
LEONARDO DA VINCI'S 500th ANNIVERSARY

1519-2019

The unity of science and artistic composition underlying the *Sala delle Asse* and
The Last Supper

by Pierre Beaudry, 4/23/19

FOREWORD

Five hundred years ago, on May 2, 1519, the greatest genius who ever lived died at the Amboise Castle in France. His name, Leonardo di ser Piero da Vinci, more commonly known as Leonardo, will be remembered for all times to come, because he developed the talent of making others discover the pathway to the creative process of the human mind in a way that no one else has surpassed.

Today, we celebrate the 500th anniversary of Leonardo's leaving mankind a heritage of the sciences of anatomy, architecture, astronomy, botany, cartography, drawing, engineering, geology, geometry, history, mathematics, music, painting, physical science, sculpting, and writing. Most of all, Leonardo epitomized the Renaissance humanist ideal of man.

This report is on the epistemological significance of the ceiling decoration that Leonardo painted in the *Sala delle Asse* in the Sforza Castle of Milan during the two year period of 1495 to 1497. Was this fresco a mere decoration or was he giving us a new discovery of principle? The fact that this so-called "decoration" was painted at the same time that he composed *The Last Supper* is not a coincidence. There exists a hidden discovery of principle between the two.

THE GEOMETRY OF NUMBERS BEHIND THE *SALA DELLE ASSE* AND *THE LAST SUPPER*

“Let proportion be found not only in numbers and measures, but also in sounds, weights, times and positions, and whatever force there is.”

Leonardo, *Manuscript K.*



Sala delle Asse, Milan Italy - Leonardo da Vinci's ceiling, imitating the texture of leaves in a forest. Inside the Sforza Castle. <https://www.pinterest.com/pin/64880050854653813/>

The *Sala delle Asse* that Leonardo painted for the Duke of Milan from 1495 to 1497, is a giant *trompe l'œil* which represents 16 mulberry trees converging toward the center of a gothic canopy ceiling measuring 225 square meters whose trunks, drawn down to half the height of the four walls, appear to have taken root underground in the lower half of each wall. Of all of the paintings on the four

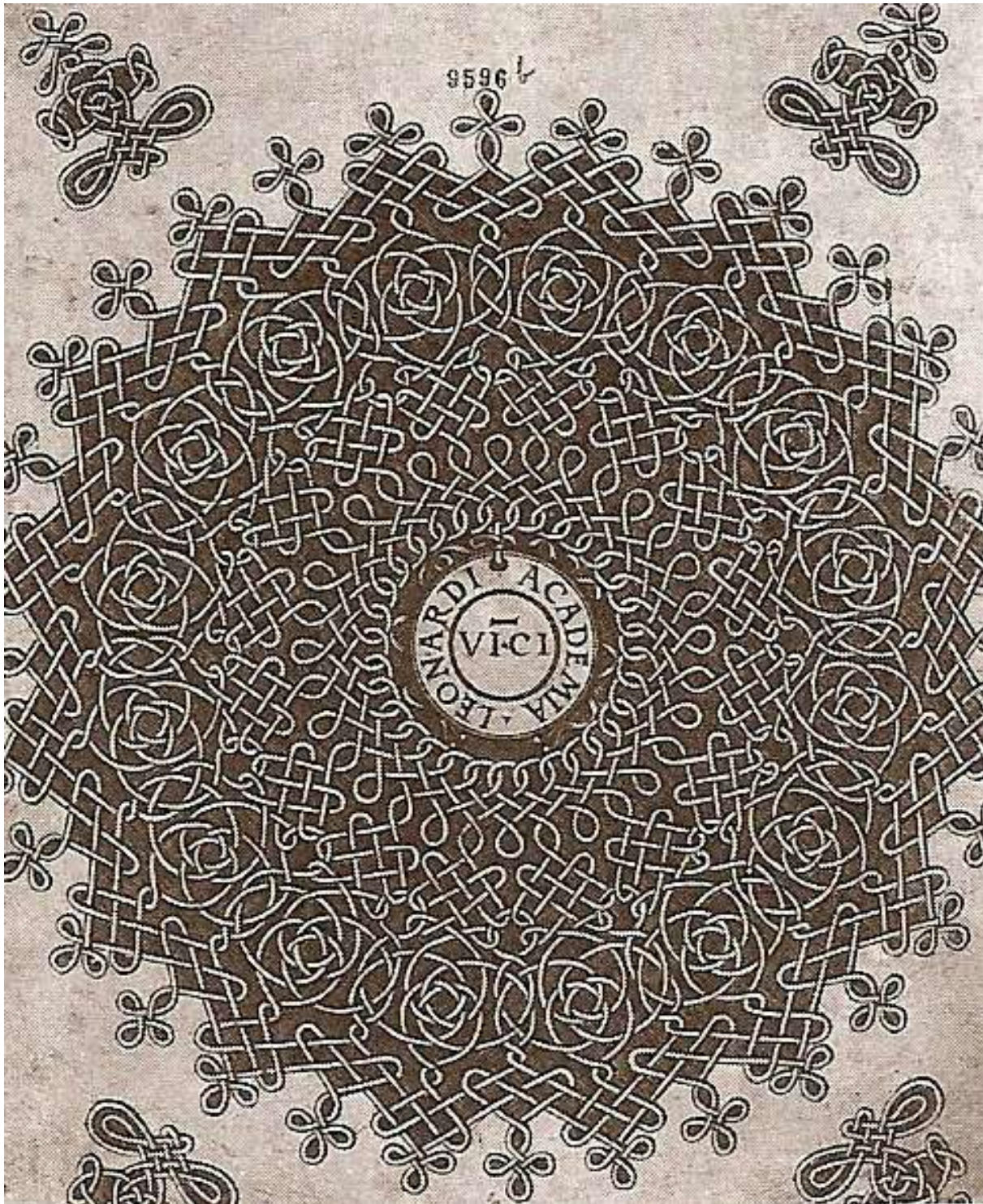
walls, there is only a single monochrome painting¹ remaining which shows roots cracking through stones. This unique composition appears to reflect the dynamic power of the creative process which, once initiated from the top down, can no longer be contained and must burst through everything it penetrates. The conception of this fresco is a real axiom buster.



Fragment of the 1954 restoration showing roots insinuating their way through the stone structure.

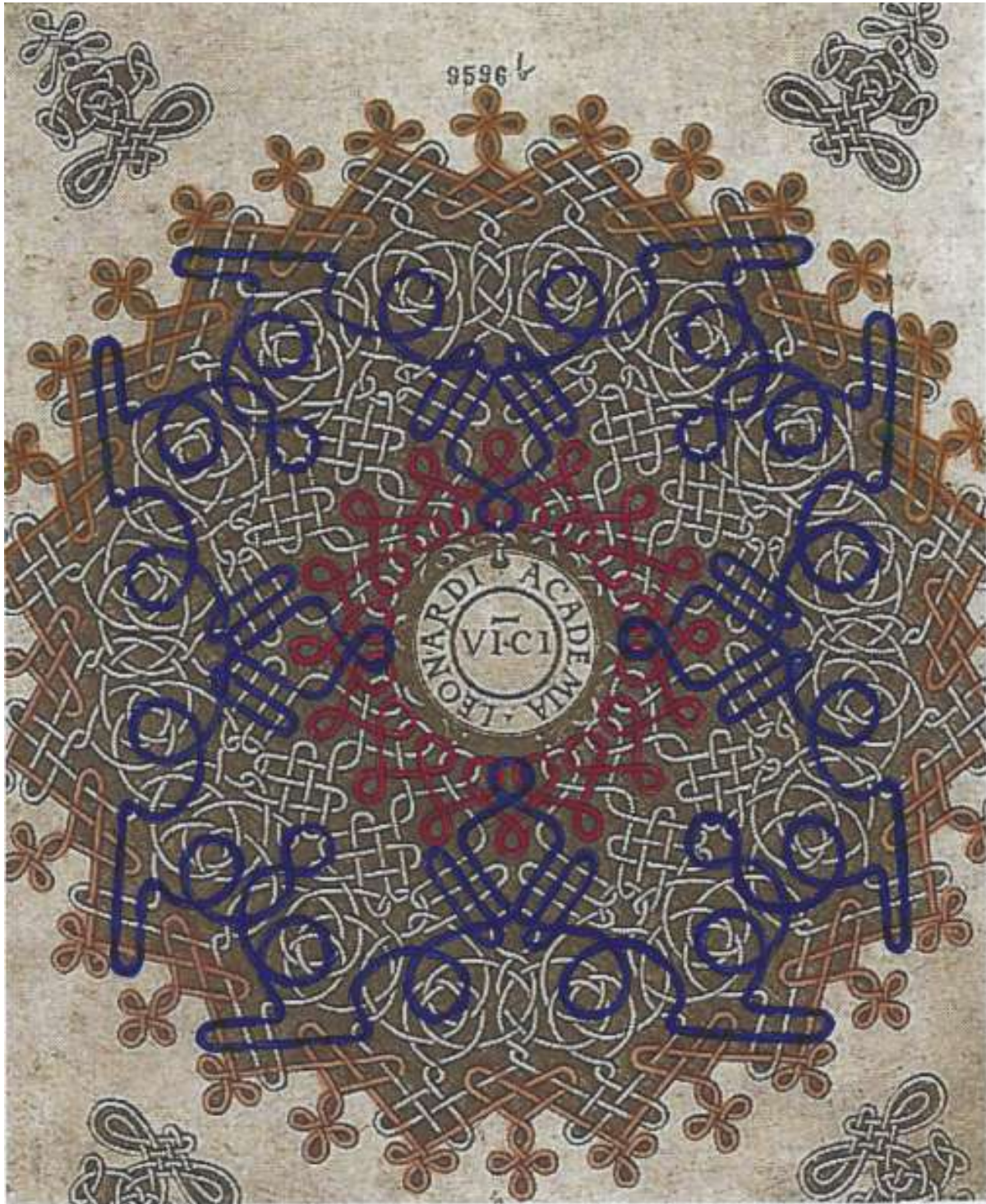
The idea of the mulberry root is the root of another idea. Leonardo's choice of such a decorative arboreal motif comes from the surname of his patron, the Duke of Milan. The composition was meant as a commemorative gesture toward Ludovico "Il Moro", whose surname in Latin and Italian means "Mulberry." The painting is also a testimony to Leonardo's untiring quest for drawing the spectator into discovering the underlying principle of creativity which is the principle of the unification of science and artistic composition.

¹ Leonardo da Vinci: *The Sala delle Asse of the Sforza Castle*, Hardback by Michela Palazzo, Francesca Tasso. "The 'Monochrome' of the Sala delle Asse is a portion of wall decoration left at the drawing stage and represents the roots of one of the sixteen mulberry trees that, regularly spaced on the walls of the room, intertwine above to create a polychrome arboreal pavilion on the vault."



Leonardi Academia logo. Emblem of school of Leonardo da Vinci.jpg. Wikimedia

The underlying principle can be represented in the form of a Logo that Leonardo composed during this same period for his Milan Academy.



Three different motifs, brown, blue, and red

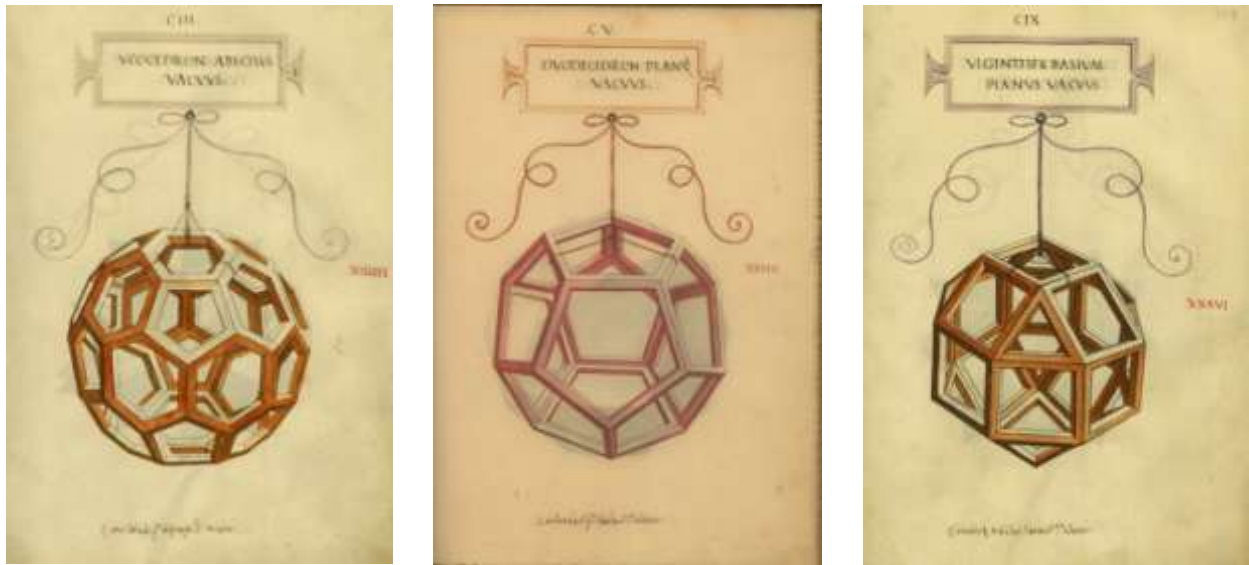
Is this composition science or art? Here, the reader may be misled by the sixteenth century historian, Giorgio Vasari, who misinterpreted the composition stating that the entire construction was generated from a single continuous string twisting into a single series of 32 knots around a torus.² The misconception led historians and scholars to believe that the knotwork was a maze or a labyrinth that Leonardo challenged his observer with. In fact, Leonardo's concern was to elaborate a geometrical method of causing axiomatic transformations in the mind of his observer by making him discover the underlying principle of geometry behind living and thinking processes.

Leonardo's logo indicates that it is constructed from three different interwoven motifs.³ The three motifs are as follows: the primary fivefold motif (blue) is rotated eight times around the torus and is replicated four different times ($8 \times 4 = 32$). The outer rim fourfold motif (brown) covers the entire outer circumference 32 times, while the inner threefold motif (red) covers the inner rim 16 times. These three motifs represent pentagonal rotations, quadratic rotations, and triangular rotations. Thus, the Leonardo Logo represents a transformation of the three primary plane geometrical figures, triangle, square, and pentagon, into the higher domain of toroidal geometry. 1496 is also the year that Leonardo collaborated with Fra Luca Pacioli in writing and illustrating *De divina proportione* which included the Five Platonic Solids and other derivatives.⁴

² Jessica Hoy and Kenneth C. Millett, *A Mathematical Analysis of Knotting and Linking in Leonardo da Vinci's Cartelle of the Accademia Vinciana*, Department of Mathematics, University of California, Santa Barbara, Ca. 93106, USA, November 3, 2014. The authors reported Vasari as saying: "Leonardo spent much time in making a regular design of a series of knots so that the cord may be traced from one end to the other, the whole filling a round space." page 1. <http://web.math.ucsb.edu/~millett/Papers/Millett2014Leonardov5.pdf>

³ As I show near the end of this paper, a single string is allowed only when the P/T ratio has no divisor, or when the four sides of a rectangular knotwork have no common divisor.

⁴ See Daryl Green, [*Luca & Leonardo – The Divine Proportion and a lifelong Renaissance friendship*](#), March 5, 2018.



Leonardo drawings from the manuscript of *De Divina Proportione*, Bibliotheca Ambrosiana. 1496

What does this all mean? It is meaningful for the geometry of numbers, crystallography, and living processes, but how can this be also meaningful in terms of epistemology? As I will show at the end of this report, Leonardo solved the paradox of squaring the circle by going from simple circular action into doubly-connected circular action and triply-connected spherical circular action. I like to think of the relationship between the three knotwork motifs as being a reflection of the proportional integral interaction among mind, light, and matter being created as orbital functions like those of a planetary solar system. However, it is the living evolution of the human species as a whole which causes axiomatic transformations in the minds of human beings, not astronomy.



Fivefold



Fourfold



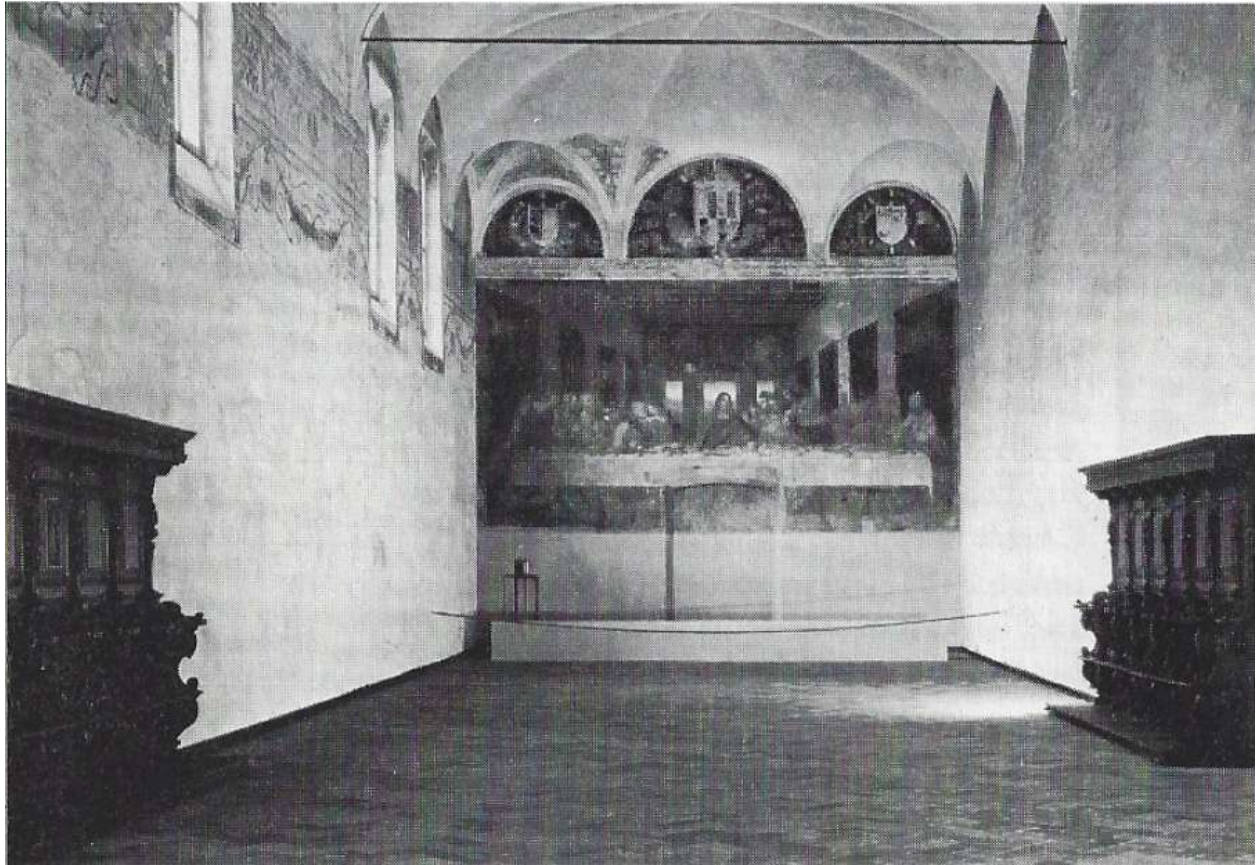
Threefold

During that period of history, in Milan, Leonardo was going through a particularly difficult period of axiomatic transformations filled with theological, scientific, artistic, and strategic knots that needed to be untangled and unified into a single whole constructed from a single principle. One such knot is that, in 1494, Ludovico il Moro became the Duke of Sforza in Milan and hired Leonardo as his artist-engineer advisor at the moment when the Duke called on Louis XII of France to support him in his fight against the alliance between Pope Alexander VI and the king of Naples, Alfonso II, who were threatening to take over Milan.

How did Leonardo construct a higher manifold uniting science and artistic composition during such a tormented period and with such playful decorative knotworks? How can he create a unity of conception which can bring together the domain of God's nature and the domain of the human artistic imagination? Moreover, how can a painting represent reality and the process of transformation of that reality at the same time? There is only one answer to these questions: art and science must have the same mission of improving the human mind that is created in the image of God, and in so doing, they must also have the power of changing the way the human mind thinks. Both the *Sala delle Asse* and *The Last Supper* had that epistemological purpose as both became metaphorical emblems of the unity of science and artistic composition. But, how was such a unity achieved? It was done through the axiom busting device known as a *trompe l'oeil*; that is, through a dramatic three dimensional optical illusion which transformed reality into a true extension of artistic composition. What Leonardo demonstrated is that reality is not what it is perceived to be.

Leonardo understood that the mystery of life itself was the mixture of two opposite principles that worked only when they were unified together; one was a motif which had the form of a polygon, and the other was a complex circular action organizing a series of such motifs to form a complete organism known as a Platonic Solid. This is much like the problem confronting biologists today, whereby if one can account for all of the chemical components of a living organism, one cannot account for how life is breathed into them. The answer can be found in the principle underlying the *trompe l'oeil* of *The Last Supper*. Life is

not in the individual part of the organism; it is in the ordering principle which brings all of the parts together.



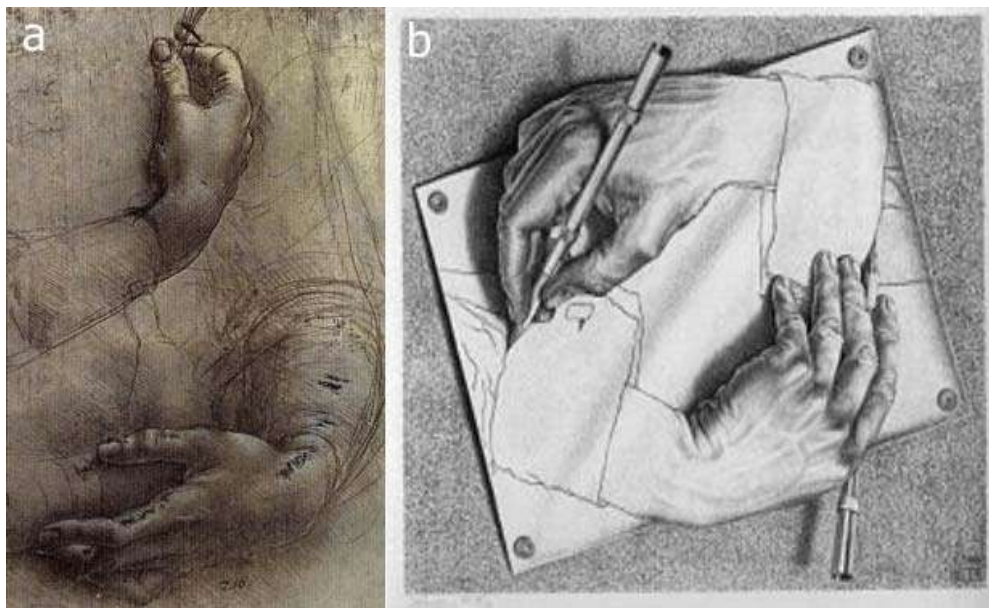
The continuity between the refectory room and *The Last Supper* is so real that even the light projected from the left windows of the refectory is replicated inside of the Leonardo fresco.

While he was living at the Duke of Milan's castle, Leonardo replicated the same conception of a *trompe l'oeil* with his masterpiece of *The Last Supper*. He worked on the two frescos alternatively during the same period of time and impressed on both the same principle of composition. The setting inside the refectory of Santa Maria delle Grazie was meant to replicate how the creative process of the human mind is able to be identified with the mental dynamic represented through the axiomatic turmoil created by Christ during the last supper. Similarly, the setting of the *Sala delle Asse* was meant to represent how vegetation

varies similar motifs which twine and untwine as if nature had been created to replicate itself from the same law of change as that of the creative human mind.

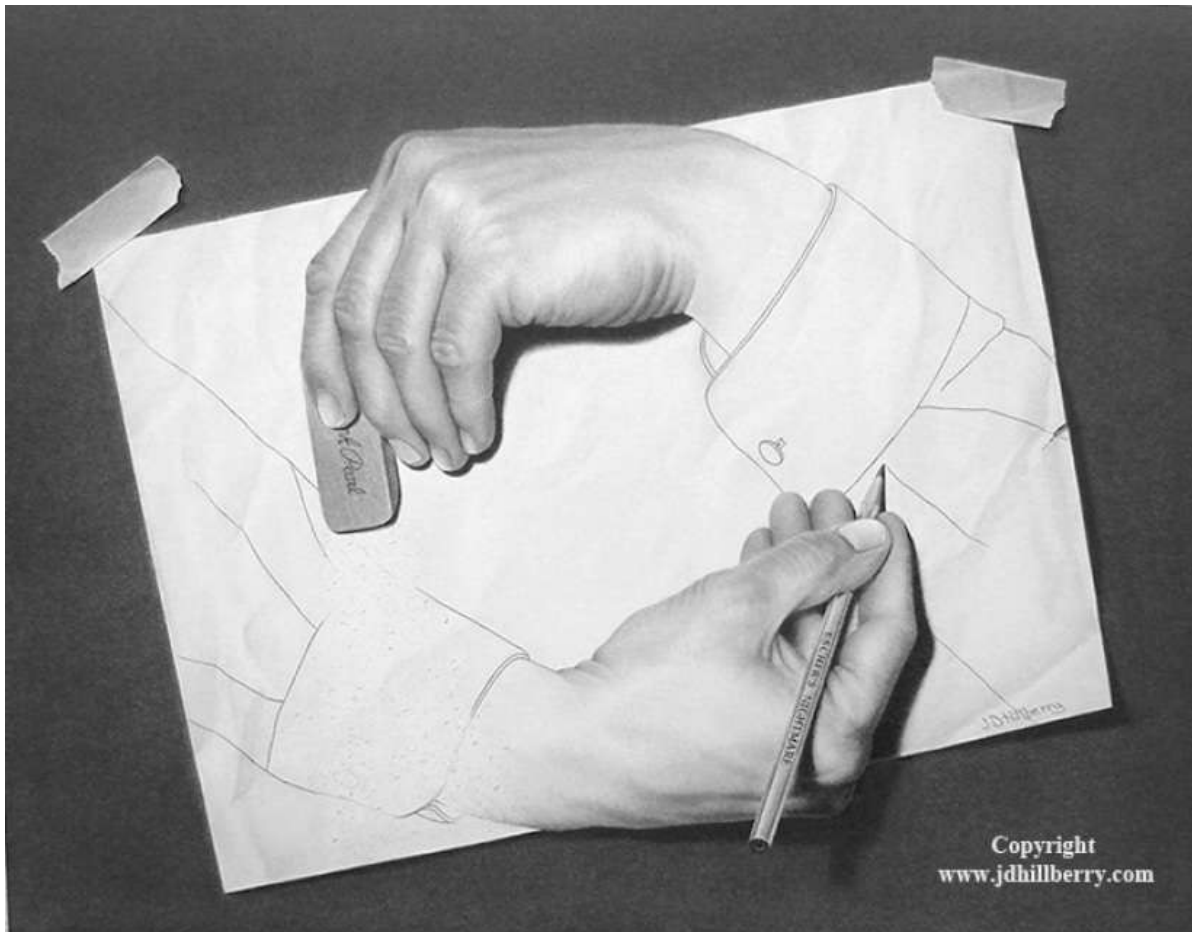
In that context, the idea of the *trompe l'oeil* has a very special significance which the reader should pay special attention to. The more profound significance of a *trompe l'oeil* is often missed because the perception of it tends to obscure the conception of it. As a result, the *trompe l'oeil* tends to be viewed simply as a visual trick. In fact, its purpose is not merely to display the illusion of a three-dimensional object piercing through the surface of a two dimensional plane; it is a metaphor of the creative process of going from a lower to a higher manifold. Its purpose is to cause a change in the mind of the observer through the metaphorical force of discovering the *coincidence of opposites* which leads to the discovery of a higher dimensionality.

THE EPISTEMOLOGICAL ROLE OF THE *TROMPE L'OEIL* AND THE COINCIDENCE OF OPPOSITES



a) A sketch by Leonardo da Vinci dated about 1474; b) Drawing hands by M.C. Escher, 1948.
ResearchGate

The two opposites in the above sketches are not only the left and right hands; they are also the opposite two and three-dimensional domains. Let's examine the idea of the *trompe l'oeil* a little more closely. The drawing or the painting of a *trompe l'oeil* must have, first and foremost, the striking effect of creating a dramatic illusion provoking a state of perplexity; a representation which is so real that you can't believe it is merely an illusion. A good example is the drawing by J. D. Hillberry who has significantly improved on the drawing of the hands from *Escher's Nightmare* and who has ascribed to it a more profound epistemological situation of opposites.⁵



http://www.jdhillbertutorials.com/store/p39/Escher%E2%80%99s_Nightmare.html

⁵ See J. D. Hillberry's tutorials: <https://www.jdhillberry.com/9xxb.htm> and <https://www.youtube.com/watch?v=r6ZsGBp9GLE>

The idea captures the attention of the observer because it focuses it exclusively on the performative creative process of the geometrical change that is produced. How can something voluminous come out of something flat? How can life come out of non-life? In other words, the *trompe l'oeil* strikes you as something that is impossible; that is, where an action in a three-dimensional world cannot be perceived or generated inside of a two-dimensional one.

The paradox that Hillberry drew is the nightmare of every creative mind. At one level, it is a warning about paying attention to what the other hand is doing, but it is more. It is also the expression of a more profound fear. Why should my left hand erase what my right hand is drawing? It is the paradox of the creative process which embodies the fear of seeing the disappearance of one's own creative powers. Why is society periodically confronted with the fear of not being able to break with its past, change itself by improving the well being of its species, and bring itself into a new and better future? This is a moment of Gethsemane. How can one solve such a paradox of the *coincidence of opposites*?

The psychological fact of such torment is obvious, but the epistemological ability to solve it is not as easy to discover, because the underlying assumption of the anguish is based on fallacy. The irony, here, is that the observer can only find relief in discovering that the left hand (holding the eraser) will not be able to wipe out what the creative right hand (holding the pencil) is drawing because the mind, which commands them both, knows that the axioms of the lower manifold must be erased if those of the higher manifold are to take hold. That's the secret of Leonardo's *trompe l'oeil*.

Consider, for a moment, that the purpose of the Leonardo *trompe l'oeil* experiment is a revolution in the domains of science, clinical epistemology, and artistic composition, at the same time, simply by the fact that it demonstrates how the mind is able to surpass itself by going from a lower to a higher manifold. When one passes from a false conception of reality into a higher domain of creative activity for the benefit of all of mankind, one experiences an increase in energy-flux density caused by such an axiomatic transformation, but the passage must also

include the painful moment that Leonardo identified, as if between the notes, in *The Last Supper*.

A truly human society which is based on creativity has the ability to do away with the lies embedded in its own fictitious underlying assumptions and can become creative by the very action of that self-inflicted elimination. Lyndon LaRouche addressed such an axiom busting change when he dictated his historical “Gethsemane” statement from his prison cell in Rochester Minnesota, on January 17, 1990:

“The secret of great revolutions, of great civil rights movements, as Dr. King’s example illustrates, is this capacity, which the Greek New Testament called *agapē*, which Latin called *caritas*, which the King James version of the Bible calls *charity*, which we otherwise know as *love*. Whenever this power of love, this recognition of that divine spark, setting us above the beasts, prevails, wherever people can approximate that view of the sum total of their lives, as if from 50 years after their deaths, whenever movements arise which, out of love, produce people who are willing, not fruitlessly, but for a purpose, to *lay down their lives*, so that their lives might have greater meaning, for this purpose-there you have the great revolutions of history.

“If we were to project events on the basis of what is taught in the schools about revolutions and other struggles of the past, then the human race at present were doomed. If we say that people struggle against this and that oppression, and so forth, and out of rage or whatnot, overthrow their cruel oppressor, we should lose; the human race would lose. However, if we touch the force of love, the spark of divine reason, we unleash a force, a creative force, a divine force, which is greater than any adversary, and we win. Those revolutions, which are based upon the appeal to this divine spark of reason within the individual, prevailed. Those which worked otherwise produced abominations, or simply failed.

“Yes, we must struggle against injustice. But it is not enough to struggle out of anger. We must struggle out of love. And that we learn best,

who have had to walk as leaders of one degree or another, through our own Gethsemane, with the image of the Cross before us.”⁶

THE TROMPE L'OEIL OF THE LAST SUPPER AND THE MATTER OF LYDIAN INTERVALS⁷



Leonardo da Vinci, *The Last Supper*, 1498 (After restoration)

⁶ Lyndon LaRouche, *In the Garden of Gethsemane*, January 1990, reprinted in EIR, September 15, 2017, p. 21.

⁷ See my report: [LEONARDO DA VINCI, THE LAST SUPPER](#).

Now, turn back to the example of Leonardo's *The Last Supper* and consider the revolutionary idea of consubstantiality (*homoousious*)⁸ that is expressed in that painting; that is, the triply-connected socializing process between the divine and the human through Christ. No one, at the exception of Leonardo, had been able to produce a more appropriate social representation of that relationship as in *The Last Supper*, because Leonardo was able to transform the scene from a mere representation of objects into the higher level of intentions behind those objects. In fact, it is only through such a transformation between the dimensionalities of mind and matter that science and art can express the domain of a higher united manifold.

If you look at *The Last Supper* as a process of transformation expressing changes in the three domains of mind, light, and matter, the difficulty can be resolved. Look at Leonardo's *The Last Supper* as a *trompe l'oeil* in the sense of a change of epistemological dimensionality; that is, as a change of manifold provoked by the statement of Christ who just finished saying to his apostles: "One from among you shall betray me." (Mathew 26:20-22) Thus, the twelve apostles became twisted into quadratic dissonant knots in much the same fashion as the grouping of four musical minor thirds twisting the human ear with Lydian spirals of dissonant intervals within the well-tempered musical system. Think of the Apostles of Leonardo's *The Last Supper* as four sets of such intervals of minor thirds and you will be able to hear the resolution of the knotted dissonances.

The monks of the refectory must have been completely inspired and elevated by the applied principle of the imitation of Christ through the Lydian measure of the creative powers that Leonardo had imparted to the connection between the fresco and their dining room; that is, by applying the epistemological rule whereby if the method of imparting ideas to art is the same as God creating natural things, then the principle of scientific discovery must also be understood as being the same as the principle of artistic composition.

It is the performative generation of such a unity of reality/fiction which causes the desired transformative effect in the mind of the observer, provided the

⁸ See my reports: ['HOMOOUSIOUS'](#) and [THE EPISTEMOLOGICAL SIGNIFICANCE OF THE 'FILIOQUE'](#)

purpose is for the improvement of humanity as a whole, past, present, and future. In a similar manner, Leonardo intertwined the mulberry trees of the *Sala delle Asse* with golden knots like light waves, thus achieving the *trompe l'oeil* effect of the coincidence between two incommensurable dimensionalities by means of the golden section.⁹

Play any series of four minor thirds on a keyboard: say, **A, C, Eb, F#**, then **G, Bb, C#, E**, and also **F, Ab, B, D**. In each case, you will hear, in the intervals between the notes, the call to resolution of the dissonances into three different and well-ordered key signatures. The beauty of this little experiment is that it reflects the universe as a whole because **C, Eb, F#, A** generates **C#, E, G, Bb**, which generates **D, F, Ab, B**, which in turn generates **C, Eb, F#, A**. Thus, the universe is based on the higher hypothesis proportionality whereby: *this is to this as that is to that in the same proportion as this is to that*. It is as if there were only a single orbiting motion in the universe and that motion is triply connected into quadratics and biquadratics. Both the mind and the physical universe seem to work according to that principle of proportionality.

THE MUSICAL GEOMETRY OF NUMBERS BEHIND LEONARDO'S KNOTWORK

Let's look more closely at how Leonardo accomplished this amazing feat simply by bringing together artistic composition with the geometry of numbers. As he said: "The artist disputes and competes with nature." The fascinating aspect of

⁹ Fred Haight reminded me recently that Marion Anderson's spiritual [*They Crucified my Lord*](#) had similar Lydian characteristics. He noted then as follows:

	"They	cru-	ci-	fied	my	Lord	
	EGB	F#	ACDEb	GBE			
			(tonic)				
and	he	never	said	a	mumblin'	word.	(repeat)
	F#BD		EGBbC#	DF#B			
			(dominant)				
Not	a	word	not	a	word	not	a
	GBE		F#AC	Eb	GBE."		

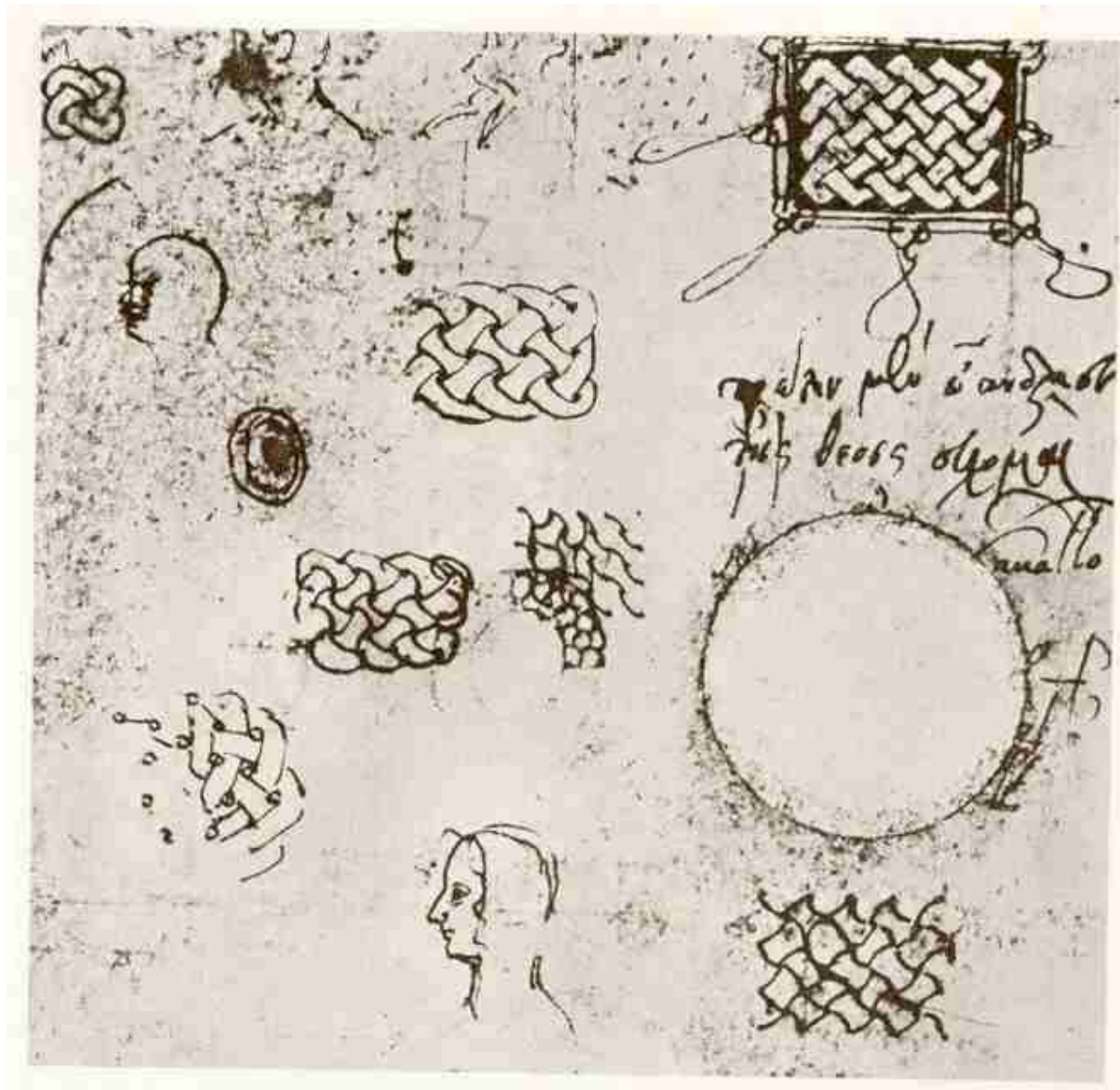
the interlacing process of the geometry of numbers and art is that it is entirely and exclusively composed through quadratic and biquadratic knots. What is so special about quadratics and biquadratics? Since the *Sala's* architectural structure was constructed as a square, Leonardo had no choice but to paint 16 mulberry trees in accordance with the room's preestablished geometry.



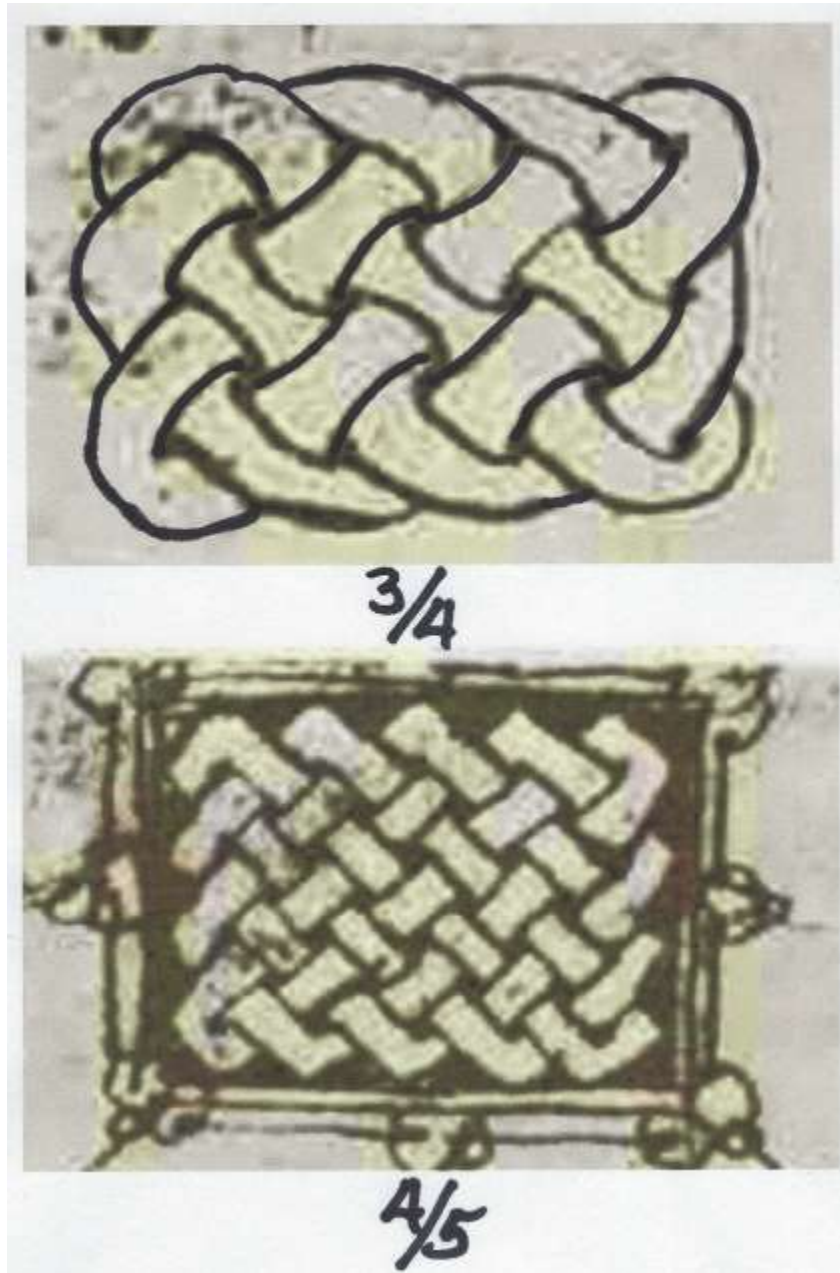
The knotwork is composed of a single string going through 6 quadratic knots. You can follow the pathway continuously with your cursor starting at 12 o'clock and returning to 12 o'clock without interruption. <https://blog.urbanfile.org/2015/11/16/zona-castello-dopo-expo-riprendono-i-restauri-alla-sala-delle-asse/>

Put your cursor on the top left end of the string and follow the meandering loops the string makes through the different branches and you will be able to follow the entire sinuous pathway counterclockwise starting and ending at the top.

From there, all Leonardo had to do was to weave in a series of 16 interlacing knots tying together the array of tree branches with strings which connected them together to form a complete and closed manifold of the musical C-256 series. As I will now show, the series of interlacing knots is based on the quadratic and biquadratic forms of numerical combinations underlying the well-tempered musical system.



Leonardo's solution to squaring the circle by knotworks

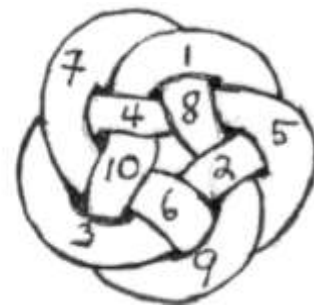
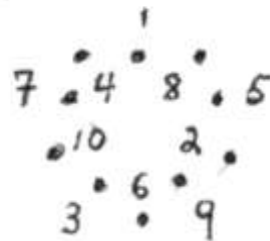
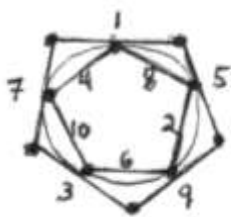


Leonardo knotwork details

Rectangular knotworks are formed by single strands when the ratios of their sides, like $3/4$ and $4/5$, have no common divisors. Note how both knotworks rotate clockwise and counterclockwise after every 3rd and 4th turn.

What Leonardo discovered was what Lyndon LaRouche called the principle of increasing energy-flux-density inside the mind of the observer. The way this principle expresses itself is through elevating the mind of the observer to a higher dimensionality; in this case, by going from the simple form of flat circular action to the next higher level of a doubly-connected circular action of weaving knots of positive and negative curvature. This idea was perfectly congruent with Leonardo's idea of the *trompe l'oeil* in which a three dimensional object is able to pierce through a two dimensional surface and shock you into discovering such an apparent impossible transformation. However, this raises the question as to why such intervals of action work with 16 and not with 18 or 20. The answer is that number 16 pertains to the well-tempered system of the natural musical scale of C-256 series.

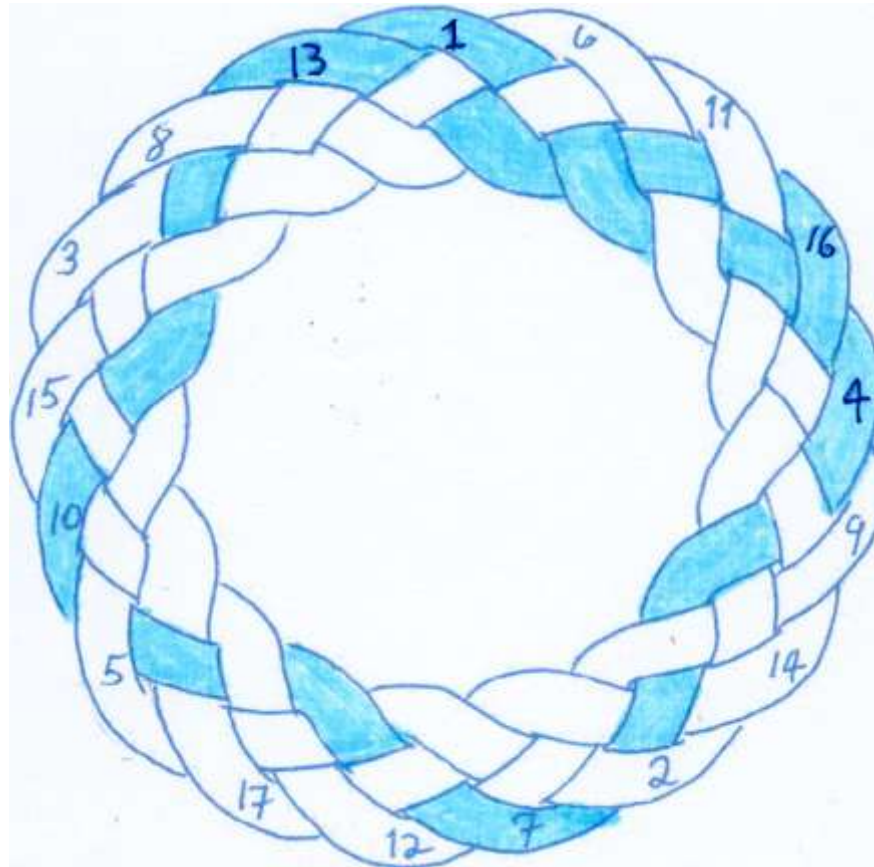
Strikingly, Leonardo's search in these complex matters is not mathematical, but entirely epistemological in character. He is reexamining thoroughly the axiomatic question of squaring the circle in the same spirit that Nicholas of Cusa had investigated it before him.¹⁰ Here is an illustration of how Leonardo was able to solve the problem by replacing the sides of polygons by transforming them into intervals of action, thus making your mind jump from two to three dimensions.



Squaring of the circle by playing between the notes of a knotwork whose ratio is $P/T = 3/5$. The total number of poloidal waves is $1+3+9+7=20$

¹⁰ See my report: [THOUGHTS ON HOW TO CONSTRUCT AN AXIOMATIC CHANGE](#)

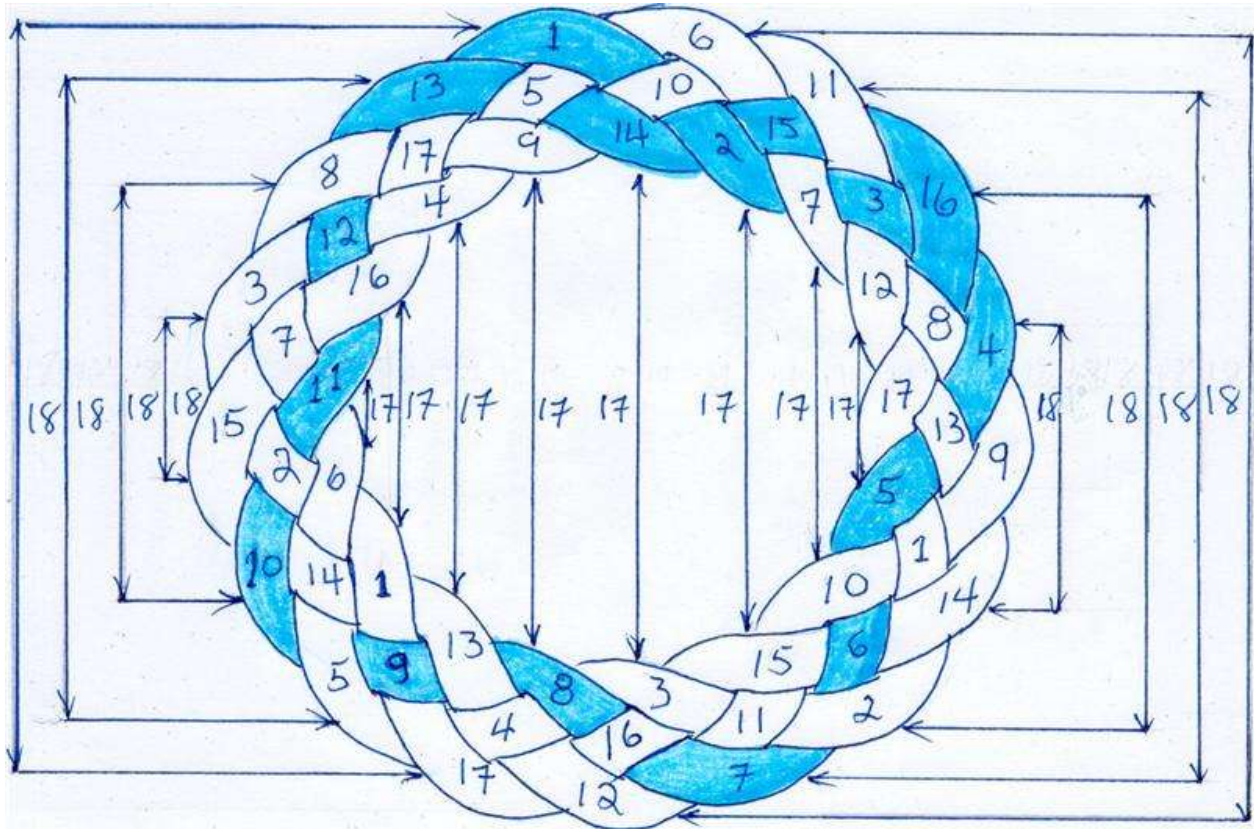
The design below follows the principle of the musical octave progression of the C-256 series; that is, 1, 2, 4, 8, 16, 32, 64, 128, 256, etc., where each previous number becomes a multiple of the subsequent one. Leonardo's construction can be easily applied to the Poincaré-Gauss geometry of numbers, especially to the ordering of primitive roots and biquadratic residues. Take the case of 4 modulo 17 as applied to the biquadratic knotwork below.



Biquadratic Modular wave with P/T ratio = 4/17

The four power waves of the biquadratic residues are 1, 4, 16, 13 and they generate a total of $1 + 4 + 16 + 13 = 34$ poloidal waves before returning back to 1. As a result of this Poloidal/Toroidal action, the knotwork displays an amazing series of reciprocities in the balance of opposites by breaking through all of the powers of 4 with respect to 17. If you think like Leonardo in terms of field-interaction as opposed to object-interaction, you should have no difficulty in understanding this construction. The same geometry may be applied hypothetically

to black holes where the fields of positive and negative curvature coincide to form a ring of axiomatic transformation.¹¹ However, the geometry of black holes is not about the holes themselves; it is about the poloidal-toroidal field being generated around it.

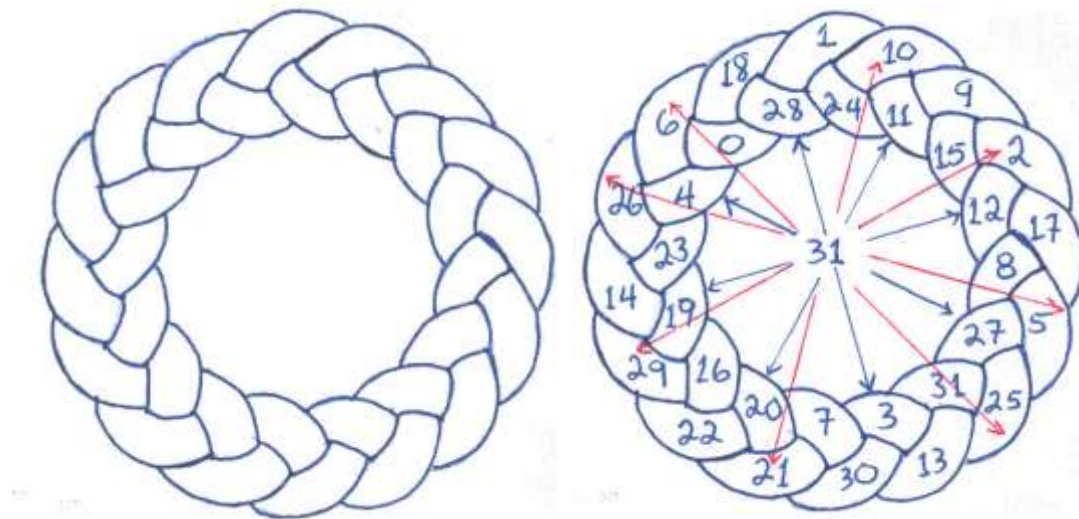


Biquadratic reciprocity in the balance of opposites

A similar configuration can be found with a knotwork of a P/T ratio of 3/16 below. This process works very much in the same way as a Lydian spiral action in the well-tempered musical system; that is, where every new interval of action is expected to fill some empty space in the immediate future, in accordance with the *analysis situs* requirements that Leibniz had originally established. As Leibniz wrote:

¹¹ See the interesting hypothesis for the geometry surrounding black holes in the following YouTube: <https://youtu.be/zUyH3XhpLTo>

‘Following the games that depend only on numbers, we have the games which further involve the situation, such as backgammon, checkers, and above all chess. The game called Solitaire also pleased me enough. However, I am considering it (*analysis situs*) in a reverse manner, that is to say, instead of undoing a composition of pieces, according to the rule of this game, which calls for jumping into an empty place, and taking away the piece on which we jump, I thought it would be more beautiful if we reestablished what had been undone by filling in a hole on which we jump; and by that means, we could propose to form such and such a given figure, if it were doable, as it surely could be done, since it was possible for it to be undone. But, some will say: ‘what is the purpose!’ I would respond, to perfect the art of invention; because we should have methods for solving everything that reason can put before us.”¹²



Knotwork P/T ratio of 3/16 with 32 intervals of action

Follow the waves sequence of the numbers in their order of distribution, from 0, 1, 2, 3, 4, 5, etc., moving clockwise until you reach interval 31. Starting from 0 to 1, *count the numbers as intervals of action and not as things in and of*

¹² See my report: [ANALYSIS SITUS OF WHOLE NUMBER RECIPROCITY AND HOW TO MAKE AN AXIOMATIC CHANGE](#)

themselves. Add a new unit of action after every series of intervals you jump over until you have completely filled the knotwork spaces using all of the numbers from 0 to 31.

Every multiple of the musical octave progression of the C-256 series is characterized by such a unique form of acceleration that no other series can create. Why does the C-256 series accelerate with every step and why does one encounter an empty spot at the end of each additional number of intervals? I don't know, but if I had to make a hypothesis, I would say along with holistic physicist, William Day, that this sort of acceleration is a means of understanding universal motion in a completely new way; that is, in a closed rotational and orbital space. However, as Day identified, some axioms will have to be abandoned:

“From the physics for light and fields, Mach's principle is unnecessary. There is no inertial motion. Motion in space is due only to non-uniformity by gravitational fields from other matter and is therefore closed, which is to say, orbital. With motion closed and orbital, it is finite. It is not the rate of motion of an orbit, therefore, that is absolute. It is its length. Instead of seeing motion as a rate, for orbital systems, we need to think of it in its totality. An orbit consists of and is based on total motion.

“This principle has direct support from the medium and our suspension in it. Any force against the suspension (inertia) of a body in space is transmuted to a displacement. And since all motions in space are orbital, then the displacement span is added to the length of the orbit. This, of course, is exactly what we witness when propulsion is added to a satellite in orbit. The satellite doesn't go faster, it goes farther. It moves to a higher orbit because the orbital length has been increased.”¹³

What this new view of physics implies for understanding Leonardo's discovery of principle is that the idea of the medium of pictorial space understood as a field of interactions among the twelve subjects of *The Last Supper* is an exemplar of the true cause of universal motion and of the resolution of dissonances

¹³ William Day, *A New Physics*, ed. Foundation For New Directions, Cambridge Ma, 2000, p. x. See: <http://www.non-newtonianphysics.com/index.htm>.

in physical space-time. This higher reality has been denied by most artists and scientists since ancient Greece, because of the long standing refusal to rid the mind of the belief that the Earth is stationary and that everything else in the universe rotates around us. If the scientific world had listened to Leonardo, the idea of space as a void would have been replaced by fields and the idea of force would have been replaced with the idea of motion.

From the vantage point of Leonardo's genius discovering this principle of change, therefore, I would like to end this report with the following question: What if mind, light waves, and physical matter were three expressions moving within a single universal medium which sustains universal motion and determines the velocity of change in the universe as a whole; that is, the medium of a higher ordered *curvature of matterofmind*?

If that were the case, then science and artistic composition would have only one fundamental question to answer and scientists would have to work together with artists in order to figure out how to determine the *curvature of universal change*. Then, would we not all have to think like Leonardo?

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