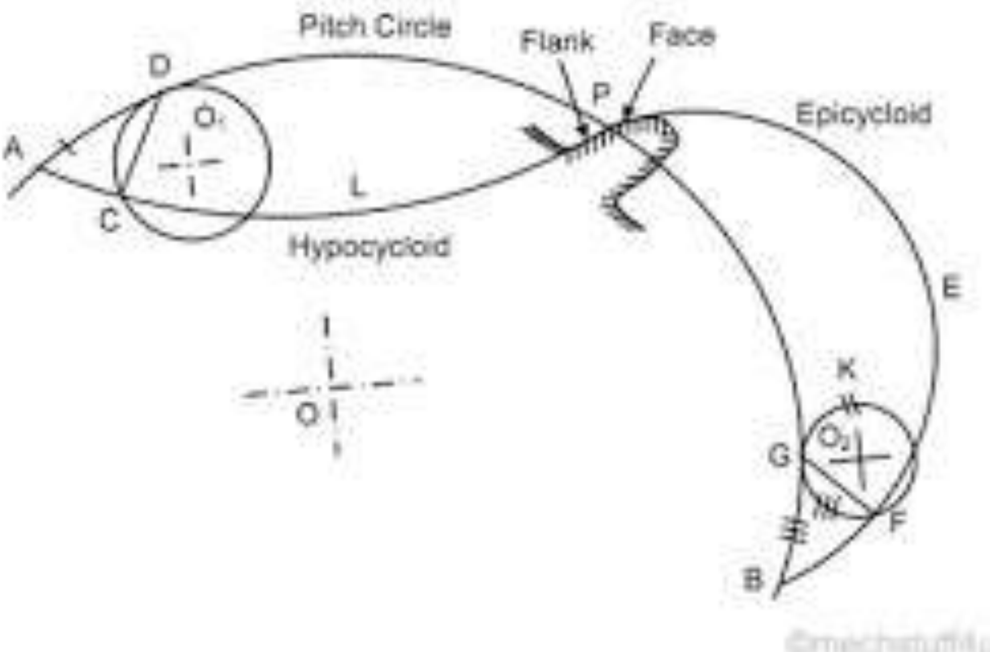


Figure 6 Hypocycloid and epicycloid. **https://www.mechstuff4u.com/2017/08/cycloidal-tooth-profile.html?m=1**

[9] Those two motions, which act at right angle to one another, also represent the two opposite motions that Edgar Allan Poe had identified as the two forces of *attraction* and *repulsion* in his last publication, ***Eureka***, which is Poe's contribution to a new conception relating to the Defense Of the Earth (DOE) which would replace the fallacious doctrine of geopolitics in the defense of Nations.

[10] See my report on Roberval's construction of the roulette in: **THE LEIBNIZ DISCOVERY OF PRINCIPLE OF THE CALCULUS IN ACTA ERUDITORUM.**

Technically speaking, the question came down to the impossible problem of the transformation of a hypocycloid into an epicycloid; that is to say: how do you go from the inside to the outside of the boundary limit of the circle. My reasoning was as bad as the reasoning of the slave boy in Plato's *Meno* dialogue. The way I was thinking about it was revealed to me recently by a failed attempt at adding teeth to a circle for gearing purposes.

Figure 6 illustrates the perplexing irony of not being able to break through the axiomatic barrier of the circle from the bottom up; that is, by attempting to go from inside of the circle to outside of the same circle in a continuous manner. The illustration seems to have the assumption that if circles had teeth, you could probably do it; that is, if you chewed on the problem long enough. However, such a thought will only lead you to more perplexity. The solution to the problem lies in hypothesizing a solution from the top down, as opposed to chewing the rug from the bottom up.

My mistake was to think that since a hypocycloid was the locus of a point of a circle rotating on the inside of a larger circle and the epicycloid was the locus of a point of the same circle rotating on the outside of that same larger circle, this process could become continuous simply by breaking through the common barrier of that circle. I was assuming that one could go from a lower domain to a higher domain continuously without having to go through an axiomatic crisis. Wrong. It cannot be done.

Why? The reason for the failure is not because circles have no teeth. The reason is that the solution cannot come from what is already known in the past. It is not the past which changes the future, but the future which changes the past. The solution can only come from the future. So, a blind jump (hypothesis) into the future had to take place. In other words, something outrageous had to take place. The solution lies in changing the past; that is, in changing the axioms of the lower geometry by answering the question that Bernhard Riemann formulated in his *Hypothesis Dissertation*: ***does your concept of reality relate to objects whose existences depend on situation or is it independent of space and time*?** That Riemann question was the same that Leibniz had posed to his teacher Huygens, which led him to the hypothesis of *analysis situs*. Riemann provided the answer for me when he identified that the required metric was no longer *magnitude* but *change* within a determined situation; that is, something like the variability of the Poloidal/Toroidal complex action of the Torus.

What this required, therefore, was to discover the solution to the paradox of two different and opposed circular actions such that, in their *coincidence of opposites*, they could capture the two fundamental tendencies of the universe, *attraction and repulsion*. *How could attraction and repulsion coincide in their opposition?* The answer was recently provided by the latest experiment of the Stellarator which demonstrated how the Physics of Plasma could resolve that coincidence of opposites.[11]

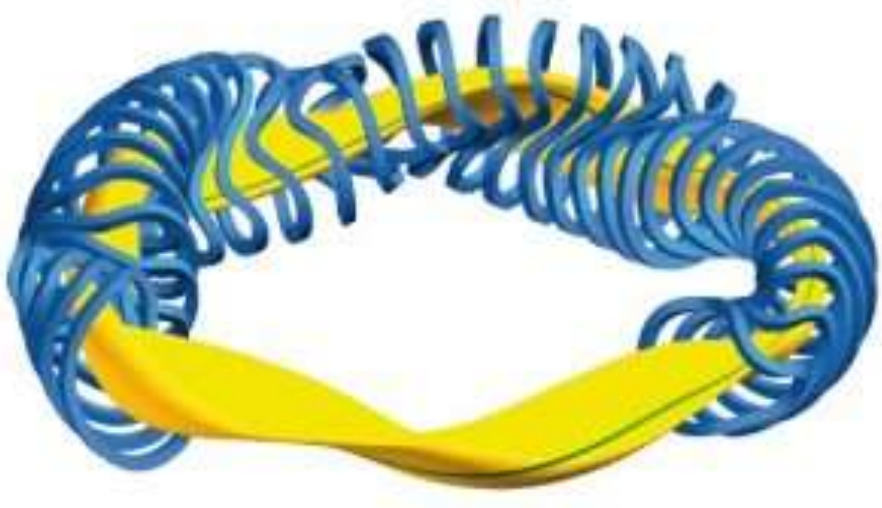


Figure 7 Stellarator Wendelstein 7-X

The following construction of "going beyond" the boundary condition of the circle between the two pentagons (Figure 8) demonstrates how to construct the *analysis situs* of the Torus by comparing the one dimensionality of simply-

[11] https://www.popularmechanics.com/science/energy/a21945982/german-nuclear-fusion-experiment-sets-records-for-stellarator-reactor/

extended circular action to the higher dimensionality of doubly-extended circular action.

The pathway of the Torus construction shows that it is impossible to construct from the bottom up. The axioms of simply-extended circular action cannot break through the barrier of the circle. Only the addition of a second and third contrary circular action, independent of the first and coming from the proverbial outside, can generate the *coincidence of the three opposite motions*. This is how fusion plasma behaves because this is how the mind works.

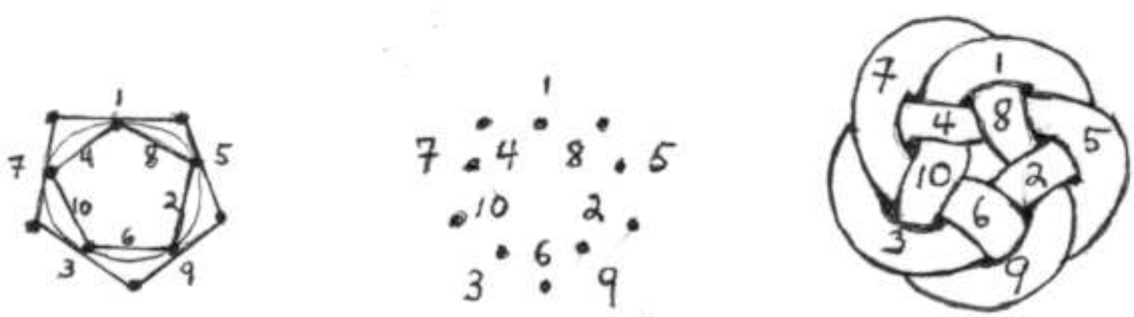


Figure 8 Axiomatic transformation between a singly-extended circular pe3ntagonal action (left) and a doubly-extended pentagonal circular action inside of a Torus (right).

THE PRINCIPLE OF BIQUADRATIC RECIPROCITY

The most amazing characteristic of the toroidal geometry of primitive roots is the fact that the torus *analysis situs* construction is everywhere determined by a *coincidence of two opposite motions*, one motion of Toroidal equal time and the other motion of Poloidal least time; the two motions expressing least action across the entire Torus, as if in the simultaneity of eternity.

Take the example of the biquadratic value of 4 mod 17 (Figure 9). Not only does the distribution of all of the numbers reflect equal reciprocity of 17, but also other sets of reciprocals seem to be keeping the system balanced as well. Simultaneously, the Toroidal *repulsive motion* expresses equality of time while the *Poloidal attractive* motion expresses least time. It was the composition of this process of getting all tied up into knots that gave me the idea that it might have something to do with Kepler's idea of gravitation, because this sort of configuration was also music to my mind.

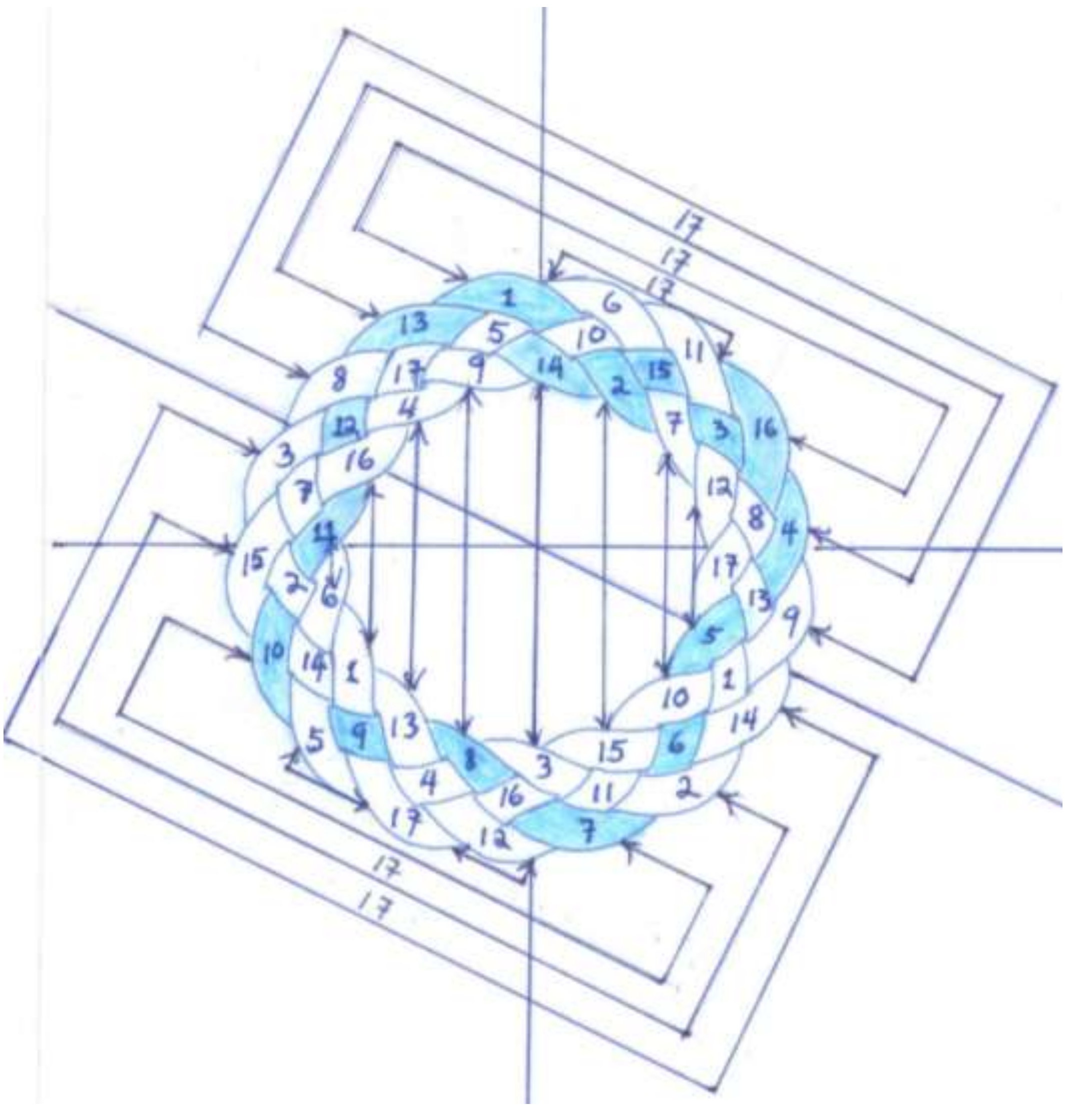


Figure 9 The P/T ratio is 4//17, and the clockwise motion generates the four biquadratics which are: 4, 16, 13, and 1, in that order. Note how all of the Toroidal reciprocals of 17 express equal time while the Poloidal clockwise motion expresses least time. You can put this on my tombstone when my body dies.

The beauty of this process is that while the Poloidal motion of least time is generated at different speeds throughout the entire range of the Torus – regardless of how many rotations are required – the time is the same since the Toroidal motion expresses that equality by way of reciprocity.

FIN