



From the desk of Pierre Beaudry



RIEMANN'S DOUBLY-CONNECTED MANIFOLD AND THE GEOMETRY OF THE GALACTIC MIND

By Pierre Beaudry, 6/11/2011



“The Universe is not something outside of mind. Mind, in its true sense, *is* the universe. It is the cognition of the universe, and it’s a state which every truly creative scientist and great artist has manifested in some of their best works, which is how we know it, and how we can share it.”

Lyndon LaRouche

“The mind is a compact multiply-connected thought-mass with internal connections of the most intimate kind. It grows continuously as new thought-masses enter it, and this is the means by which it continues to develop.”

Bernhard Riemann

INTRODUCTION.

This paper is in response to Lyn's challenge on evaluating Riemann's critical notion of space as reported in the third section of his habilitation dissertation,. (See Bernhard Riemann, *On the Hypotheses which Lie at the Foundations of Geometry*, in *A Source Book in Mathematics*, Ed. David Eugene Smith, Dover Publications, Inc. New York, 1959, pp. 411-425.) One of the most fundamental points that Riemann makes in this section is that mind is not three dimensional as is visual space, because mental processes function independently of size in a manner that is anti-entropic and multiply-connected.

One of the implications of this mental condition is that the three dimensional domain that we are so familiar with is real only for the sense-perceptions of sight and touch, and not for anything else. For instance, you can't hear the third dimension, and you can't smell or taste it either. Therefore, the only reason for the existence of three-dimensional space is to set the boundary conditions for visual size, and it is also a sensing apparatus that prevents you from bumping into things. The significance of this for our purpose, here, is not trivial. The knowledge of size is useful, but it is not pertinent for mental processes generally. As a consequence, from the standpoint of mind, size should never be considered as ontologically necessary, because it is not a universal characteristic of the physical universe as a whole. Indeed, as Einstein once put it, if the entire universe were to double in size overnight, no one would be the wiser.

1- RIEMANN'S ANALYSIS SITUS OF THOUGHT MASSES AND TIME REVERSAL.

Thought masses have no size, only a direction of intention. You may not know where they are going to lead you, but they know how to get there. As Lyn keeps emphasizing, we must break from the domination of sense perception, especially from the dominating sense of visual perception of things in empty space, if we wish to survive beyond the primitive state of animals and understand the galactic dangers that humanity is currently facing. Therefore, we must not only seek new perceptor extensions that function as new precursors beyond our limited five senses, but we must also reexamine the epistemological value of each of our senses with respect to mind and in relationship to the mind of the galaxy and of the universe as a totality. This means that thinking big no longer means thinking large in terms of size. *Thinking big means thinking anti-entropically by paying attention to the intention from the top down.* In fact, the only way to think big is to stop thinking in terms of visual space and to start thinking in terms of what you intend to do with your time in the future. But, unless you get rid of the idea of Cartesian empty space, and of spatially dominated clock-time, you will never know anything about how intention and time work in the universe, because real time is actually the intention to change by means of final causality. So, the question is: How does final causality work? How do you free yourself from empty space and clock-time by focussing on the intention of final causality?

From a similar standpoint, but contrary to visual requirements, the sense of hearing is also limited by boundary conditions, but its limitations are not determined by size in three dimensional space as vision is. Like time, hearing is determined by the interactions of resonance, by the partitioning of the musical octave, which is not the same as visual space, but which is minimally, doubly-connected as Riemann develops throughout his habilitation dissertation. As a result, what holds for time also holds for music, as what holds for music also holds for speech, in the same proportion that what holds for speech holds for mental processes. This is the quadratic proportionality of intention that you need to understand if you wish to make sense of the idea of causality in galactic time.

It is the hearing domain, therefore, and not the visual domain, which can best represent the shadows of thinking processes, such as expressed by musical counterpoint. It is for that reason that musical arts, such as poetry and drama, for example, are closer to the geometry of thinking processes, and closer to galactic thinking than are plastic arts. This doesn't mean that you should underplay the visual arts. It means that the geometric mode of human understanding cannot be determined by the visual manifold of a so-called "three dimensional" domain, but, rather, minimally, by a doubly-connected manifold as Riemann develops it in his revolutionary work on the geometry of hearing and in his dissertation. For instance, this is how Riemann addresses the general question in his short paper on *Analysis Situs*:

"In the investigation of functions which arise from the integration of total differentials several theorems belonging to *Analysis Situs* are almost indispensable. This name, used by Leibniz, although perhaps not entirely with the same significance, may well designate a part of the theory of continuous entities which treats them not as existing independently of their positions and measurable by one another but, on the contrary, entirely disregarding the metrical relations, investigates their local and regional properties. While I propose to present a treatment entirely free from metric considerations, I will here present in a geometric form only the theorems necessary for the integration of two-termed total differentials." (Bernhard Riemann, *On Riemann's Surfaces and Analysis Situs*, in "A Source Book in Mathematics," by David Eugene Smith, Dover Publications, Inc, New York, 1959, p. 405.)

The Riemannian idea of "not existing independently of position" is the grounding principle of relativity of time as Planck, Einstein, and Vernadsky later applied to their conception of the universe, and this was the fundamental concept of time that was sabotaged by the followers of Bertrand Russell at the Solvay Conferences during the 1920's. The point, here, is that the geometry of the creative human mind is representable heuristically by means of the Leibniz *analysis situs* of a doubly-connected modular time manifold such as can be represented, for example, by the heuristic thought-object of the torus. This is the type of thought mass that Riemann is referring to in his philosophical fragments, when he writes:

"With each simple act of thinking, something durable, substantial, enters our mind. This substance appears to us, in fact, as a unity, but it appears as (insofar as is it the expression of space and time extension) as comprising a subsumed manifold; I name this a "thought mass" (*Geistesmasse*). To this effect, all thinking is the development of new thought masses.

"The thought masses entering into the mind appear to us to be images; their varying internal states determine how they differ qualitatively.

“As they are forming, the thought masses blend; or are folded together, or connect to one another and also to older thought masses, in a precisely determined manner. The character and strength of these connections depend upon causes which were only partially recognized by Herbart, but which I shall fill out in what follows. They rest primarily on the internal relationships among the thought masses.

“Thought masses once formed, are imperishable; and their connections cannot be dissolved; only the relative strength of their connections is altered by the addition of new thought masses.

“Thought masses need no material carrier for their continued existence, and exert no lasting effect upon the physical world. Therefore, they are not related to any portion of matter, and have no position in space.

“On the other hand, a material carrier is required for every entry, generation, every formation of new thought masses, and for their unification. Thus, all thinking does occur at a definite place.” (Bernhard Riemann, *Philosophical Fragments*, 21st Century, Winter 1995-96, p. 51.)

Although Riemann gave all of the required concepts to understand his idea of thought masses as expressed by multiply-connected manifolds, no mathematicians and only a few physicists understood what he meant and realized the magnitude of his revolutionary discovery. What most people fail to understand, for example, is the psycho-physical form of a thought mass process and, as a result, they tend to get lost in mathematical formulations which result in fallacies of composition. The point that Riemann makes is that one must look for the psycho-physical connection between mental processes and physical processes, and seek to discover what their mental and physical carriers have in common. One of the greatest obstacle to this understanding lies in the fact that the footprints to be discovered do not pertain to a visible object in space, but rather to an auditory form of motion in time.

Thus, since it is the motion of the mind which has to be discovered first, what must be investigated has a better chance to be discovered is the continuous multiply-connected manifold motion of mind and in relationship with music. Moreover, Riemann did more than provide us with such an object to study. He also provided us with a form of the motion that is required for its development process, and that motion is psycho-physical in character. In other words, the mind is able to replicate a psycho-physical parallel image of itself, whose function is to “*recreate the form of motion of the matter in which it is formed.*” The most effective form of such a psycho-physical motion is represented by the complex form of a closed doubly-connected wavelength, or frequency wave, as in the case for cosmic radiation, for example. Riemann determined its measure of change as follows:

“For determining the metric relations of an n-fold extended manifold representable in the prescribed form, in the foregoing discussion, $[n(n-1)/2]$ functions of position were found needful; hence, when the measure of curvature in every point in $[n(n-1)/2]$ surface-directions is given, from them can be determined the metric relations of the manifold, provided no identical relations exist among these values, and indeed in general this does not occur.” (Bernard Riemann, *On the Hypothesis which Lie at the Foundation of Geometry*, from David Eugene Smith, *A Source Book in Mathematics*, Dover Publications, New York, 1959, p. 418.)

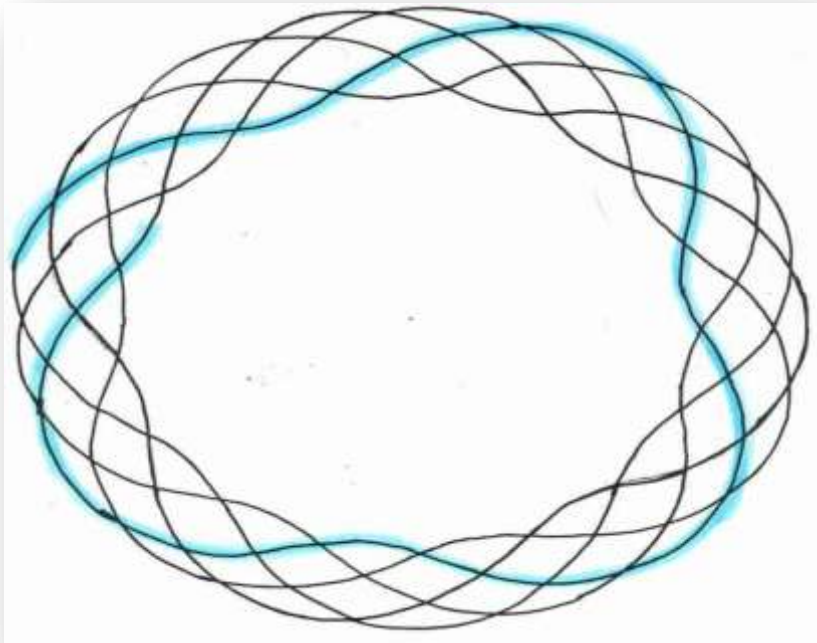


Figure 1. Heuristic illustration of a mental thought-mass-carrier of ideas that is multiply-connected and colligated by elliptical time-reversal-waves in the simultaneity of eternity. This doubly-connected manifold contains $[5(17 - 1)/2]$ different functions of position, none of which are identical because each function keeps being changed and corrected by the actions of universal physical principles acting on the thought mass as a whole in a manner that is finite and unbounded.

Here, I am not proposing to identify **Figure 1** as the visual shape of a thought mass, but rather the time-reversal motion of that thought mass. With the help of such a thought mass process in time reversal, you can also represent the dynamics of human historical memory, as I reported in my 1996 Baltimore videotaped class on *Time Reversal*. (Anyone who wishes to have a copy of that video should write to me at pierrebeaudry@larouchepub.com) This process can also be used to express Lyn's measure of change in time reversal for economic processes, provided it is based on the principle of *agape*. Here is how this principle could be understood:

*From the standpoint of economics, time reversal is the psycho-physical time of the principle of the "benefit of the other" that Mazarin established during the negotiating period of the Peace of Westphalia as the natural dynamic between sovereign nation states; that is to say, expressing the congruence of a process of investment of one nation into the future of other nations, in order to improve the current condition of labor of such other nations, and without the expectation of anything in return, with the explicit intention that the well-being of their future generations is guaranteed by such a change and improvement of their past condition. As Lyn put it, in *A Timely Note*: "Thus, capital is expended at the expense of a later phase in the process, to increase the net productivity of the economy*

at an earlier stage of the production-consumption process.” (Lyndon LaRouche, *A Timely Note*, LPAC, May 31, 2011.)

Such a time reversal memory modular function of economic process is based on the same principle of Classical artistic composition modality that J. C. Bach used in his art of the fugue (see video by Sky Shield and Chance McGee, [Is The Past Fixed? Part I](#)) In both of the cases of economics and music, this *Analysis Situs* geometry employs the same method of time reversal congruence that Gauss established in his harmonic ordering conception of change among intervals of whole numbers, and for which he achieved an axiomatic *congruence* among three such numbers as A, B, and C, but only when A was able to divide the difference between B and C. (Carl Friedrich Gauss, *Disquisitiones Arithmeticae*, Yale University Press, 1966, p. 1) This is the same doubly-connected motion of *congruence* that Cardinal Gilles Mazarin had established, in 1642 during the initial negotiating dynamics of the [Peace of Westphalia](#), when he demonstrated that if France were to find peace with her neighbors, she had to discover the pathway of eliminating the difference between the Habsburg Empire and the principalities of Germany. This is what the United States must realize as its foremost mission today in what Lyn called the Four Power Agreement; that is to say, by having the United States divide the differences among each of the three nations of Russia, China, and India, with respect to the British Empire Monetary System.

Today, the economic integration of the entire planet requires a credit system which should be initiated by the United States and should function along the same lines as this Principle of the Peace of Westphalia; that is to say, as the *congruence function* of the simultaneity of eternity in the manner that Lyn represented the concept a few decades ago, with reference to the *Ars Magna* memory function of Ramon Lull. (See my report, *Timereversal in the Simultaneity of Eternity*, 5/19/2010, which is part of a CD on *Epistemological Implications of Time Reversal* that accompanies the DVD video class mentioned above.)

Thus, you will find *congruence* by dividing the difference between Lyndon LaRouche and Ramon Lull in the same doubly-connected motion of thought mass that established *congruence* between Riemann and Gauss. I remind the reader of how Lyn referenced this same crucial topic of the memory of Classical imagination in its relationship to the proportionality of power and reason, more than two decades ago:

“The Substantial reference to be stressed, as by the celebrated medieval composer Ramon Lull’s *Ars Magna*, is that the power of individual reason is located within the active functions we associate with memory. That is to say, we are conscious of perceptions by means of the agency of memory. Or, we should say, that human memory is not an analog of the “memory” of a digital computer. Human memory functions according to the principle of hypothesis: memory is the seat of individual cognitive judgment. Memory is governed by the functions ontologically associated with the usage of *Analysis Situs* as we have defined it here.” (Lyndon LaRouche, *Russia’s Relation to Universal History*, EIR, November 29, 1996, p. 22.)

Lull had discovered, as Lyn did subsequently, that if memory were to express change within a complex integral of time reversal in the universe, then, hope had to be the form of endurance of that changing interval of memory function, and simultaneity of eternity had to be the “universal moment” of closure of all changing relative intervals of motion in the universe. The discovery was as if Lull had found the Riemannian method for securing the sort of universal distinctness and effectiveness that a

Platonic idea requires for it to be functional. As Lyn also did, Leibniz saw that light in Lull's system and he used it as a beacon-lantern to guide his own investigations in the very effective principle of proportionality of change between reason and power in the solitude of his political leadership. That became the thought mass required for Riemann to generate the same Leibnizian method of *Analysis Situs*, as a measure of change.

Therefore, from that multiply-connected standpoint, a researcher is able to exercise his own creative imagination by relating to historical ideas not in term of size, like "things" that are determined by metric relations or by fictitious monetary values, but in terms of intervals of change in his or her own mind relative to position and direction for the benefit of the economic progress of humanity as a whole. Today, the case in point is best represented by Lyn's emphasis on the notion of "economic platform," on which the future world economy must be based, with the economic integration of great water developments projects, where continental rivers and canals intersect multi-functional higher energy flux-density nuclear plants and intercontinental links of railroad systems around the planet. This is how we have today, the power to change Charlemagne's original form of an eleemosynary-based economic platform and apply it to the future development of mankind. A similar measure of change also applies to the domain of the infinitesimally small such as the domain of cosmic radiation. These are the implicit conditions that Riemann established for a continuous manifold in the third section of his habilitation dissertation:

"Now, however, the empirical notions on which spatial measurements are based appear to lose their validity when applied to the indefinitely small, namely the concept of a fixed body and that of a light-ray; accordingly, it is entirely conceivable that in the indefinitely small, the spatial relations of size are not in accord with the postulates of geometry, and one would indeed be forced to this assumption, as soon as it would permit a simpler explanation of the phenomena.

"The question of the validity of the postulates of geometry in the indefinitely small is involved in the question concerning the ultimate basis of relation of size in space. In connection with this question, which may well be assigned to the philosophy of space, the above remark is applicable, namely that while in a discrete manifold the principle of metric relations is implicit in the notion of this manifold, it must come from somewhere else in the case of a continuous manifold. Either then the actual things forming the groundwork of a space must constitute a discrete manifold, or else the basis for metric relations must be sought for outside that actuality, in colligating [binding together or uniting] forces that operate upon it.

"This path leads us into the domain of another science, into the realm of physics, into which the nature of this present occasion forbids us to penetrate." (Bernard Riemann, *On the Hypothesis which Lie at the Foundation of Geometry*, from David Eugene Smith, *A Source Book in Mathematics*, Dover Publications, New York, 1959, p. 424.)

However, for the purpose of economics, the path towards a "simpler explanation of the phenomena" does not primarily lead to physics, but most emphatically, to the history of economic ideas, and to all major forms of Classical artistic composition as the primary sources of credit for physical economy. Therefore, credit for education in the history of polemical ideas relating to the creative Classical artistic imagination must come first and foremost. This becomes self-evident when the political observer relates to the idea of time as the same doubly-connected manifold by means of which the future

can become accessible by time reversal, that is, by changing the past, as Lyn recently reemphasized in, ***THROWING OUT CLOCK TIME***, NEC Meeting for Saturday, May 21, 2011.

Thus, the memory function required to experiment the simultaneity of eternity is constantly transformed, historically, through the thought masses of Plato, Lull, Dante, Cusa, Leonardo da Vinci, Raphael, Mazarin, Leibniz, Bach, Beethoven, Gauss, Riemann, and LaRouche as the Lydian modular pathway of a memory function that becomes understood as the most joyful characteristic of the enduring process of change in the universe. This is the kind of constant change of measure that you want to adopt and introduce in society in order to create the new mind-set that did not exist before, which reflects the galactic mind that is expressed in the process of generating cosmic radiation. Thus, we find, with this Leibnizian-Riemann ***Analysis Situs*** method, an epistemological form which can satisfy the requisites of any n-fold extended manifold, because the relations which define it are never the same and each change cannot be measured by scalar measurements between one another. In fact, it is the qualitative change that measures the manifold by way of the changing directionality of its components, as the principle that determines the whole.

It is the process of inversion that is the determinant factor here. The more truthful to Universal History such an interlacing function of qualitative change in position becomes, the stronger the new manifold will be able to resist fallacies of composition relating to size, because the inversion generated by a high degree of discontinuities within a small area of action, which determines an axiomatic change, will systematically call to consciousness clear examples from the past to be changed, and will display before you all possible fallacious oppositions. Such is the Riemannian measure of change that must be used for generating new creative ideas, but only through the above stated moral Platonic tradition. This is the measure of change that I will now investigate as the LaRouche-Riemann method of double-connectedness.

2- THE LAROCHE-RIEMANN IDEA OF DOUBLE-CONNECTEDNESS.

Two considerations of great importance to be emphasized, here, at this point: One is the necessary form of the ***Analysis Situs*** method of constructive geometry developed by Leibniz, and the other is the conception of the doubly-connected manifold developed by Riemann, which Lyn used for the ordering of the musical well-tempered system. In this way, Lyn developed a conception of the well-tempered musical system conceived as human music; that is to say, as a form of music that reflects the process of mind in the universe. Lyn made that crucial point quite emphatically 25 years ago, when he wrote:

“The congruence of the division of the octave by singing-voice register, with the passage from the subdominant to dominant, is crucial for understanding the interconnectedness of singing with definitions of the well-tempered scale. This interconnectedness is the ground-principle which distinguishes human music from the abstract music of such dead objects as musical instruments. This is what defines human music, the only real music, as situated within a doubly-

connected manifold.” (Lyndon LaRouche, *Truth is Beauty, and Beauty is Truth: Understanding the Science of Music*, Internal Memorandum, 09/09/86, p. 34.)

The point that he made is that the singing-register values are universally fixed because the well-tempered pitch, established at C-256, is also universally fixed within the biquadratic intervals of a doubly-connected manifold. I have demonstrated that biquadratic relationship of intervals in a previous pedagogical report entitled *Towards Understanding the Scope of Pierre Fermat’s “Great Theorem” of Least Action*, 12/22/2006. This well-tempered pitch also fixes the two interactive domains that form double-connectedness in the musical system as well as human thinking more generally, because it is also the anchor that permits you to capture all of the changes of emotional coloration through the twenty-four key signatures as J. S. Bach demonstrated in the 192 Preludes and Fugues of his *Well-Tempered Clavier*. The singer must not only obey the “absolute” set of pitch-values for all six human voices, but must also adopt such a foundation as the bases for all instruments and in all performances of musical composition. Furthermore, voice registration of speech must obey the same rule as bel canto well-tempering. This double-connectedness is also the natural geometric form of constraint in well-tempered human cultures and in astrophysics.

It is only through this Leibnizian *Analysis Situs* geometric constraint of time that one can legitimately abandon the Euclidean and Cartesian domain of abstract empty space, because this is the only way by means of which all metric relations can be legitimately abandoned as useless; in fact, as detrimental. Within the domain of *Analysis Situs*, relationships are never measured as objects in empty space; relationships are the changing dynamics that determine any action as developed from within the field by universal physical principles, because they are generated from the principles of the field itself as a changing medium. This is also how to measure higher forms of integration of least action in a changing universe, within the different phase-spaces of the Noosphere, the Biosphere, and the Lithosphere. Thus, the measure of change of *Analysis Situs* interaction must replace all scalar measurements, including clock-time, as Lyn insisted we should do.

As a result, it is the anti-entropic measure of interconnectedness and interactive change that is generated through the increase in energy flux density; that is to say, through an increase in the density of singularities per small area of action of axiomatic change. Those are the only measures which correspond to effective changes in the curvature of the universe. It is this that Gauss and Riemann determined, beyond what Kepler had already discovered as the principle of gravitation. Lyn indicated the appropriate geometrical change in connection with this matter when he wrote:

“The elementary solution to the problem left unresolved by Kepler on this account, was discovered in a relatively early work of Gauss, on the subject of the arithmetic-geometric mean, the root basis for Gaussian and Riemannian elliptic functions. This approach yields directly, the correct values for the well-tempered scale, and also a correct physical understanding of the primary intervals.” (Lyndon LaRouche, *Truth is Beauty...*, p.38)

Here, Lyn applies the same principle of the least inadequate geometry that Kepler had adopted when he investigated the relationship between the Solar System and the Musical System. Kepler recognized the footprints of the same harmonic ordering among the planets as among the intervals of the human voice, but he could only come up with values for the planetary orbits that corresponded to a “*well-tempered form of equal-tempering*.” The essential point of correction that Lyn made “is that the

fundamental laws of astrophysics underlie a rigorous, unique determination of the well-tempered scale.” (Idem, p. 39)

The problem, here, is not in Kepler’s thinking, but in the inadequacy of his geometrical models. As Leibniz had once warned his geometry teacher, Huygens: “*There is always more in nature than what can be found in your geometry.*” The intervals of the series of Platonic solids that Kepler chose for determining the positions of the planetary orbits, for example, were inadequate means of establishing well-tempering harmonics, because they related essentially to the visual domain of size. It was not until Gauss established his arithmetic-geometric mean method, and until Riemann established the geometry for the shockwave effect, and his doubly-connected work on hearing, that a least inadequate account was given for the relative value of the asteroid belt of the Solar System and of the register shift of the human voice.

This brings us to an axiomatic limit in the process of discovering a least inadequate measure of change in the solar system as being geometrically doubly-connected in the manner of the human voice, and of axiomatic change in human creative thinking. Again, this means that relationships of time are not based on measurement of extension in space, but by measures that relate to changes and transformations in a well-tempered universe, which can only be properly expressed by means of inferential proportionality.

Think of the process as a higher order singularity, like a Riemann surface function that is minimally doubly-connected in the sense that it describes the double motion of a closed circular helix: one motion represents the uniform horizontal displacement along the long circumference of the cylindrical torus, and the other motion represents a uniform rate of rotation around the small circumference around the surface of the same torus. It is within the relationships of intervals of those two actions, as Gauss would say, within the relationship of the field of the complex domain represented by “ $a + bi$ ” (where “ a ” corresponds to one action and “ bi ” corresponds to the other action), that the measure of change is generated. This understanding of double-connectedness should be sufficient epistemological ground to throw out the reductionist Helmholtz image of a flat frequency as represented by the simplistic notion of the mechanical sine-wave. As Lyn put it:

“We are in the outskirts of Riemannian electrodynamics. We are in the realm of qualities of evidence, which prompted such as Weierstrass, Riemann, and Cantor to overcome the fallacies which arise from ordinary Fourier Analysis. We are forced, most emphatically, to lead the discussion into this region, because of that “double-connectedness” which is identified at the beginning of this chapter of the report. Epistemologically, the discussion of music becomes paranoid-schizophrenic, and quite literally so, whenever the credulous are duped into accepting the terms of reference of that notorious hoaxster, Helmholtz, whose frauds are the commonplace textbook assumptions of the musicological classroom today.

“The secret of music lies not in the Newtonian mechanics of vibrating rods, nor even in the scope of ordinary Fourier Analysis. Music is intrinsically human, such that its sensations are subsumed within the definitions of a “non-linear” optical (e.g. electrohydrodynamic) biophysics: the biophysics of bel canto singing, for example.” (Lyndon LaRouche, *Truth is Beauty...*, p. 40.)

This is the locus of derivation of what Gauss identified as the field of change of measure of the arithmetic-geometric mean. As for music more generally, it is also doubly-connected in the sense that the complex helix function represents both the integral of the Lydian modality, and the voice register shift function expressed by the arithmetic-geometric change. Both processes negotiate, as if in the Peace of Westphalia, for the benefit of the other. This is the same process followed by the Solar System orbiting in a 62 million year cycle within the ellipsoidal galaxy.

3. THE LAROCHE SINGULARITY OF THE “*WHITE OWL EFFECT*”.

“The irony of galactic time resides in time reversal, because when your sensory extensions are observing a galaxy, they are registering the past and not the present. This means that if you wish to change something in the future of galaxies, you will have to change their pasts.”

Dehors Debonneheure.

During the 1980’s, Lyn had challenged the scientific community, and especially our own, now defunct, *Fusion Energy Foundation*, with the provocative idea of the *White Owl effect*. This provocative hypothesis first appeared in the fusion studies of one of our former FEF members, Daniel Wells, a Princeton plasma physicist who had imagined the formation of the Solar System as the result of a series of concentric solar vortex rings that generated the planets into force free orbits. (Daniel R. Wells, *How the Solar System Was Formed*, 21st Century, July-August 1988, pp. 18-28) The idea originally came from an engineer for the General Cigar Company, Bob Mark, who designed a machine that would blow 10-foot smoke rings during the 1965 World’s Fair in New York City. Wells saw in the formation of those smoke rings a depiction of the formation of plasmoids in his magnetohydrodynamic model, including an explanation for the Titius-Bode law.

The hypothesis he developed was a devastating blow to the Newtonians. As he stated in the conclusion of his paper: “We have obtained the geometry of the rings (planets) and the velocity ratios with a three-dimensional field theory that is independent of any “action at a distance” forces... This was the objective of Kepler, who took the opposite approach to that of Newton and Galileo. He did not view “forces” as primary; instead, he derived his laws of planetary motion from the physical geometry of the planets and the Sun.” However, Wells did not consider that such a heuristic device as the *White Owl Effect* could also act as a metaphor for a higher hypothesis that describes axiomatic changes in psycho-physical processes, including in Classical artistic composition.

A *White Owl Effect* can also explain the process of measuring the curvature of primitive roots and biquadratic residues, as I demonstrated in 1996, as well as provide an epistemological framework for understanding elliptical functions, memory modular functions, and what Lyn then identified as time reversal functions of high density of singularities of axiomatic changes in a higher hypothesis series. In 1996, Lyn wrote a series of reports on time reversal and emphasized the crucial role of Riemann’s

epistemology especially with respect to music. During the September 14 intelligence meeting of that year, Lyn stated:

“This function, which takes us from one term of such a discontinuous series, is Plato’s notion of *higher hypothesis*, a method of discovery which takes you to a new hypothesis as a series. And, the succession of hypothesis is a discontinuous series, that is, a discontinuity between each and all the terms of the series, taken in permutations or in simple series. And the generating principle which is consistent in going from one member of the series, one hypothesis to the next in the series, is *higher hypothesis*. So, that notion of function exists in music.” (Lyndon LaRouche, *Leesburg Intelligence Meeting*, September 14, 1996.)

The function of *higher hypothesis* exists also in painting and in most other form of Classical artistic composition. However, as Lyn later insisted, there was no such well-tempered analytical series to be found in mathematics, not even in a Cantorian transfinite series, because the crippling deductive method of mathematics precludes any possible participation in the dynamics of creativity. In point of fact, whenever a high density of singularities occurs within a process of axiomatic change, the entire process itself is changed ontologically, and no mathematical function can deal with such a predicament. An axiomatic change is never a logical process. That is why mathematics cannot deal with axiomatic limits. This is also the reason why, at the end of his habilitation, Riemann called for mathematicians to abandon the overrated power of their inflated domain and reach humbly into the domain of physics.

So, the question is, therefore, how does that *Analysis Situs* dynamic work inside of your own mind? In the following, I briefly identify a few examples of such a *White Owl Effect*. Let’s take first the example of Mount Etna that Lyn recently asked us to investigate. The last Etna eruption was reported on January 13, 2011.



Figure 2. *The White Owl Effect* coming out of the steaming crater of the Mount Etna, Italy, 2007.

Now, I want you to concentrate on the emergence of a singularity that takes place inside of this crater, as if it were happening inside of your mind as opposed to Mount Etna. The [steam rings of Mount Etna](#) (vapor and sulfuric dioxide) are warning signs that the volcano is about to erupt. Don't worry if you don't see anything emerging in your mind right away, warning that something is about to erupt in there as well, but concentrate on the formation process of *The While Owl Effect* that is being produced. It may take a while before the idea takes shape in your mind, but you must persevere in the thought mass that you are actually experimenting the formation of an axiomatic change in the form of a harmonic doubly-connected manifold. However, the best pedagogical device I have found to express such an ontological reality inside of the mind is not visual: it is Beethoven's great dissonance of *Sonata Opus 27*. See **Figure 3**.

The point is that what happens in your mind is produced by a tension inside of the relationship between two opposing motions, the poloidal (vertical) and toroidal (horizontal) motions. Those two motions in one generate similar Lydian waves of a doubly connected mental process, such as manifested, for instance, by the steam rings of Mount Etna.



Figure 3. Ludwig van Beethoven, *Sonata in C-sharp minor, Opus 27, No. 2*, measures 164-165. The sequence demonstrates the fluid dynamics of a musical axiomatic change. What is the dynamic correspondence between measures 164-165 and the *White Howl Effect* of **Figure 2**?

In comparison with the tectonic activity of the volcano, the creation of doubly-connected ideas operates much in the same way. What is happening is the same that is happening in your mind when you are about to give birth to an idea in which two opposing currents come into conflict where one is attempting to change, and the other is attempting not to change. To change or not to change is the question. In the two cases, you are witnessing the same underlying process. In Mount Etna, the rings are produced by pressured gas and are generated by shock waves through a narrow cylindrical conduit of the crater hitting a much cooler external atmospheric temperature. Some of those rings last up to 10 minutes and appear to be formed within a mushrooming ring which also generates little poloidal steam ringlets around the main toroidal ring. The most interesting feature of the rings' behavior is that, after they have gone through an initial shock-phase, they are measurable by the change of temperature produced through

a series of contractions between two forms of circular action, the toroidal (horizontal) and poloidal (convection) motions of double-connectedness. It is the relationship of the horizontal and convection motions that determines changes in the climate of the planet, for example. Such vortex ring phenomena are rarely understood as reflecting the complexity of generating ideas, but they do, and they are especially pertinent in the domain of musical ideas, as Beethoven demonstrated in his *Sonata Opus 27* that I reported on in the Art section of *LaRoucheNET*. (See Pierre Beaudry, *The Truth About Beethoven's so-called "Moonlight Sonata,"* 5/08/2011.)

Moreover, it is always useful to compare your mental process with a physical phenomenon that reflects similar anomalies. Since a compression shock induces a wave motion in opposition with a rotating motion in any given flow, the wave dynamics of the whole process is propagating in two opposite directions at the same time, throughout the whole process. In the case of a volcano, the pressure inside of the tubular whole is different than the atmospheric pressure outside of it; therefore the wave which then comes out of the nozzle is initially a Prandtl-Meyer expansion flow (See **Figure 4a** and **4b.**), then, the wave-system changes into a closed circular helix as it hits the shock front of the cooler atmosphere.

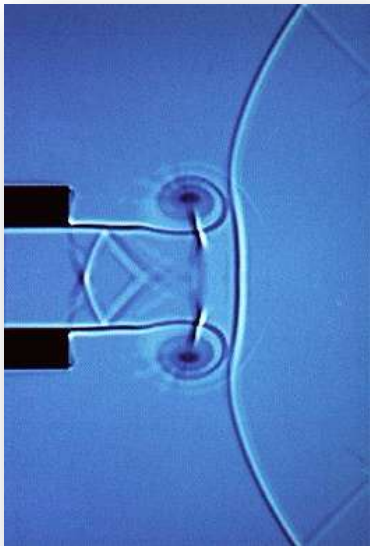


Figure 4a) Fluid dynamics (T.T. Lim)



4b) Flying Triangle shockwave (Bruce Cornet)

In **Figure 4a)** Professor of Fluid Dynamics, T. T. Lim, from the University of Melbourne showed how the fluid dynamic cross section of a shock wave effect generates a vortex flow. **Figure 4b)** shows similar shock wave effects of a Flying Triangle stealth airplane captured on camera by Bruce Cornet of Virginia. Such configurations are similar to plasma gun discharges demonstrated by S. F. Schaer in his paper on [COAXIAL PLASMA GUN](#) .

Schaer showed that his coaxial plasma gun (CPG) injected a plasma torus into a drift space which is similar to the steam rings of Mount Etna, but he obtained the quasi-geometry of Tokamak plasma. As noted by Schaer, such experiments are not only important for future projects in magnetic plasma confinement, but most significantly for space propulsion. The plasmoid geometry exiting the muzzle of the gun demonstrates a highly harmonically organized doughnut shaped configuration bringing together a toroidal current with a permanent radial magnetic field. (Figure 5)

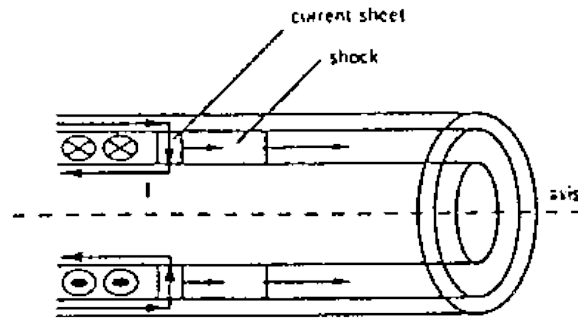


Figure 5. Current sheet and shock region in the coaxial plasma gun by S. F. Schaer.

Schaer described his experiment as follows:

“This current magnetizes the plasma producing a confining poloidal field, which drastically aids the stability of the ejected plasma rings. These elongated rings really do have enough mass to be considered as such, since thermal diffusion should not be forgotten. The current is then distributed over the whole torus cross-section with a gradient. At the ejection, a highly supersonic flow of Mach 50 enters a region of lower pressure. There are two edges at the muzzle, one of the inner and one of the outer cylindrical electrode. [Figure 6] shows the rarefaction wave pattern that forms [fn. 34]. It is readily seen that this prevents transverse expansion at first, therefore enhancing stability. The effect of magnetic field components in the supersonic flow pattern was neglected.” (S. F. Schaer, COAXIAL PLASMA GUN IN THE HIGH DENSITY REGIME AND INJECTION INTO A HELICAL FIELD, from the Centre de Recherches en Physique des Plasmas (CRPP) of the Swiss Federal Institute of Technology in Lausanne, Switzerland.)

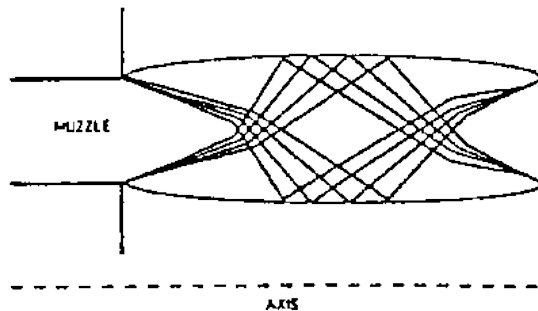


Figure 6. “Simplified rarefaction-wave pattern at the muzzle preventing significant transverse expansion. The intercepting shock wave pattern was simplified.”(S. F. Schaer.)

Those are only a few examples of doubly-connected phenomena in the visible and musical domains. Let's look at some similar cases in the galactic dimensionality, but which are not accessible to the visual domain. Take the Crab Nebula for example.



Figure 7. X-Ray Crab Nebula. “Filaments in the nebula are remnants of the atmosphere of the star that exploded and they consist mostly of ionized helium and hydrogen. Temperature in the filaments is 11,000 K to 18,000 K with a particle density of 1,300/cm². The blue region in the Crab Nebula is synchrotron radiation that is produced by electrons given off by the neutron star and moving in curved paths at up to 50% the speed of light. The expansion of the nebula is slowly accelerating as energy from the neutron star (pulsar) feeds into the nebula’s magnetic field, thereby enhancing expansion and forcing the filaments outward. The east-west band crossing the Crab Nebula in this photo is a helium rich torus which comprises about 25% of the material that can be seen in visible light. This torus remains mysterious and there is no good explanation for its structure. At the center of the nebula, the pulsar’s equatorial wind slams into the nebula material creating a shock wave that is seen as wisp like structures that brighten then fade as they move away from the neutron star.” (Blog amazingdata.com)

The point to be made, here, is that there are many other atmospheric, tectonic, astronomical, and galactic phenomena that are dominated by such a doubly-connected geometry of the *White Owl Effect*, but which are not of the visible domain. The current volcanic activity of Jupiter’s moon Io, for instance, is a case in point. In terms of eruptions, Io, which is similar in size to our Moon, but which is like our Earth in many respects, is the most volcanically active body in our Solar System, with more than 500 active volcanoes, of which only about 100 have been monitored. As reported by the Russian Astronomy Encyclopedia, Sozvezdiya.ru, Voyager probe has shown Io to be very volcanically active, whose material is currently forming a flux tube of plasma around Jupiter.

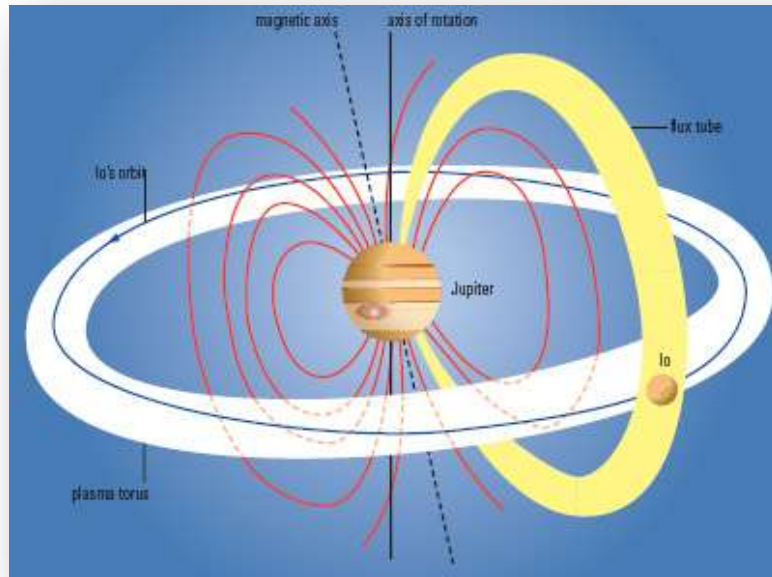


Figure 8. “Io Material ejected from Io’s volcanoes forms a torus around Jupiter. A magnetic flux tube links Io and Jupiter: particles ejected during the satellite’s volcanic eruptions can lead to enhancements of the Jovian aurorae.”

This is a strange anomaly which shows a second derivative doubly-connected manifold which is not visible, but which has been recorded through the orbital resonance of tidal heating and by other sensors from Jupiter and other moons. Sozvezdiya.ru further reported:

“Io’s tenuous atmosphere contains sulphur dioxide, as well as atoms of oxygen, sodium and potassium. The surface pressure is less than a millionth of the Earth is but nearly a billion times greater than the atmospheric pressure at the surface of the Moon or Mercury. Io’s atmosphere continually leaks away into space, contributing to a ‘cloud’ of sodium and potassium atoms falling inwards towards Jupiter and into a magnetically confined belt of ionized sulphur that stretches right round Jupiter, concentrated around Io’s orbit (the Io torus). The atmosphere is replenished by a combination of volcanic activity and collisions on to Io’s surface by high-speed ions channeled by Jupiter’s magnetic field. When Io passes into the shadow of Jupiter its atmosphere can be seen faintly glowing in an auroral display caused by these same magnetospheric ions impinging on the atmosphere.” (Sozvezdiya.ru Astronomy Encyclopedia)

This raises some fascinating questions: Why is the first torus belt around the equator of Jupiter formed by a magnetically confined sulfur dioxide tubular ring, while the second torus moving at right angle to the first, sheds cosmic radiation of oxygen, sodium, and potassium along the magnetic lines of Jupiter? What is the nature of this differentiation and what holds them together, separately? Are these rings overlapping, and if so, what are their significant interference patterns? What is their complex plane *Analysis Situs* configuration? Next, correlate these events on Io with the ionosphere anomalies over Japan at the time of the M9 Tohoku earthquake. What do you find in such correlations? Once you have discovered [precursor anomalies](#) that link seismic activity between ionic changes in the ionosphere and the

atmosphere with tectonic activities of volcanic activities, how do you explain the causality of this process of interaction? What is the significance of their doubly-connected relationship? Does connectivity work like causality? Is causality spatially kinematic or time reversal performative? Now, ask Professor Dimitar Ouzounov of Chapman University in Orange, California: “What did the tomography of the ionosphere tell him about the release of radon gas that ionized and heated-up the surrounding air of Tohoku on March 11, 2011?”

Such a complex second derivative double-connectedness of helical actions will necessitate some serious investigation, which will also require the serious study of Classical artistic composition, especially Bach’s preludes and fugues that manifest similar mood inversions that can also resonate as volcanoes and tornadoes do. And, what is the role of volcanic lightning? However, when such physical processes get to be multiply-connected with Classical artistic composition, the outcome of their congruence becomes a moral question of necessity, because such questions are a matter of survival for the future of mankind. Therefore, as you look into your own mind to study your mental processes, if you don’t think of the future in this doubly-connected format, you will not even be able to generate such questions. These are the type of doubly-connected ideas that are required for understanding the future, which must be willfully established as a matter of course, because they are necessary for the benefit of mankind. The first effect that such a Riemannian idea will make, therefore, is that of a shock, because it will be contrary to all generally accepted dominant ideas. Good.

The X Ray NASA picture of the Crab Nebula indicates a similar predicament. The structure of the supernova is a shock wave torus of axiomatic change, whose origin has not yet been identified because scientists have not seriously considered the role of the principle of axiomatic change in the universe. As Lyn keeps emphasizing in everything that he writes, axiomatic changes represent the motor of higher energy flux density in the universe, and this is why all aspects of their causality compositional make up are crucial to investigate. Furthermore, that is the moral question of principle required for understanding the *While Owl Effect* in physics as well as in Classical artistic composition. However, as far as the validation of the process is concerned, it is the social tension of sharing the idea that will determine its effect. Take the example of the American artist George Caleb Bingham as a case in point.

4. GEORGE CALEB BINGHAM AND *THE GLASS STEAGALL EFFECT*.

“The creative process of the physical universe is the same as the self-corrective method of the human mind, which is where the future of the universe is located. So, the only way to know what the future will be like is by studying and correcting the mistakes of the past.”

Dehors Debonneheure.

Lastly, let’s take an example of how a doubly-connected manifold can be applied to the shaping of political ideas in the form of social tension expressed by Classical artistic composition. Take the case

of the famous painting of *The County Election* by American artist, George Caleb Bingham (1811-1879), whose bicentennial anniversary is being celebrated this year. (See the recent report sent to EIR for publication by Steve Carr on the 200th *Birthday of George Caleb Bingham, America's Most Political Artist.*)



Figure 9. *The County Election*, (1852) by George Caleb Bingham (1811-1879).

The irony of *The County Election* is that the doubly-connected manifold forces the political process into an inversion; that is to say, in a movement toward a collision such that the more you attempt to suppress the truth, the more you accelerate the process of its revelation. The same thing is currently happening with the fight to implement Glass-Steagall today. As you will soon be witnessing with the *Glass-Steagall Effect*, worldwide, an inversion of the dead monetary system must soon take place, inevitably, because the truth is that only the inversion process by Glass Steagall can prevent the political universe of this planet from coming to a screeching halt. Ironically, this doesn't mean that it is the size of the vote for or against a particular bill in Congress that will force the political change in the nation, but a historical crisis that carries within it an inevitable axiomatic inversion, something like a *Pearl Harbor Effect*. The arrest and trial in New York City of the head of the IMF, Dominique Strauss Khan, has already begun this process of inversion.

Bingham's painting represents a Riemannian thought-experiment in American politics which is the same as what could be called *The Glass Steagall Effect*. It represents an axiomatic change through the singularity of an anomaly which elevates the subject matter from a lower manifold of local politics to the higher manifold of universal principles. However, the principle to be discovered, here, is not perceived by sense perception, but only through the mind that pays proper attention to the direction and intention of history. Throughout his artistic career, Bingham developed extensively the idea that there could be no long view of the future of America without a constant correction of the past, and this painting is a very good example of this corrective truthful measure. Study that painting carefully.

The scene of *The County Election* is, at first glance, an illusion, a representation of how elections used to take place in a typical Midwestern rural setting, during the middle of the nineteenth century, when the process of voting was not yet regulated on the frontier, when you still had slavery, and when women did not yet have the right to vote. However, don't be fooled by the mere idiosyncratic appearances of the tableau. The issue is of universal character. The vote being taken is, believe it or not, a variation of the vote on Glass Steagall, today. It has to do with a confrontation with the British Empire. Moreover, like a Shakespearian tragedy, this painting is not a fiction, but a performative representation of reality in the format of Edgar Allen Poe's *Purloined Letter*.

The painting is historically specific by the fact that the scene represents Election Day 1850, in Saline County, Missouri, where the artist himself ran for a seat in the State Legislature. G. C. Bingham, who portrayed himself sitting on the courthouse steps sketching, lost his election against E. D. Sappington, whom he depicted as the man in the blue coat tipping his high hat and handing his card to a voter at the top of the stairs, just before his name was sworn-in as a means of casting his ballot. However, the painting does not make any sense if the spectator does not seek to discover the underlying truth of the matter lying behind this scene, and does not supersede the local event from the vantage point of understanding the longer perspective of what was then the fight over the principle of what was termed American political economy.

While the scene depicts local characters that most of his contemporaries would recognize in the foreground, including an indictment against his opponent – Sappington reportedly bought votes with liquor, and was related by family ties to the performing electoral judge (in blue on the balcony) and to one of his clerks – Bingham introduced in this scene a much higher dimensionality than this factor of cronyism. Bingham chose to introduce an irony which acts as a typical Riemannian singularity that permits the spectator to go from a lower to a higher manifold. It is in that sense that *The County Election* reflects the geometry of a doubly-connected Riemannian manifold. The two complementary motions of the manifold are as follows.

First, at the lower level, the entire canvas is filled with typical political idiosyncrasies that one expects to find in the merry-go-round of any western frontier County Election of that period. You can relish this by discovering all sorts of small details that Bingham has judiciously chosen to characterize the proximity of this caricature of a typical nineteenth century political process. However, at the other end of that deceptive proximity, Bingham added a dark cloud which is about to overcast this “Americana” display of clueless local politics of pleasure and pain, and which was deliberately made to disturb the thinking observer and lead him to discover and experiment an axiomatic inversion.

Secondly, Bingham chose to introduce the singularity of a precursor that is forecasting something ominous that would happen again, unless certain things were changed. Examine closely the sitting drunken businessman in the left foreground, who is already savoring the rigged victory of his candidate, as he is being served another glass of hard cider by a slave. Pay attention to what is happening right next to him to the left and to the right, and in the distance behind him, in contrast with his clueless attitude. To the left is located injustice, to the right the cause of that injustice, and in the back, the solution to the problems. Behind the backward reclining posture of this clueless character, Bingham introduced a tiny little shadow representing Paul Revere galloping across an otherwise empty town square. That singularity is covered by the shadow of a dark cloud which is only partly visible, but which is about to overcast the whole scene. Why did the artist introduce such an anomaly? Is this announcing the coming of some sort of stormy event? Is this a case of out of sight out of mind?

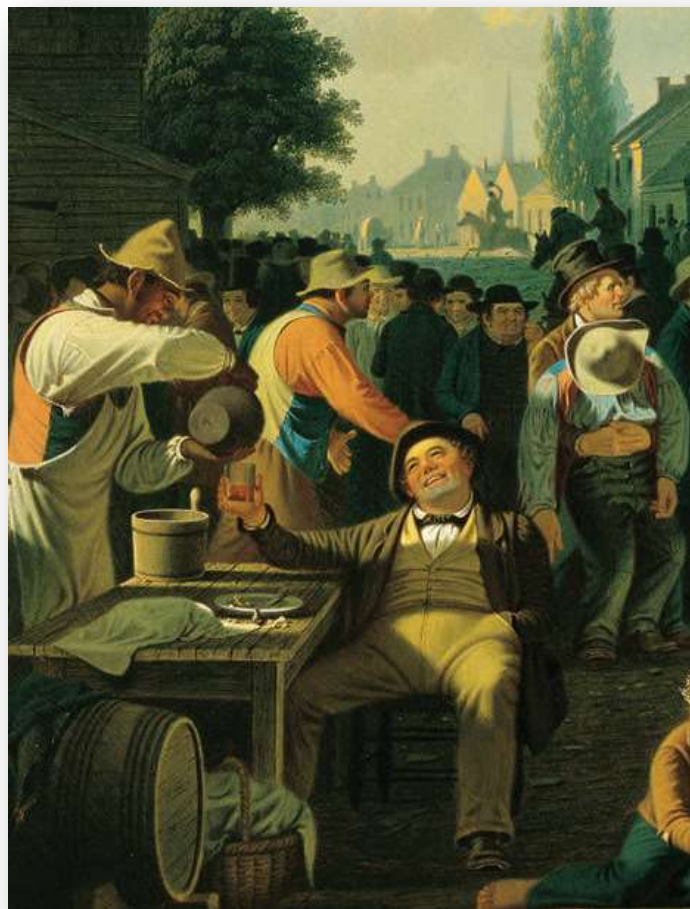


Figure 10. *The County Election*, detail. (1852)

What is that suppose to mean? What is the nature of this small and apparently insignificant shadow anomaly? The fact is that this anachronistic element, which should not be there, because it comes from another time and another place, changes the whole meaning of the painting, and raises the time issue to the level of time reversal in the simultaneity of eternity. The painting is no longer what it appears to be.

It is a reminder that this nation had changed the rules of the game and was no longer at the mercy of British Common Law, but was based on Republican Constitutional Law.

By introducing this little shadow as a corrective element into the political scene, and by restoring the memory of what was missing in the political process of that local election, Bingham caused a Lydian dissonance to emerge as a precursor of change within the boundary condition of the new American nation. That is the shadow precursor of *The Glass Steagall Effect*. By introducing a universal historical element which completely destroyed the myth of liberal local politics, Bingham forced the uplifting of the observer to the higher dimensionality of the true historical American purpose. This is how you change the past by politically organizing the population with Classical artistic composition.

Therefore, this shadow is no longer a little shadow behind the scene. It is the needed correction that wrenched the political orbit of *The County Election* back into its true course. That shadow has now become the key to the scene itself, forcing the citizen to look at the political process from the top down and not from the bottom up. Once you have discovered this, you can no longer ignore it. It becomes the constant reminder of recently past historical events which implies the interaction of two different sets of ideas: one is the rotating field of tragic currents of events in local American politics which need to be changed, and the other is in the form of an orbiting moral imperative that the perspective of history has to make in shaping the content of all local community life. In other words, the political will has to change and correct the past in order to secure the future. Thus, Bingham created the formation of a doubly-connected manifold within the context of the interaction between the establishment of new political settlements in the mid-western state of Missouri, and the national purpose of moving further westward to complete the American nation, from coast to coast. This is how Bingham introduced into county politics the Lydian dimensionality of Manifest Destiny as the true American dream. Today, we have to move further west to Asia in order to complete this unfinished mission.

This is what a Riemannian doubly-connected manifold is expected to do when the domain of Classical artistic composition introduces a political irony to force a change on the stage of the citizen's creative imagination. Therefore, this provokes the question: what sort of political irony would be required for our situation today? What is the measurable degree of dissonance that you must create in order to change your own local culture, today, which will deserve to become immortalized as an appropriate shadow of the current political situation? Bingham's *The County Election* represents the measure of change that will decide, retrospectively, if the singularity you introduce to change the rotten manifold of today's politics is morally fit to survive or not.

Such a measure of change, however, has nothing to do with being acceptable or not. It is not ultimately subjected to an agreement or a vote, but only to your self-consciousness and to your will to change the world for the better. In fact, you have no choice in the matter, because this is not democracy. Acceptability of public opinion does not enter into the equation. It is only the truth of the measure of change which has the power to impose itself. What counts is the moral congruence between the two contradictory motions that you want to develop as the measure of change in a doubly-connected manifold, not some popular opinion effect that you wish to create with the size of popular support. This is where the idea of "*Beauty is Truth and Truth is Beauty*" gets realized outside of the visible domain of size into the solitude of your own political leadership.

In conclusion, if and when you discover the function of such a shadow as the Paul Revere of Bingham, or any other shadow of truth, and before it gets to be completely formed as the central interlacing function of your mental manifold, evaluate the content of this new moral singularity by going through the historical memory of mankind, as if you were testing its value through the field resonance of immortal friends that you are in silent communication with, such as Plato, Cusa, Leonardo, Kepler, Leibniz, or Bach, Mozart, and Beethoven, and get them involved in the fight for the higher hypothesis that you are planning to generate. They are your friends, but they are also your judges whose role is to back you up, but also to keep you in check. So, don't let the cat out of the bag until you are good and ready, and not before you have checked with them. Then, you will discover that, as you are going along, other ideas you had formed in the past, either tend to reject the new idea in order to maintain the status quo by going along to get along, or they will stand corrected and will become changed dramatically by the truthful change you have introduced. Then, and only then, you will be able to determine if the precursor you have discovered is validated or not. This is the way the past is always alive and changing. How about you?



Figure 11. *The White Owl Effect* of the Puyehue-Cordon Caulle Volcano dust cloud, Chile, June 5, 2011.

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