THE CARTOUCHE OF THE DOUBLE PORTRAIT OF LUCA PACIOLI AND PUPIL.
THE DA VINCI'S ENIGMA DECODED

Carla Glori

The cartouche with the mysterious inscription and the disquieting fly

Part. Leonardo da Vinci and workshop, "Double Portrait of Fra' Luca Pacioli and Pupil ", 1495.
Property of the Italian State, Naples, Capodimonte Museum.

«Nam Sibyllam quidem Cumis ego ipse oculis meis vidi
in ampulla pendere, et cum illi pueri dicerent:
Σίβυλλα τί θέλεις; respondebat illa:
ἀποθανεῖν θέλω.»
[Satyricon, Petronio Arbitro,quoted in
T.S. Eliot, The Waste Land]

In Cuma I really saw the Sibyl suspended inside
an ancient bottle, with the children around
asking her : Sibyl, what do you want?
And she replied: I want to die
[English version by Glori C.]

Premise

This is a summary of my research on the decryption of the cartouche of the "Double portrait of Luca Pacioli and Pupil "(Capodimonte Museum, Naples). It is the first part of my ten-year study on the painting, which will be the subject of an imminent publication in Italian.

On the basis of the results achieved in this first part (2010-2017) , I consider well founded the attribution of **the cartouche** to Leonardo da Vinci.

Further analyses (2012-2019) carried out on the painting, (including the dossier with the comparative study of reflectographic details), added significant evidence to support the attribution of the entire painting to Leonardo and his workshop (this is the second part of the research that will be published soon).

The present reconstruction is focused on the decryption but it also makes use of partial references to some discoveries that will be the subject of the announced book, as the study on the cartouche cannot be separated from the study of the entire painting. About the reflectographic dossier, I publish here only a significant comparative detail: I decided to publish it in preview because it certifies the irrefutable similarities of the "Double portrait" with "il Musico" (entirely by Leonardo's hand) Moreover this detail is sufficient to offer proof of the provenance of the Capodimonte painting from a Milanese workshop, which we can reasonably consider as Leonardo's own workshop.

However, the point of view chosen here focuses on the cartouche and it is aimed at highlighting the methodological path followed, in order to allow the scientific nature of the decipherment to be examined. In fact - beyond the charm of the perfect Latin anagram-sentences presented here in a reduced sample and referring to the figure of Pacioli, the fly and the VINCI signature - in this context I consider primary to demonstrate the requirement of the scientific nature of the decryption achieved.

I therefore avoided facing in this context the development of the fascinating themes related to the ancient and noble art of the anagram - which constitutes a linguistic enigma that is still insoluble today - and I also left out the presentation of the stories of the Sforzas, which reconstruct the plot of the history of the dynasty in the crucial year 1495, in which the poisoning of Duke Gian Galeazzo occurred, with the usurpation of the ducal title by Ludovico il Moro. It is an amazing chapter of the research, in which the cartouche is a sort of arcane narrative matrix, which however - as I will demonstrate here - generates anagrams (epigrams all marked VINCI) that rigorously respect the criteria of repeatability and reproducibility.

In this synthetic reconstruction, I aimed first of all at focusing on the methodological path and the scientific nature of the results, necessarily leaving aside the linguistic / literary / historical dimension involved in the decipherment of the hundreds of anagram-sentences.

I have tried to expose my complex work in the most didactic and simple way possible to make the text comprehensible to a large readership

i apologize for my "unnatural" Italian/ English

THE CARTOUCHE OF THE
"DOUBLE PORTRAIT OF LUCA PACIOLI AND PUPIL"
THE DA VINCI'S ENIGMA DECODED

Carla Glori

Leonardo da Vinci and workshop, "Portrait of Fra' Luca Pacioli ", 1495. Oil on panel,
property of the Italian State, Naples, Capodimonte Museum.

*Bold ideas, unjustified anticipations, and speculative thought,
are our only means for interpreting nature: our only organon, our
only instrument, for grasping her. And we must hazard them to win
our prize. Those among us who are unwilling to expose their ideas to
the hazard of refutation do not take part in the scientific game* - K. Popper

Foreword

Given my artistic and humanistic background, I started from Popper's statement that a scientific theory, as well as human knowledge in general, is irreducibly conjectural/hypothetical, and that it is generated by the creative imagination to solve problems that have arisen in specific historical and cultural contexts.

The hypothesis about the decryption of the cartouche is characterized by a creative approach, open to conjectures, but strictly careful to respect the scientific status of the method. The method I adopted for the decryption is hypothetical deductive. Starting from entirely conjectural initial hypotheses, I have come to foresee consequences and developments that have been tested each time with scientific criteria, methods and instruments..

The peculiar characteristics of my research fall within the definition of "low probability theories" and capable of bringing highly innovative results. In fact, as Popper points out, the probability is inversely proportional to the content or to the deductive power: in reality an assertion with a high probability will be scientifically uninteresting because it is easily predictable and it has little power of explanation. I would like to underline that, at the basis of the surprising decryption and of the daring conjectures and hypotheses that I have conceived, there is the in-depht knowledge of the history of Sforza family and of the subjects involved in it, and the over ten -year study of the portrait of Capodimonte and of the pictorial work of Leonardo.

This summary has the purpose of outlining the methodological path of the research on the cartouche in a didactic key. The decryption has many levels of complexity, but, for the necessary clarity, I have chosen the simplest form of exposure possible

In this presentation I have preferred to give priority to a sample of anagram-phrases that are more concrete and that best allow to check their direct correspondence with the painting and the significant figures of the black fly and Luca Pacioli, with the geometric shapes and the polyedra connected to his activity. I added also some examples concerning the mark VINCI recurring in every decoded sentence.

This targeted selection of examples (pages 45-47; 50-55), is much more restricted than the large number of anagram-sentences that I deciphered, having as their subject the stories of the Sforza family. This prevailing aspect of my decryption, having the charm of the enigma and of the historic mystery, is supported by historical and archival documents. The presentation of the over three hundred anagram-sentences forming the plot of the Sforzas history around 1495 is very complex and I will publish them in an apposite book.

About the description of the anagram sentences concerning the history of the Sforza family - which I don't summarise in this presentation for the brevity needed - I refer to chapter 20 of the book "Leonardo da Vinci and the Pacioli code", where the author, Jerzy K. Kulski offers a complex and rigorous synthesis of my decryption centered on the Sforza family and the death of the young Duke Gian Galeazzo. I am grateful to Kulski for the demanding and difficult reconstruction of my discovery of the hidden code in the inscription IACO.BAR.VIGENNIS P1495, which he published in the context of his passionate historical reconstruction on the "Double portrait".

As an art historian and critic, I am amazed and deeply fascinated by the deciphering of the scroll, but as a researcher I consider the conclusion of my investigation as a result that I will accept as long as it is refutable, testable and falsifiable and as long as I can rely on a controlled theory.

NOTE: In this context I mainly use the word "decryption" according to the definition of Collins English Dictionary, where "to decrypt" = "To decode (a message) with or without previous knowledge of its key". This definition has a general use according to the origin of the word where DE =from + CRYPTIC=crypt. In the specific context of the formation of anagrams, the word decyption is used also with reference to the definition of the Cambridge Dictionary "to change electronic information or signals that were stored, written, or sent in the form of a secret code (= a system of letters, numbers, or symbols) back into a form that you can understand and use normally".

The Latin anagram-phrases that I have decrypted are perfect anagrams; they are contracted and sometimes requiring minimal integrations due to the limited alphabetical repertoire of the inscription IACOBARVIGENNIS P. + MUSCA. For this reason they cannot correspond to the classical canon, but are nevertheless understandable, grammatically correct and able to form the text (the plot of the stories) with logical and structural coherence.

THE SCIENTIFC DECRYPTION

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A PRELIMINARY CLARIFICATION:
ABOUT LEONARDO'S AUTORSHIP OF THE CARTOUCHE:

FOCUSING SOME REVEALING CLUES

The fly by Leonardo, 1495   L'oiseau ivre, Georges Mathieu, 1987

The analytical study on the cartouche took place at the same time as an in-depth study of the painting based on a documented historical and biographical reconstruction concerning Luca Pacioli, Leonardo and the Sforza family (1495 and subsequent years), which refers to the testimonies of historians and chroniclers of the time .

However, the research on the cartouche and in particular the linguistic investigation about its hermetic inscription has preserved from the beginning an autonomous dimension. The results of the decryption at a certain point implemented the subjective belief that the whole painting was by Leonardo, and this belief has strengthened over time due to the evidence obtained from the reconstruction of the history of the painting and the biography of the subjects involved, and, above all , through the study and research on the Double portrait in its multiple aspects. The relationship between the research on the Double portrait and the investigation carried out on the cartouche was characterized by dialectical correspondences accompanied by autonomous developments, maintaining investigative independence in their respective .contexts.

Initially I intended to limit myself to scientifically decode the enigmatic inscription IACO.BAR.VIGENNIS P.1495.Then, based on the exceptional results obtained in deciphering the inscription, I was convinced that the cartouche was by Leonardo, and in the course of the research I collected a lot of evidence about his autorship

However In this reconstruction of the research on the cartouche the question of its attribution is not directly addressed. Here I offer as a preliminary only some parts of the complex demonstration work on the cartouche, because in this summary the main objective is to demonstrate that its decryption was scientifically reached .. The specific problem of the attribution of the cartouche - and even more for the Double portrait - is left in the background, as it requires an in-depth exposure, which, as announced, I reserve the right to publish soon in the dossier "The double portrait of Luca Pacioli with Pupil Attribution to Leonardo and workshop.

Hans Hartung, Senza Titolo, 1938

Antoni Tapies, Ban de Loo, Cologne, 1972

Emilio Scanavino, Senza titolo, 1955-1956

Georges Mathieu

Giacomo Soffiantino, Fossili

Georges Mathieu, L'oiseau ivre, 1987

It should be underlined that the successful decryption, which I submit to the attention of the scientific community, is not a result in itself without consequences, since - given its scientific requirements - it would already be able to validly support the attribution of the cartouche to Leonardo. Furthermore, the results of the decryption are also corroborated by peculiar artistic aspects, which lead to associate the abnormal and disquieting fly (a small detail that has always catalyzed the interest of experts and art historians), to Leonardo's creative mind and hand.

First of all, it should be noted that the cartouche is original and its authenticity is proved by the reflectography of Maurizio Seracini (1992) and the National Institute of Optics (around 2012).

Furthermore, in my work on the attribution of the cartouche it is highlighted that the author had a highly innovative and diverging personality compared to the aristic canon of his time. In this regard, among other things, it is noted that:

- **THE FLY** - The fly is not comparable with any other fly or insect from the Renaissance period, since on the basis of graphic-pictorial comparisons it is similar to the works of contemporary exponents of informal art and only Leonardo can boast such a bold, visionary and anticipatory production (see the "deluge drawings" Windsor, Royal Library, 1517-18). He experimented on anamorphosis,optical illusions, alterations of perception and other gestaltic anomalies. In some studies Leonardo exposed his anticipatory knowledge in the field of perception and psychology of form, also dealing with "subjective effects" and "vision errors". For example, he wrote that looking at a wall spotted with stains, or with a mixture of stones we may discover a resemblance to mountains, rivers, rocks, trees, or also battles and figures in action and an endless variety of objects, which can be a starting point for some extraordinary art

  In the article "I moti mentali e la biografia di Ginevra Benci…" (Academia edu.) taking up some ideas from Carlo Pedretti relating to the deluge drawings, I hypothesize that Leonardo had anticipated some Freudian aspects of the theory of the unconscious. In that context, the dark masses and the tangle of the juniper bush in the background, behind Ginevra Benci's shoulders, is seen as the projection of her deep anguish. The fly has an emotional impact on the observer vaguely similar to that of Rorschach's spots of ink.

"The Father Card" of the *Rorschach Inkblot Test* (The card is often associated with a male figure)
The fly: the background color has been made similar to that of **"The Father Card"**

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These hints, although fragmentary and superficial, are suggesting that the author of the dark fly next to the enigmatic inscription was a genius who was not afraid of subverting the aesthetic canon of his time.

-   **THE RENAISSANCE TRAVEL BOOK -**The singular "illusionistic" skill of the artist is also profiled in the shape impressed on the cartouche, which, if carefully observed, creates an impression of three-dimensionality (such as to simulate an open small book with the upper corner of the left page folded and with the unfinished right part). At the same time, due to its ambivalent and imperfect conformation, the cartouche seems to contradict this impression, creating an ambiguous effect.   In this regard, I remember that the "errors of sight" came to have for Leonardo an importance equal to that assigned to the geometric rationality of vision. For example, his studies on the treatise "De aspectibus" or "Perspectiva" by Alhazen are known, in which the Islamic philosopher treated the "errors of sight" (deceptiones visus) in a systematic exposition.

Cartouche color changes that highlight the three-dimensional shape typical of the "libretto da viaggio" (i.e. the codex L)

Other examples of color changes highlighting the three-dimensional shape

The subtly ambiguous formal artifices implemented by the Painter, such as to induce subliminal and perceptive processes in the recognition of the three-dimensional shape of the cartouche by the observer, who can thus distinguish his "book form", lead to presuppose in the artist not only mastery, but also a complex and singular mind.

The equivalence "cartouche = book", made manifest by the three-dimensionality of its representation, is justified because the intertwining of "anagram stories" that emerges from the

decryption of the inscription of the cartouche forms a logically coherent and organic text, such as to constitute a historically and biographically documented narrative ..

The fly gives off dark suggestions and the reflectography has revealed that similar suggestions emanate from the hermetic rhombicubottahedron, in which the dark shapes and the black fragments floating inside suggest that the fly is a part of a "construction of an enigma". Even in the choice to give the "leaflet" the ambiguous - shape coinciding with that of the "libretto da viaggio" (a pocket-sized book, like the Manuscript L, Bibliothéque de l'Institut de France) - one can grasp the Painter's intent to overshadow the veil of the riddle also in this respect. And, on the other hand, the discovery that the inscription IACO.BAR.VIGENNIS P.1495 encripted stories formed with hundreds of anagrams marked VINCI, converges to show us that the cartouche dated 1495 is really a book, and that it contains stories coinciding with the history of the Sforza family at the time of Leonardo's first Milanese period, during Luca Pacioli's stay at the court of Ludovico il Moro

THE CARTOUCHE, WHICH - DUE TO ITS THREE-DIMENSIONAL FORM - IS A REAL "LIBRETTO DA VIAGGIO" (A POCKET SIZED BOOK LIKE THE CODEX L), CONTAINS THREE ESSENTIAL ELEMENTS: THE FLY, THE INSCRIPTION "IACO.BAR VIGEN / NIS P. AND THE DATE 1495,

- *The date 1495*

The altered form of the number 5 of 1495 has led to doubts the scholars. The following comparisons aim to demonstrate that the number 5 can match with Leonardo's usual writing of 5. Even the 4 is deformed and also in this case we are faced with an enigma.

My comparative analysis aims to investigate with a scientific approach the disturbing dimension that emanates from the picture in its entirety and from every small constitutive element. Even the date is an enigma since the deformations made on the numbers 5 and 4 are not random, but are framed within a plot of shadows and hermetic signs that obscure the rigorous geometry of the polyhedra and the rigor of the composition of the entire painting.

The analytical investigation carried out on the numbers of the date omits the mysterious aspects of the Double portrait and focuses on the concrete and elementary numerical comparisons. Furthermore, I consider the randomness and narrowness of the numerical comparison sample - extracted from a single small written sheet of the MsL of the Institut de France- a scientifically significant choice. In fact, a random and reduced sample of autograph numbers better guarantees the validity of the contrast compared to a large and composite numerical sample, whose formation must comply with complex scientific and methodological criteria, that are difficult to control. Furthermore, it was also necessary to take into account the extreme variability in the writing of some numbers - including the number 5 - which occurs in Leonardo's sheets, even in the

same period and in the same sheet, and therefore I considered all the numbers 5 written in a very small sheet of Ms L , randomly chosen, a sufficiently representative sample.

COMPARISON OF "1" AND "9"
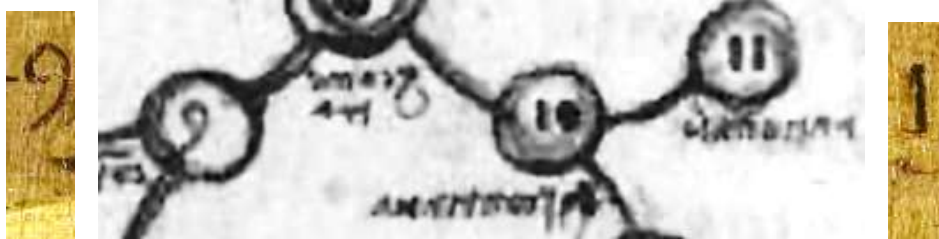
The "9" of the cartouche//Part. : Tree of proportions and proportionality of the Madrid Code.//The "1" of the cartouche

Given the recurring legibility and the certain identification of the numbers 1 and 9 (missing in the chosen sheet from the Ms.L) for the comparisons I used the Tree of proportions and proportionality of the Madrid Code. Both number one and number nine, certainly by Leonardo's hand, are fully compatible if compared with the numbers 1 and 9 of the date "1495" of the cartouche (above extrapolated from the date and presented on both sides of the autograph document in the center).

DA VINCI'S AUTOGRAPHY OF THE NUMBER FIVE OF THE DATE OF THE CARTOUCHE: LEONARDO'S WRITING OF 5 IS CHARACTERIZED BY DEFORMATIONS AND CONSTANT STRUCTURAL VARIABILITY

In Leonardo's writings and calculations, the number "5" appears variously sketched and ofthen extremely deformed. The Manuscript L shows some examples of numbers which, specifically as regards the handwriting of the number five, highlight deformations . The "5" is characterized by the serpentine path, which assimilates it to an "S" more or less accentuated in its upper and lower curvatures.

Part. MS L. - the "5" with a strong "S" curvature – In the same sheet there are also the numbers 0-1-2-3-4

The example above shows a stronger double angle of the curvature impressed on the number five.
The analytic comparison published below compares the "5" of the cartouche with the sample of the MsL sheet that I used for the contrast. The inserted page 10BIS reproduces the MSL and the chosen sample page of the manusript.

THE CODEX L. AS AN EXAMPLE OF HAND POCKET RENAISSANCE BOOK

The opened Codex L (cm 10 × cm 7) compared to the 3D simulation of the cartouche

THE PHOTOS OF THE PAGE WITH THE EXCERPTS CHOSEN FOR THE COMPARATIONS
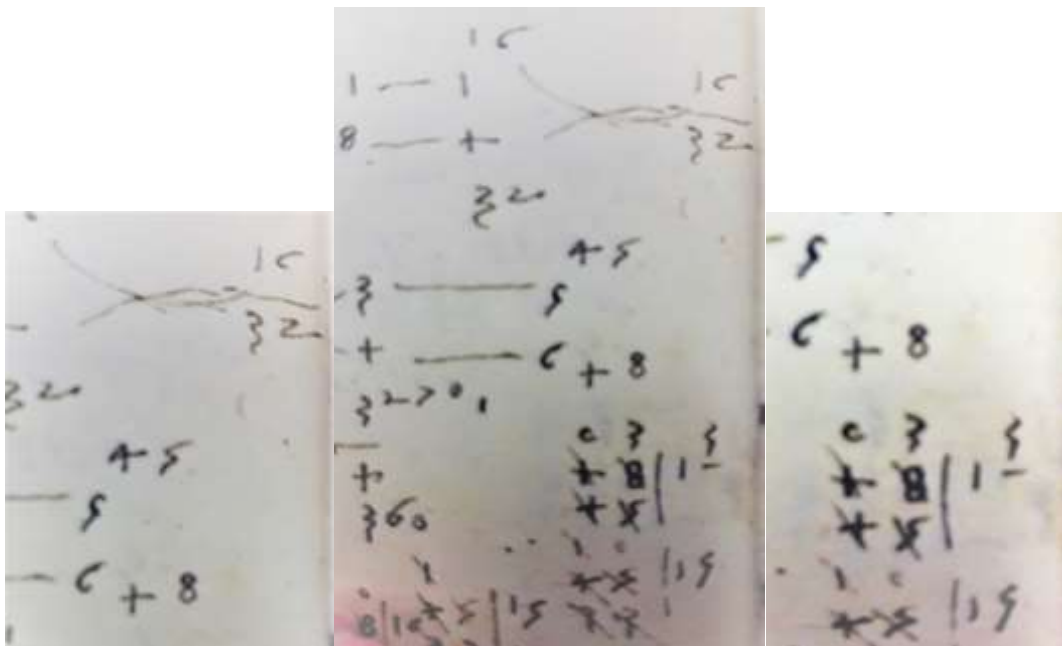
*At the center: the part of the sheet with the numbers:1-2-3-4-5-6-8

*On the left, in the central space, there are the numbers 4 and 5, which are recurring in the date 1495. We can verify that the number 4 in the date was macroscopically deformed by Leonardo in order to make it similar to a noose.

*On the right: the excerpt chosen for the comparations of the recurring numbers "5" with the"5" of the date 1495

Note: Note: the photos of the pages that I used for the comparisons are poorly defined and blurry, because they were taken twenty years ago with an old analog camera and with poor lighting

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The example below proves that often Leonardo used to trace the number five by flattening the double curvature of the "S" almost to suppress it, outlining a kind of sinuous threadlike path.

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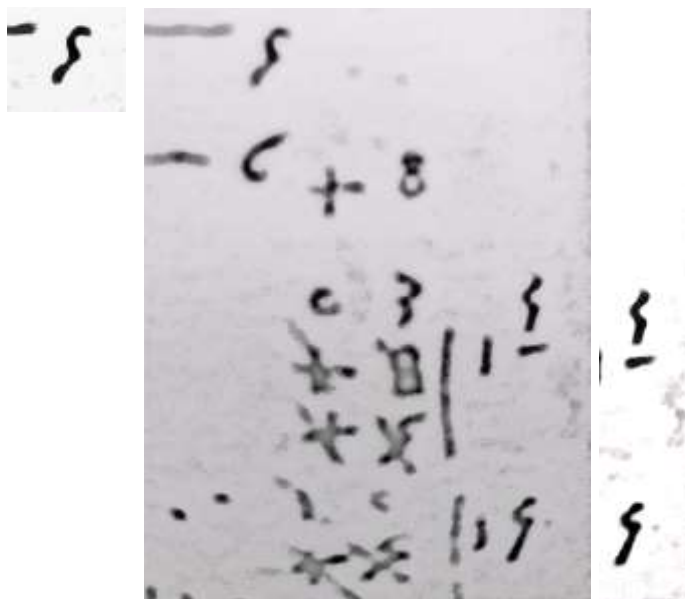
MS L. Institut de France (the sheet has some "5" with reduction of the "S" curvatures)

The example below was created by extrapolating the forms of Leonardo's "5" written on the page reproduced above and comparing them respectively to the "5" extrapolated and isolated from the date 1495 of cartouche of the "Double portrait".

The lower curve of "5" is truncated and the filaments of the body of the fly are re-forming the illusion of the lower lacking part of the "5". So we are able to compare only the upper superior part of the truncated number:

The compatibility, verifiable at first glance, is also supported by the fact that the sample examined from the Codex L has the singular and bizarre characteristics recurring in Da Vinci's graphic execution of the number five. In the cartouche, the threadlike 5 was painted in such a way as to confuse it with the filaments emerging from the black mass of the fly. The reflectography of the cartouche does not help to better focus the shape of the "5", because the numbers are more blurred, and it is difficult to distinguish the most minute peculiarities and in particular the imperceptible detachment of the 5 from the formless mass of the fly.

The observation reveals that the deformation of the number "5" is an artifice, and that its confused appearence is intentional and is corresponding to a hidden psychological process of the artist.

Detail of the cartouche   *Reflectographic excerpt of the cartouche*

THE AMBIGUITY OF THE NUMBER "4" - SIMILAR TO A NOOSE - CONFIRMS THE CONCLUSION THAT THE PAINTER WANTED TO MODIFY THE GESTALT OF "4" AND "5"

The number four, as well as the number five, also varies in Leonard's writings / drawings / works / calculations. But, generally, it is found to be formed with accentuated acute angles; only rarely they appear rounded and vaguely more similar to the shape of the "4" of the cartouche. Number four does not allow the possibility of making numerical comparisons with the same demonstrative cogency as those made with thenumber five.

The ambiguity of "5" has specular correspondence in the ambiguous form of "4", which was extremely altered to make it coincident with the shape of a noose

In any case, the hypothesis that the deformation of "5" was implemented by artifice, finds a justified application even in the case of "4" of the cartouche. In fact, his handwriting is completely atypical and the observer can recognize the number 4 only within the date. If this anomalous "4" is extrapolated from the date, this number is no longer recognizable because it coincides with a small noose

The idea that Leonardo wanted to accentuate the deformation of the four to assimilate it visually and symbolically to the shape of a noose (which implies the idea of a loop in a rope used for hanging a person), appears entirely plausible, given the enigmatic aura that pervades the whole picture. This hypothesis finds support in the light of the story of the poisoning of Gian Galeazzo Sforza that emerges from the decryption of the cartouche and from the study of the painting in its complexity (as documented in the announced next publication).

The "4" is transformed into a symbolic figure, bearer of meanings linked to the mystery of the painting. The transformation of the "4" into the noose does not allow for useful comparisons to

evaluate the Da Vinci autography of the number, but it reflects a modus operandi in which the "mind of the great mystery creator" can be recognized, even in a matginal detail. Since the achieved knowledge about Leonardo's work in art remains as if suspended in the vertigo of a labyrinth, where every path comes out in unexplored serpentines or opens on unexpected perspectives.

Finally we are able to conclude that the deformation of the numbers 4 and 5 is not accidental and that the painter, who created the symbolic image of the dark body of the fly, with its confused interweaving, also wanted to overshadow the serpentine line of the 5, whose lower curve is obscured and truncated by an obliquous filament. The same dark filament forms – with a controlled distortion of the gestalt laws of perception - the illusion of the lower curvature of the "5" that was truncated.

It is as if the Painter wanted to deform the "5". already from the conception of the original plan of the cartouche, to accentuate as much as possible the ambiguity of that number. Regarding the modus operandi by Leonardo, it's true that he habitually wrote the "5" with deformations in contexts completely unrelated to the Double portrait, but I observe that in this case the voluntary choice to change its shape with an artifice is proven by the strong deformation impressed also on the number 4 of the date. Leonardo studied Alhazen's De aspectibus, a systematic exposition of the extravagances of vision written in the 11th century, in which "errors of sight" were addressed, and often experienced deviations from the rules of optics and perspective in the scientific and artistic fields. In addition, his works of art (see the "Deluge drawings") testify to a visionary and innovative creativity, which was unique in the artistic production of the time

THE ENIGMA OF THE SPHINX

The sense of mystery that emanates from the "Double Portrait of Luca Pacioli with Pupil" had led me to speculate that Leonardo wanted to accentuate the usual deformation of the number "5", in connection with the enigma that pervades the painting. In fact, based on the results of my research, the "artfully deformed 5" would take on a symbolic value of desecration of the sacredness attributed by Pacioli to that number. This desecration – as the decryption demonstrates

- is referable to the historical mystery of the death of Gian Galeazzo Sforza and to the subsequent usurpation of the ducal title by il Moro which occurred in 1495. In particular, also the transformation of the number "4" into a noose would find a similar justification in the poisoning of Gian Galeazzo Sforza, who died on October 21, 1494. The documented Sforza story dated 1494/95 is faithfully reconstructed with the hundreds of anagram-sentences signed VINCI decrypted from the inscription of the cartouche.

Most scholars have focused their attention precisely on the cartouche, the small object that was believed to bear the signature of the painter Jacopo de Barbari or in any case the identifying trace of the author of the painting. But so far it has not been possible to reveal the secret meaning of the inscription JACO.BAR.VIGEN / NIS P.1495, nor to prove that it is precisely the signature of de Barbari.

In hindsight, the basic logic also suggests to the profane observer that the most obvious solution that recognizes the signature of de Barbari cannot be accepted, because there are too many indications of a refined and inexplicable simulation planned artfully, which - in reproducing in a strikingly different way the signature of the great Venetian artist - aimed to feed doubt about the true identity of the author.

On closer inspection, one cannot explain the reason of this macroscopic ambivalence of the artist. At the same time it is not possible comprehend on the basis of which absurd logic de Barbari could want::-

1) to deform his own signature by hybridizing it with the interpolation of extraneous alphabetic letters;

2) to deform the numbers 4 and 5 of the date making them almost unrecognizable;

3) to transform the elegant caduceus, chosen by him as an hermetic element and symbol of his beloved classical culture, into a dirty and dark fly emerging from a shapeless black stain.

Equally inexplicable is the reason for which another painter (identifiable as Leonardo), who evidently knew the artworks of de Barbari, wanted :

1) to simulate de Barbari's signature while transforming it into a conspicuously different alphabetical formula, such as to raise doubts about the autography of the Venetian artist ;

2) to deform the numbers 4 and 5 of the date making them almost unrecognizable

3) to replace the caduceus of de Barbari with a species of black insect with a humanoid shape resembling a fly emergin from an informal stain.

It is as if the painter wanted to draw our attention to "something secret" linked to the year 1495, warning us - with a logical paradox - through evident signs and clues, that the date of the cartouche hides a secret from us. It is a perturbing and paradoxical behavior, unveiling a sort of bipolar ambivalence, since those who really intend to hide a secret do not spread visible evidence of its existence. This ambivalence permeates other aspects of the painting, (for example the

rhombicuboctahedron which I analyze in my forthcoming book), because the whole Double portrait is pervaded by mystery.

My research began by accepting the challenge contained in the cartouche, in the belief that, behind the numerous puzzles of the "Double portrait", there was the mind of a Sphinx. In the end (see the last pages) I found a logical explanation supported by historical and heraldic documents. This explanation is not arbitrary because it is supported by at least three hundred anagram-sentences , all signed VINCI, deciphered from the inscription of the cartouche. The scientific and methodological path of this decryption is at the center of this summary.

THE STARTING POINT OF THE RESEARCH :
The objective of the research on the cartouche is to give a scientific explanation about the enigmatic inscription IACO.BAR.VIGENNIS P.1495

The anomaly of the inscription was confirmed by the scholars and experts who tried to solve the brain teaser without succeeding

In this partial reconstruction, the question of attributing the painting and the cartouche itself to Leonardo is not addressed, except with indispensable hints, because, as I premised, here I assign priority to the research on the decryption of the cartouche, which must be evaluated on the basis of the scientific nature of the methodological procedures adopted, regardless of the attribution issue (that has been addressed in my complete ten-year work on the painting). Therefore in this context the starting point of the research on the cartouche is identified by making a simplification, since the solution of the problem of the attribution of the Double portrait is the result of an in-depth study of the whole, picture together with preliminary researches and data acquired in different disciplinary field.

The caduceus and no other symbol was de Barbari's signature

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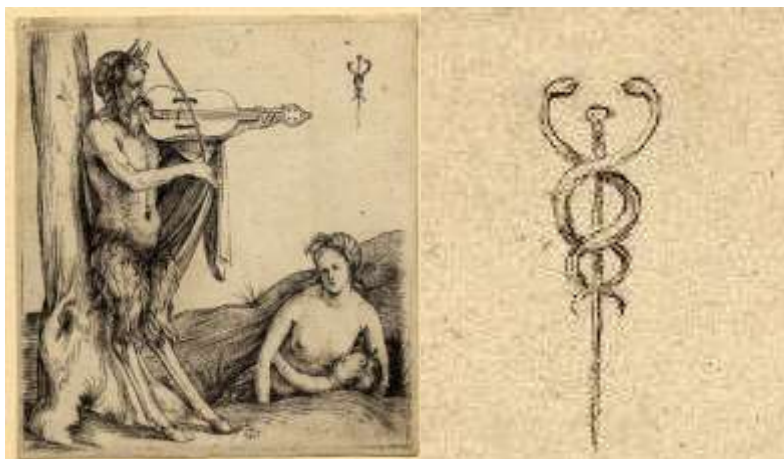
Jacopo de Barbari was probably the greatest engraver of all time (the splendid view of Venice is a masterpiece never equaled). In most of his production (consisting mainly of engravings and including a few paintings of controversial attribution), he signed his works with the caduceus and/or with a signature totally different from the inscription of the cartouche, as we can see for example in the famous *Still-Life with Partridge and Iron Gloves,. Oil on panel cm. 49 × 42, Alte Pinakothek, Munich*

The caduceus appears in most of his production, but instead of the caduceus, on the Capodimonte cartouche there is an absurd and disgusting fly, and this bizarre and grotesque replacement is inexplicable. It is true that he also added Latin acronyms to the paintings that have been attributed to him, but they make sense and the paintings are signed with the caduceus and in any case have understandable inscriptions: for example Madonna and Child with Saints ... (Louvre), Portrait by Henry V (The Hague, Maurishuis), Portrait of Albert of Brandenburg (Kreuzlingen, Sammlung Heinz Kisterssignature.). In any case, apart from the caduceus, no other symbol appears close to its signature

IACO.BAR.VIGENNIS P.1495 IS NOT IDENTIFIABLE AS DE BARBARI' S SIGNATURE

PROBLEM DEFINITION : What does IACO.BAR.VIGEN/NIS P.1495 mean?

A MORE ACCURATE FORMULATION OF THE PROBLEM

In order to find the solution of the unsolved problem I focused two questions:

Is IACO.BAR.VIGEN/NIS P.1495 an acronym ?

IACO.BAR.VIGEN/NIS P.1495 is a cryptogram?

THE DEFINITION OF THE HYPOTHESIS ON THE CARTOUCHE
IS CONNECTED TO THE PREVIOUS STUDY AND RESEARCH ON THE ENTIRE PAINTING

I formulated the hypothesis on the basis of the study of the "Double portrait" and the biography of Luca Pacioli. The hypothesis is founded on the research on the painting as a whole (the study will be published in the book in which I will include als the publication of the reflectographic analyses). In particular, the research on the painting sets with certainty the date of the painting after the publication of the Summa (November 1494), which is the red volume that appears on the painting.
.

Luca Pacioli in January 1496 is already arrived in Milan (invited by Gian Francesco Sanseverino to the representation of Danae) and there are no documents that exclude that he had already arrived In Milan in 1495.

Fig 6 The rhombicuboctahedron by Leonardo

The polyhedra depicted in the Double portrait" are completely similar to the rhombicuboctahedron and the other geometric solids illustrated by Leonardo in the Compendium de Divina Proportione.(1496-1498).

The Student alongside Luca Pacioli wears the Milanese fashion in vogue in the decade 1490-99 as evidenced by the portrait of Francesco di Bartolomeo Archinto (National Gallery, London), attributed to Leonardo's workshop (probably Marco d'Oggiono), which bears the date 1494 on the scroll; it is important to underline that the fashions at the time were strictly related to the Courts of belonging.

The Archinto Portrait, National Gallery, London - The Pupil : Milanese fashion around 1495

The scroll with the date 1494

The identification of Guidobaldo da Montefeltro as the Pupil alongside Luca Pacioli is unsustainable and macroscopically contrary to the evidence. Raffaello portrayed Guidobaldo around the mid-16 th century and the type of man depicted by him in the Uffizi portrait is totally different from the man of the portrait of the Capodimonte Museum. The identification of the Pupil as Galeazzo Sanseverino, already proposed by me in 2010, was based on the historical-biographical reconstruction and on the Milanese fashion around 1495. We can also verify the compatibility of the figure of the Pupil with the only authenticated image of Galeazzo Sanseverino.

Fig.8 Guidobaldo portrayed by Raffaello and Galeazzo Sanseverino as the Pupil and as the "bearer of the flag"

The captain of the ducal army, is depicted very small in the illumination of the Arcimboldi Missal, Investiture Ceremony of Ludovico il Moro (1495), Library of the Capitolo Metropolitano, Milan: Galeazzo is quoted as the bearer of the flag in the document *Traditio possessionis ducatus Mediolani facta per infrascriptos procuratores praefato duci…, Milano, Archivio di Stato, registri ducali, 62, cc., Iv-9v9*

Sanseverino is quoted in the following excerpt: "*Quod vexillum illustri et magnanimo heroi domino Galeaz Sfortiae Vicecomiti de Sancto Severino, suo genero et armorum capitaneo generali, dux ipse Ludovicus illico tradidit…*"

The impossibility of identifying Guidobaldo with the Pupil of the Double portrait entails a historical / biographical reconstruction of the Capodimonte painting completely different from that hitherto accepted by most scholars. In this case, all the historical information documented dates back to the period in which Luca Pacioli worked in the service of Ludovico il Moro and was closely linked to his patron and disciple Galeazzo Sanseverino, to whom he dedicated one of the three copies of the Compendium, completed in 1498, where Leonardo illustrated the identical rhombicubottahedron painted in the Double portrait.

But the most convincing evidence about the Milanese origin of the Double portrait comes from the comparison of the portrait of the Pupil with the portrait of the Musico, entirely by Leonardo.

Fig. 9 The "Musico" by Leonardo (Pinacoteca Ambrosiana) – The Pupilo of the Double portrait

A PLAUSIBLE MISUNDERSTANDING: The belonging of the DOUBLE PORTRAIT to the Venetian School - The Milanese workshop of Leonardo and Venice

The identification of Guidobaldo da Montefeltro as the pupil of the Capodimonte portrait has so far supported the attribution of the portrait to Jacopo de Barbari, or in any case other attributions all related to the Venetian pictorial tradition. In reality, from a biographic point of view, there are no elements that demonstrate the contacts between Luca Pacioli, Guidobaldo and de Barbari.

The attribution to Jacopo de Barbari, and more recently to other Venetian painters (even minor ones), finds justification in the fact that Venice at the time was a crossroads and an experimental laboratory for many artists (Pietro Vannucci known as Perugino, Boccaccio Boccaccino

[Boccaccino Boccacci] , Albrecht Dürer, Andrea Solario, Francesco di Paolo from Montereale). In particular, in Leonardo's workshop there were some disciples and collaborators who had traveled from Milan to Venice between the beginning and the end of 1490 and, returning to the Master's Milanese workshop, it is inevitable that they bring the accumulated wealth of experience.

Leonardo's disciples often went to Venice in those years, for reasons not yet fully clarified by historiography: so Andrea and Cristoforo Solari, Marco d'Oggiono, Giovanni Agostino da Lodi, Boltraffio. For example, Andrea Solario (not unrelated to the influences of the Bellini, Antonello and Vivarini, and perhaps even de Barbari) was in Venice between 1490 and 1495. Francesco Galli, also known as Francesco Napoletano, was present in Venice in those years and we know that his career began right in Leonardo's Milanese workshop. These disciples, who had been influenced by the Venetian school and the experiences of their travels in Venice, may undoubtedly have poured into the processing of the painting some contributions related to the experiences and teachings acquired in the lagoon city. For example, Giovanni Agostino da Lodi made documented journeys between Lombardy and Veneto in the second half of 1490 and he was one of the fundamental sources of the diffusion of artistic innovations between Venice and Milan. Some paintings that have been attributed with reserve to de Barbari, were also attributed to Giovanni Agostino da Lodi (this is the case of the beautiful Commiato di Cristo dalla madre). Because of this stylistic proximity, sometimes emerging, with de Barbari, the interventions of this disciple of Leonardo's "bottega" could have given, even if only in the details, a Venetian atmosphere and formal consonances with the lagoon painting to the Double portrait, leading to attributing the whole work to de Barbari.

Moreover, the reference to the MUSICO entails analogous references by Leonardo to the Flemish models and in particular to Antonello da Messina who in Venice was as a cornerstone of the Venetian Renaissance. In this context, it is plausible that some of Leonardo 's pupils may have contributed to bring to the painting the atmosphere similar to the Venetian School, which led to the recognition of the hand of de Barbari, Jacometto or of minor disciples mostly connected to Vivarini's school.

The proof of the Milanese origin of the"Double portrait" : The comparison of the Pupil with the "Musico" by Leonardo - A reflectographic preview of my research

After my identification of the Pupil as Galeazzo Sanseverino in 2010, some students have pointed out that there are some similarities between the "Musico" by Leonardo and the Pupil of the "Double portrait", proposing the identification of the same person in both portraits. It is possible that the changes of the same physiognomy are the consequence of the different play of shadow and light, and that the opposite angle of the two portraits has changed the same facial features, also taking into account the fact that the Pupil brings traces of the collaboration of the "bottega" in the process of work. I think that in this dubious case the identification of the same person will be possible

solely through the face detection technology, that identifies human faces in digital images.

The identification of a musician was determined by the musical score in his hand and the name of the character is controversial, because there are a number of proposals in this regard. The pieces of evidence I achieved through the reflectographic analysis break the consolidated belief that the subject of the portrait of the Pinacoteca Ambrosiana is a musician, involving him in the mystery that surrounds the pupil of Capodimonte. In fact, at the sight il Musico wears a sober black dress with a yellow-orange stole, and gives an impression of ascetic elegance. But the reflectographic analysis revealed that the black dress with a stole was later painted over the previous original dress, and that the character wore a red dress exactly the same as that of the pupil of Capodimonte, that I identified in Galeazzo Sanseverino on historical/biographical/archival base. Despite not having the scientific data for the facial recognition of the "Musico" as Galeazzo himself, on the basis of the perfect similarity of the clothes I was able to draw the certain conclusion that the Pupil wore Milanese fashion between the last years of 1480 and the first half of 1490 (Pietro C. Marani dated il Musico around 1485). Furthermore, it is justifiably conceivable that the unusual red dress with a lanceolate opening on the chest is actually a uniform, as Galeazzo was captain of the spearmen, great jouster and commander of the ducal army.

Apart from the identification with the "Musico", other doubts have been raised on the different pictorial technique of the Double portrait, which is not related to the typical Leonardo's "sfumato". But the Double portrait, similarly to the "Musico", corresponds to the canon of Flemish portraiture, which inspired Botticelli and Ghirlandaio, especially as regards the achievement of a more effective pictorial rendering of optical reality and three-dimensionality (see the previous portrait of Ginevra Benci by Leonardo). In particular, in the Double portrait - as well as in the "Musico" - the suggestions of Antonello's portraits are highlighted, which must have been known also in Milan in the second half of the fifteenth century. It is well known that Antonello da Messina had come to show his portrait to Dukes of Milan as early as 1476, after the death of Zanetto Bugatto, the newly died court painter, who had imported Nordic painting models to Milan, and the portraits of Antonello and Zanetto were known by Leonardo.

The comparison with "il Musico" reveals that the "Double portrait" and the cryptic cartouche with its anagram-stories originate from a Milanese workshop

The comparisons between the IR reflechtography of the Pupil and the "Musico" were very important in order to demonstrate the origin of the "Double portrait" from a Milanese "bottega, and plausibly from " the very same bottega".   .

The analyses of the infra-red reflectography of il Musico has revealed that his black dress was overpainted and that it had nothing to do with the original conception of the portrait.

The following reflectographic preview is a significant example of the surprising similarities that I discovered between "il Musico" and the Pupil . In fact these analyses show that the Pupil of Luca Pacioli wore a dress identical to that of "il Musico" before repainting his original dress, and that the minimal details have almost identical features.
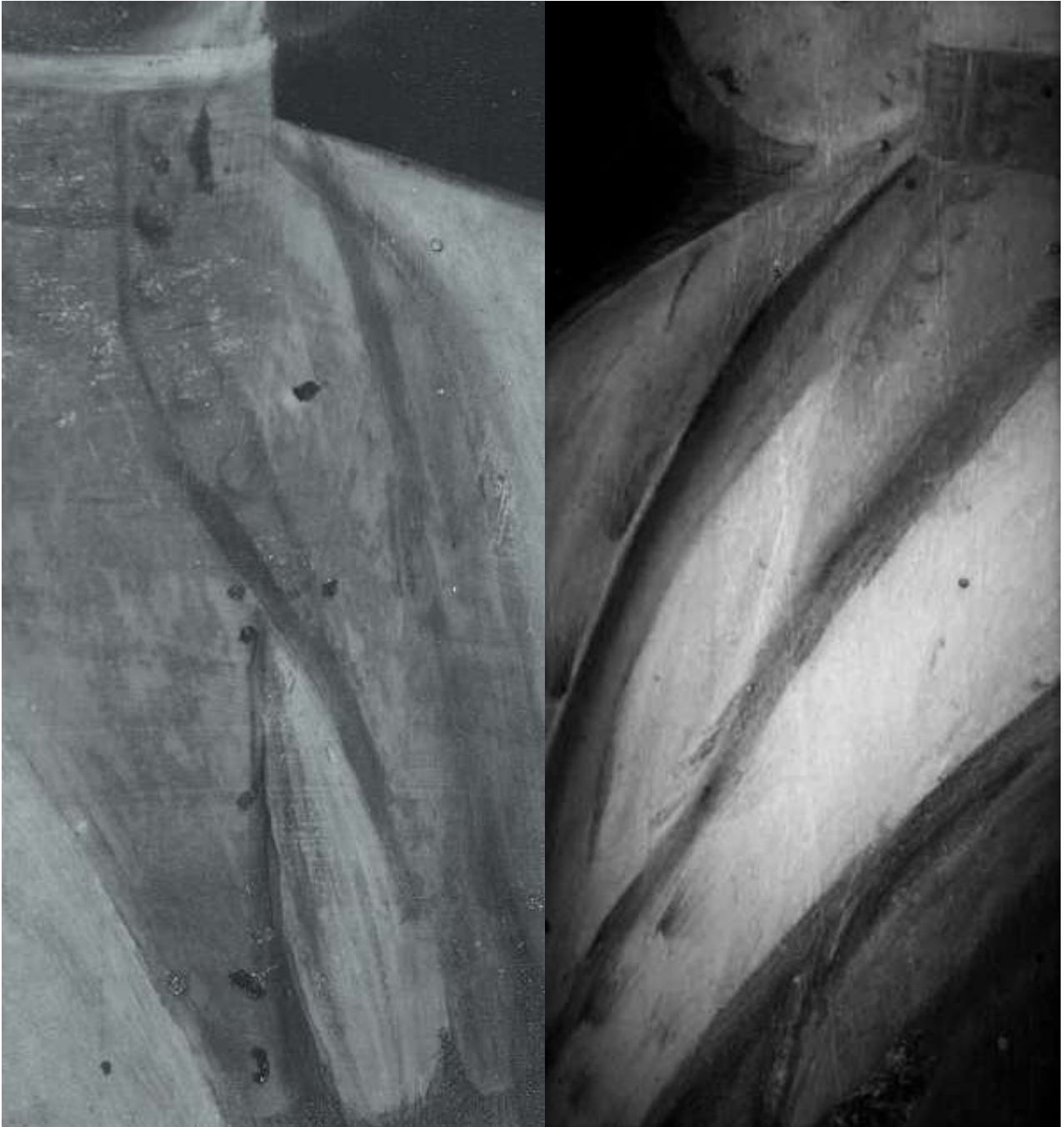

Fig.10 Comparation of riflectographic details: on your left "Il Musico", on your right the Pupil.

The differences between the details of the two closely spaced clothes could in my opinion be attributable to the fact that the two IR exams could have been performed using different camera models and this variable could have slightly influenced the results. However, in light of the dossier

with all the comparisons, the similarity of this preview is remarkably enhanced. As regards in general the differences that can be noticed in the execution of the two portraits, it is necessary to consider::

- 1) that first of all il Musico is entirely by Leonardo's hand, while the Pupil reveals the collaboration of the workshop in some details of the reflectographic comparisons;

- 3) that Leonardo - who adopted similar materials and methods of preparation in most of his paintings - could have changed the choice of techniques, materials and tools according to the specific artistic project he intended to realize;

4) that Leonardo loved to experiment with different solutions, even risky ones, in every field.

Focusing the attention to the reflectographic preview, we can observe that:

- 1) The position of the two figures is almost identical and the two subjects portrayed are seen from the opposite point of view

- 2) There are coincidences of lines in the drawings of the two dresses

- 3) The two openings in the shape of a spear on the chest, from which the shirt comes out, are very similar. In the reflectographic detail, the spear of "il Musico" is more three-dimensional and carefully elaborated by Leonardo; but, in the finished portrait, we can see that even the small folds of the shirt in the Pupil's spear are perfectly finished

- 4) The collars of "il Musico" and the Pupil are very similar; they differ in details only because they are viewed from the opposite point of view

- 5) The buttons are so similar that they seem formed by the same hand; in the Musico they are only a little bigger

I omit here many other significant pieces of evidence - already published in the chapter

"Reflectographic analysis and detailed comparisons" of the previous limited edition book "Il codice vinciano di Capodimonte" (2017), that will be re-published in a new version by 2020.

Already at first sight the similarity between the reflechtographic details of the Pupil and il Musico - even without the subsequent discoveries of the research - was in itself such as to subvert the pre-existing known history of the Double portrait. From this single preview estrapolated from the dossier, we can have unequivocally confirmation that:

- *the Pupil's dress corresponded to Milanese fashion in the first half of the 90s
- *the identification of the student as Guidobaldo da Montefeltro (already unsustainable if we look at the portrait of Raphael) becomes totally unacceptable
- *the origin of the Double portrait from a Milanese workshop has been confirmed by the fashion of the dress of il Musico, that was also identically red colored; in addition, the Pupil brought two fashion accessories to the court of Milan around 1495, that is, a leopard-print fur (as shown by the portrait of Bartolomeo Archinto on page 17) and the cap model that was traditionally red or black (as in the miniature of il Messale Arcimboldi,1495, Biblioteca del Capitolo Metropolitano, Milano).
- *Regarding the last point, the dossier with the results of the reflectographic comparisons supports my hypothesis that the "Double portrait" had been produced by Leonardo's workshop, where he created and painted by his hand li Musico more than five years earlier.The archival and technical analysis are not complete because of the absence of official exams and other significant information in order to integrate the attributive investigation: the type of wood of the panel, x-ray,chemical tests, preparation, pigment. Despite these lacks, I have finally decided to publish the evidence I have achieved in my decades-long research, to make it available to the scientific community. In fact, the documentation I produced (the decryption of the cartouche and the analyses published on the dossier containing a representative sample of the comparisons) is a set of evidence acquired with the scientific methodology, that has the requirement of falsifiability and which can be controlled through targeted refutations.

My attribution proposal focuses on concretely detailed analyzes and on historical /biographical/cultural data, documented according to the Popperian criteria of falsifiability and refutability, avoiding to absolutize exclusively aesthetic/artistic considerations on the basis of the canon universally accepted by a specific author. However, it can be seen with immediate visual impact that the alchemy of the vital expressive strenght and the dynamic psychological complexity of the pupil Galeazzo Sanseverino constitutes a masterful synthesis of Leonardo's conception of mental motions ("moti mentali") and the art of making portraits.

The Pupil Galeazzo Sanseverino

GALEAZZO SANSEVERINO: THE PUPIL – THE CHARACTER AND HIS "MENTAL MOTIONS"

Galeazzo Sanseverino, called "figlio della fortuna", is recognizable in the Pupil in the light of the historical evidence that has come to us. He was patron of Leonardo and Luca Pacioli, who had been his guest in Milan in the Palazzo di Porta Vercellina certainly since January 1496 (but. probably as early as the end of 1495). In 1495 Galeazzo was the bridegroom of Bianca Giovanna Sforza (who he will marry afetr the traductio ad maritum in June 1496) and son-in-law of Ludovico il Moro, He was known for his ambition and conceit, and accomplice of il Moro in all his ventures (including Moro's love affairs, till the last with Lucrezia Crivelli).

Galeazzo in 1489 had ,as a gift from il Moro, all the lands of the Val Trebbia that belonged to Pietro Dal Verme, poisoned by il Moro in 1485. In 1495 (the date of the cartouche) he was Lord of Castelnuovo Scrivia, Zavattarello, Pianello Val Tidone, Romagnese and lieutenant of the stronghold of Bobbio (the Malaspina Dal Verme castle) He also owned Voghera, who was the dowry of his wife Bianca. He was the commander of the Ducal Army, the chief of the chosen corps of spearmen and the greatest jousting man of the time.

Sanseverino had great diplomatic skills (Delaborde :" Il était persuasif, élégant dans son langage comme dans ses habitudes, expert dans les choses de la guerre, et passait pour le plus habile jouter qu'on put voir."). . He was very skilled in winning the admiration of the powerful (Perrens "Beau parleur, adroit à la chasse et aux exercises du corps, fin courtisan..n'hésitant pas à se déshabiller pour jouer à la balle avec le roi (Carlo VIII). "As a commander, he was little esteemed by troops (Sanudo :" Havia pocha reputation da' soldati, né era amado perché non valeva un governo, tamen era valente di la sua lancia."). His participation in the official parades was spectacular, as he was always dressed with the utmost elegance and showed up at parades with a retinue of hundreds of horses. Baldassarre Castiglione, in " Il perfetto cortigiano", first book, chapter XXV, cites Galeazzo Sanseverino as a pupil of the famous master of arms Pietro Monte, and enhances his strength, training and excellence in the military arts. After the fall of il Moro, he managed to obtain the prestigious title of Grand Écuyer de France from the King LouisXII.

The masculine figure of the Pupil, with his commanding posture and dignified look denote energy, boldness and resoluteness and these requirements are attributable to the military environment. Like the other characters painted by Leonardo, he is an enigmatic figure, and a veil of ambiguity emanates from his proud and intense gaze. Galeazzo was also documented as a weaver of courtesan plots and intrigues. For example, the letters of Isabella of Aragon accuse him, together with the magician and the court doctor Ambrogio da Rosate, of the poisoning of Gian Galeazzo Sforza (21 October 1494), which occurred on the mandate of il Moro. Around 1499 the widow Isabella tried to incriminate him and the magician Ambrogio da Rosate as accomplices of il Moro.

Also in the military field, Galeazzo (notoriously sympathetic to the French) was the protagonist of suspicious episodes, (as in the case of the escape from Alessandria on August 28, 1499), and a few years after the fall of il Moro became a favorite of the King of France.

Ludovico Muratori in the Antichità Estensi (Part 2, Chapter X) casts a gloomy shadow over Galeazzo's honor, because he writes that Beatrice d'Este had been ""avvelenata da Francesca Dal Verme ad istanza di Galeazzo Sanseverino, per quanto essa Francesca dopo alcuni anni propalò morendo" (Beatrice was "poisoned by Francesca Dal Verme at the request of Galeazzo Sanseverino, as Francesca herself after a few years declared publicly on the verge of death") .The illustrious historian, with a sibylline phrase, connects that poisoning, that occurred on January 1497, to the sudden death of Bianca - the wife of Galeazzo - died on November 23, 1496.

The historian Alessandro Giulini, in his article "Bianca Sanseverino Sforza." (Archivio storico lombardo xxxix, fascicolo xxxv, Milano, 1912), offers a documented reconstruction of this dark episode. The mysterious death.of the firstborne female of il Moro is at the center of my thesis on la Joconde, because I identify Bianca with the previous hidden sitter discovered and reconstructed virtually by Pascal Cotte under the portrait of the Louvre.

The play of shadows and light on the Pupil's face, the dynamic tension and the imposing posture of his masculine figure, his ambiguous gaze that seems to conceal some secret completely extraneous to Pacioli's portrait and the context of the painting, the gloved hand green and furtively hidden behind the folds of the friar's habit ... Everything converges in designating the Pupil as a mysterious Leonardo's creature, despite the doubts of some scholars, who adduce some overall stylistic differences of the Double portrait compared to Leonardo's other artworks. In the face of these objections, it is necessary to consider that the attribution of a work is extremely complex and that the stylistic parameters in some cases are also debatable, because an artist could decide to change style, techniques, materials and tools in order to the artistic project he aims to realize, because these variables are functional to the objectives and the results we are pursuing. For example: the panel could be of a wood non habitually used by Leonardo (as the usual walnut or poplar), and the type of preparation could be different from the traditional gesso underlayer as it was found in other works by Leonardo (e.g. *National Gallery Technical Bulletin* n. 32).

The complexity of an attribution process cannot even be resolved by "delegating" the judgment about the autorship of the artworks to the powerful multispectral high technologies able to calculate and operate on hyper complex algorhytms and capable of the highest definition, at the limit of the optical ressources.   These are very important supports (for the scientific study and also to investigate, for example, dating or to discover falsifications ...), but in the art field the "human eye" of the expert cannot be substituted by the machine, and the evaluation and interpretation process in order to attribute a work of art cannot be synthesized by a mathematical formula and by the technician's diagnostic verdict.

The problems mentioned above also have interesting philosophical implications, which cannot find space in this context. According to Popper's criteria, it is a priority to clarify that the research on the Double portrait and the cartouche is focused on demonstrating a series of falsifiable results, historically and scientifically founded, in order to provide an attribution proposal having the most high "probability" of being correct on the basis of significant evidence, including specific stylistic considerations.

The DECRYPTION

This" Summary reconstruction" of the decryption of the Capodimonte cartouche is the first part of the research on the Double portrait, it contains the methodology and some examples concerning the perfect anagram-phrases I decoded from the inscription IACO.BAR.VIGENNIS P.1495 + MUSCA

The following exposition is comprehending:

- ** a restricted sample, estrapolated from the three hundred perfect Latin anagram-phrases all signed VINCI, that I decoded starting from the cryptic inscription of the cartouche (pag.45-55)*
- ** the methodological path of the decryption, that I submit to the control of scientificity*

Regarding the documented Leonardo's production in Enigmatography field, and in particular in making rebuses and anagrams, see the chapter "Una nota su Leonardo "enigmofilo" e autore di scritti criptici", in Glori C., "LA STORIA DI GINEVRA BENCI NELLE CINQUANTA FRASI ANAGRAMMATE …" (Academia edu).

Gerolamo Calvi decripted the famous "promemoria" on F,669r C.A: In this coded "promemoria" by Leonardo, (with the decryption by Calvi in parentheses) there are four anagrams.

- *"Truova ingil (= Ligny) e dilli che tu l'aspetti a morra (= a Roma) e che tu andrai con seco ilopanna (= a Napoli). Fatti fare la enoiganodal. (= la donagione) e tolli il libro di Vitolone e le misure delli edifizi pubblici".*

Many rebuses by Leonardo are published in 1) Marinoni A., I rebus di Leonardo da Vinci raccolti e interpretati, 171 fogli, Olschki, 1954, Firenze; 2) – Croquis et dessins de devises et rébus, Feuillets inédits di Windsor, XVI vol., with eight facsimiles of seven sheets with rebus; 2) Curiosità Vinciane, Leonardo da Vinci enigmofilo (Torino, 1905, pp. 59-108),with ten pages showing the Da Vinci rebuses and other sheets

THE TWO STAGES OF THE DECRYPTION

The definition of the hypothesis and the "historical code":
I) **the interpretation of the Acronym –**
II) **the decryption of the Cryptogram**

The research on the Double portrait converged on the history of the Sforza family, starting from the historical and biographical reconstruction of Pacioli's stay in Milan, when the mathematician and Leonardo worked in the service of Ludovico il Moro. They were brought together by the patron of artists and scientists Galeazzo Sanseverino, that I identified as the young man - the Pupil - portrayed alongside Luca Pacioli.

Starting from this assumption, I coherently formulated the following hypothesis::

The Pacioli's biography during his Milanese stay at the Sforza Court alongside Leonardo and the in-depth knowledge of the private and public history of the Sforza family between 1495-99 are the essential information for understanding the Double portrait and its history.

In accordance with the hypothesis on the double portrait, I assumed that the incomprehensible inscription of the cartouche contained an encrypted message on the history of the Sforza family around 1495 and in the following years, during the Milanese stay of Pacioli with Leonardo da Vinci, To find out the meaning of the inscription and provide a scientific explanation, I concentrated two questions:

1 IACO.BAR.VIGEN / NIS P.1495 is an acronym?

2 Is IACO.BAR.VIGEN / NIS P.1495 a cryptogram?

In the first case I had to interpret the acronym. In the second case I had to decrypt the cryptogram.

The sharing of information on the biography of Pacioli and a thorough knowledge of the private and public history of the Sforza family, in my research refers to the idea of the "code as an organic system of symbols and references that allows the transmission of the message and its understanding ". Sharing this knowledge is essential basic information to interpret the acronym and decipher the encrypted code in the inscription IACO.BAR.VIGENNIS P.1495

On the other hand, the hypothesis focused on the cryptographic path was justified by well-founded historical reasons.

Cryptography, which has always been an instrument of power, was practiced in the ducal chancelleries and became a popular courtesan fashion in the Renaissance. The dominion of the Moro was marked by the massive use of spies (as widely documented, also through archival documentation, by the history of Gian Galeazzo Sforza and Isabella d'Aragona). It is understandable that Leonardo - having to give a dangerous message - intended to resort to

cryptographic practices to defend himself from checks and possible punishments, including the death penalty. In fact, the results of the decipherment lead back to the historical mystery of the death of Giangaleazzo Sforza and Moro's usurpation of ducal power, which was a real coup d'état. The dynastic saga and the tragic story of the death of Gian Galeazzo Sforza occupies a central place in the decoding of the cartouche, but - having in primary to focus the exposure on the decryption process - in this context I have to omit the too long quotation and the comment about the three hundred anagram-sentences with the historical plot. Regarding the Sforza stories, a reconstruction of the historic part of my work was published in chapter XX of the book "Leonardo da Vinci and the Pacioli code" by Jerzy K. Kulski, to which I refer the reader for a comprehensive description.

The solution to this cryptographic brain-teaser opened up on many ancient paths. In the Old Testament we already find examples of primitive cipher schemes: the 'Atbash, the' Albam, the 'Atbah. Plutarch in the Parallel Lives mentions the "scitala", used by magistrates. Suetonius in the Life of the Caesars, says that the Shift Cipher (sliding cryptosystem) was one of the methods used by Julius Caesar. In the Renaissance, the cipher disk by Leon Battista Alberti, described in De cifris around 1467, was very popular. The cryptosystem of Vigenère dated a century later ....
None of these systems seemed practicable to me in an orthodox way for the interpretation of IACO.BAR.VIGENNIS P.1495 neither as an acronym nor as a cryptogram. Moreover, although Leonardo was very prolific in terms of puzzles and riddles, he did not have a cryptographic background, and, aiming for a solution that met scientific requirements, I thought it important to follow a logical and rational, controllable and falsifiable path. In addition, this path was to be linked to Leonardo's autograph documentation. In determining the guidelines of my research, I rigorously based myself on his writings and artworks:

- - Regarding the interpretation of IACO.BAR. VIGENNIS P 1495 **as an acronym**, I referred to the inscriptions on the lunettes of the Last Supper dated around 1495, which constituted a fundamental layout both for the interpretation and as regards the formation of the alphabetical repertoire of the acronym itself. As verifiable, in the inscriptions of the lunettes appear some significant words that I got from the acronym of the cartouche.
- Regarding the decryption of IACO.BAR. VIGENNIS P 1495 **as a cryptogram**, I referred to the famous memorandum (F,669r Codice Atlantico), which is based on the similar cryptographic practice of the Permutatio: The system consists in applying the permutation to the positions of the letters and moving them accordingly. The encrypted message is, for all intents and purposes, a partial anagram of the original message. Surprisingly, the path
- taken by the anagram – an ancient fascinating linguistic enigma - has proved to be successful beyond all expectations, as evidenced by the selection of examples (pag.45-55).

THE METHODOLOGY OF DECRYPTION
VALIDATION OF THE HYPOTHESIS - THE TWO STAGES OF THE RESEARCH
-

The methodology I adopted is commonly known as the hypothetico-deductive method. Deduction involves the process of falsification: in order to test the hypothesis, we have to prove it false.

The decryption is falsifiable and refutable because it can be demonstrated to be false by observation and verifiable data, on the basis of historical, archival and biograpical documentation and under other specified points of view (linguistic,textual,grammar,structural, methodological, mathematical, artistic, biographical cultural and others…). The well-tested and documented explanation I reached, that is supported by evidence, implies the possibility of punctual refutations, that are not abstract and generic, but aimed at precise objectives and based on measurement and control in progress according to the scientific method.

- *The interpretation of the inscription, **taken as an acronym**, occurred using **problem solving** and data analysis, and the results corroborated my predictive explanation regarding the biography of Luca Pacioli, Leonardo da Vinci and the history of the Sforzas around 1495/96.
- *Then, in order to re-test and evaluate the initial hypothesis, I submitted the inscription to a new test, considering IACO.BAR.VIGENNIS.P.1495 **as a cryptogram** containing a secret message, assuming for this purpose an **experimental method**.

As I have specified in the following part, *The double spiral course of the research for the decryption of the cartouche*, the research is developing along two lines. These two areas of research initially proceed independently, starting in a first phase with the interpretation of the *acronym*, carried out with problem solving based on scientific methodology and the critical method of trial and error elimination.

In a second phase, I took the provisional interpretation of the acronym as a hypothesis ready to be re-tested and, starting from a new point of view, in this second stage I hypothesized that the enigmatic inscription was a *cryptogram* and that it hid any secret message. Through a repeatable and reproducible methodology, adding the keyword MUSCA, (=the fly painted on the cartouche right next to the inscription), I found some encrypted perfect anagrams that were formed with the very same alphabetical letters of "IACO.BAR.VIGENNIS.P 1495"+MUSCA.

For further summary description, I add the following notes:

> **FIRST STAGE According to the provisional hypothesis**, the interpretation of the inscription, here taken as an ***acronym***, was focused on the history of the Sforza family during Pacioli's stay at the Sforza Court. On this basis I made the reasonable prediction that the choice of the alphabetic letters of IACO.BAR.VIGENNIS P.1495 occurred in connection with the inscriptions on the three lunettes of the Last Supper (1495-498), which reported analogous Latin words referring to the tradition of the Sforza family and which

were formed with an alphabetical repertoire similar to that of the cartouche of Capodimonte. I demonstrated the correspondence of the alphabetical letters between the acronym IACO.BAR.VIGENNIS P.1495 and the acronyms written on the three lunettes of Leonardo's Last Supper (1495…). I also demonstrated the common use of the words belonging to the Sforza tradition (Comes, BAR(I), Anglus, Papia,) which were recurring in the interpretation of the "inscription /acronym" of the cartouche (see the following: "The analysis of the acronyms of the Last Supper"). Anyway these acronyms and the related words were belongin to the traditional cultural heritage of the Visconti-Sforza dinasty.

The results that I obtained in the first stage **confirmed the interpretation of the acronym and corroborated the initial hypothesis**, but "one" positive test result is not conclusive proof that the inscription under study is explained. Besides each interpretation is debatale. So I re-tested from the beginning the hypotesis pursuing another path of research and adopting a new methodology.

- **SECOND STAGE** -: In the second stage the inscription IACO.BAR.VIGENNIS P.1495 was conceived as a *cryptogram*, and the decryption took place through the **enucleation of perfect Latin anagrams from its alphabetical repertoire with the insertion of the Latin word MUSCA** (the fly of the cartouche right next to the inscription). **I deciphered through experimental manipulation at least three hundred perfect Latin anagram-phrases, provided with full meaning and referring to Luca Pacioli, the black fly, the mark VINCI, and, for the most part, referring to the stories of the Sforza family. The anagram-phrases that I deciphered were all marked with the word "VINCI". I performed the decryption of each perfect anagram-sentence by means of a test (experiment),. The perfect anagrams that I have deciphered are falsifiable on many levels** (including linguistically , textually, grammatically, structurally, historically, artistically, methodologically, biographically and others). **They are qualified for the requirements of repeatability and reproducibility**. The decryption of every perfect Latin anagram and the historic interpretation of the "construct" (as the set of all documented stories of Sforzas that were formed within the "text/plot" made of anagrams) does not change over time. Noteworthy the fact that the method to decipher the three hundred Latin "anagram-phrases" from the inscription IACOBARVIGENNIS P.1495 is the very same method that I used to decipher the fifty Latin "anagram-phrases" from the motto VIRTUTEM FORMA DECORAT of the portrait of Ginevra Benci, which is certainly by Leonardo' hand. I added the keyword MUSCA (the black fly on the cartouche) to the inscription, in the very same way I previously added to Ginevra's motto the keyword IUNIPERUS (the sprig of juniper on the scroll), and in both cases I decoded a large number of perfect Latin anagrams-phrases marked "VINCI", which refer respectively to the two portraits, forming a plot of stories concerning the biography of each subject portrayed and the history of each painting. The revealing sentences that I decrypted from IACO.BAR.VIGENNIS.P 1495+MUSCA

- currently amount to three hundred perfect "anagram-phrases", and all together they produce a well-known historical narrative which unequivocally refers to the history of the Sforza family around 1495. Luca Pacioli is documented with certainty in Milan on January 31, 1496, when he attended the representation of Danae, set up by Leonardo, in the palace of Gianfrancesco Sanseverino, brother of Galeazzo, and there is no document that excludes that he has already arrived at the court of Ludovico il Moro at the end of 1495 (I consider this possibilità highly probable). The archival documents and the reconstruction of the historians is corresponding to my interpretation of the acronym and to the stories formed by the "anagram-phrases"

The two phases of the research with which I deciphered the inscription, were initially oriented towards two autonomous guidelines.Given the convergence of data emerging from both phases, the respective results have mutually enhanced in accordance with the scientific method, giving rise to a well-substantiated, unifying explanation for a set of verified, proven factors.

The results of the two diverging phases were highly compatible and accordant with the formulation of the initial provisional hypothesis So the hypothesis focused on the history of the Sforzas around 1495, in close connection with the arrival of Pacioli in Milan (proved in January 1496 and probable in 1495), was corroborated and validated in the two phases by the convergent data and by the achieved results confirming the prediction.

The double spiral course of the research for the decryption:

1-2   *3-4*   *4-5*
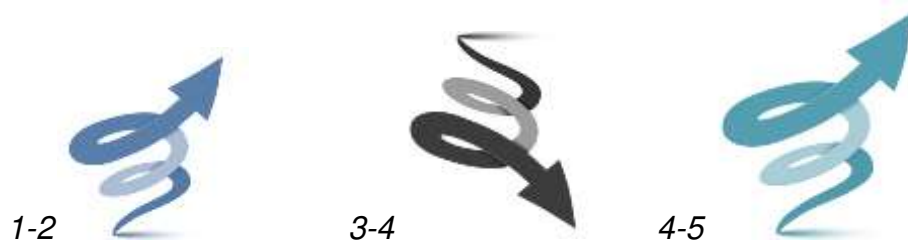
1°-2° From the conjectural interpretation of the ACRONYM "IACO.BAR.VIGENNIS P. 1495"
to the interpretation of the inscription on the historical basis,
that I assumed as the hypothesis

3°-4°   From the historic interpretation of the inscription, that I assumed as the hypothesis,
to the decryption of the CRYPTOGRAM, "IACO.BAR.VIGENNIS P. 1495
**+ the keyword MUSCA" discovering the anagram phrases and validating the hypothesis**

4°-5° From the validated hypothesis to the corroboration of the decryption
and provisionally confirmation of the theory

Currently I decrypted from the CRYPTOGRAM " IACO.BAR.VIGENNIS+ keyword MUSCA" at least three hundred perfect anagram-sentences all signed VINCI, for the most part referred to the Sforza history around 1495. The decryption is in progress…

The two stages operate in sinergy strengthening each other and consolidating the theory

1°-2°: The ACRONYM "IACO.BAR.VIGENNIS P.1495" was interpreted using problem solving and focusing on the Milanese stay of Pacioli at the Sforza Court. According to Popper's guideline, the problem solving was based on scientific methodology and at this first stage I used the critical method of trial and error elimination. In this case the hypothesis of the research was founded on the analytic study of the painting and on the Sforza history, starting from the historical and biographical reconstruction of the Pacioli's stay in Milan, when he - alongside with Leonardo - was working, at the service of Ludovico il Moro, called by the patron of artists and scientists Galeazzo Sanseverino. On this basis I worked on the interpretation described above.
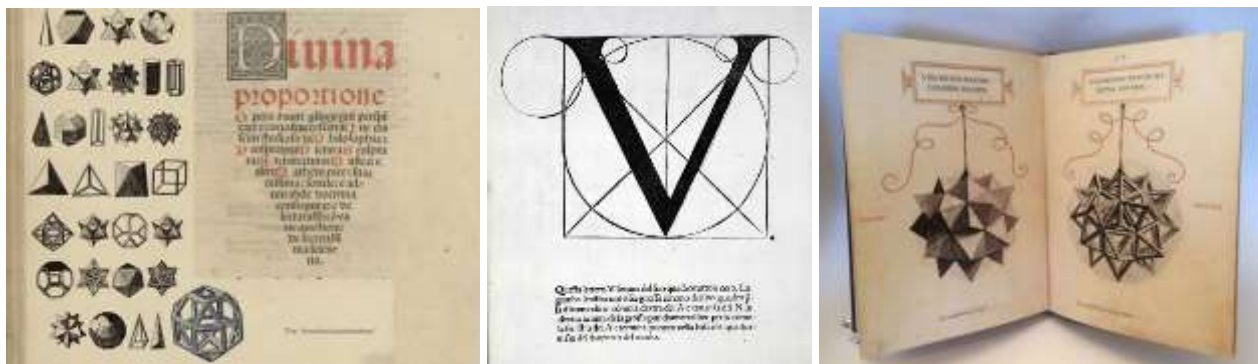
3°-4°: After the historical interpretation of the acronym, I hypohesised that the inscription IACO.BAR.VIGENNIS P.1495 could be also a CRYPTOGRAM and I tried to decode the hidden messages which I suspected it was concealing. Adding the keyword MUSCA, I discovered many anagram-phrases marked VINCI that corroborated the interpretation of the acronym focused on the history of the Sforza family around 1495.

I discovered that the alphabetic repertoire "IACO.BAR.VIGENNIS" joyned to the key-word "MUSCA" (the fly painted on the cartouche near the inscription) formed a meaningful Latin anagram-sentence with the mark VINCI.It was a perfect anagram. After this first anagram-sentence

I found many other Latin perfect anagram-sentences marked VINCI, that together formed a kown and documented historical narrative, which referred to the interpretation of the acronym. In fact the stories formed by joyning together these decrypted anagram-sentences were corresponding to the history of the Sforza family around 1495 (the date of the cartouche). The plot focuses on the usurpation of Ludovico il Moro - [the **I**llustris **A**nglus "**CO**mes" (co-regent) **BAR** (duke of Bari)] – after he poisoned the young duke Gian Galeazzo Sforza (+ October 21, 1494). In 1495 il Moro usurped the ducal investiture (**NIS** = **N**ominatio **I**mperialis **S**fortiae or **N**ominatione **I**mperiale **S**fortiae) . But **NIS** can be interpreted alternatively as **N**epotis **I**nterrupti **S**uccessor (Successor of the Killed Nephew,who had his life and his ducal family tree broken up): In fact Gian Galeazzo Sforza was the sixth duke of Milan and il Moro became the seventh duke of Milan: the dynastic branch of Gian Galeazzo was cut off and il Moro took possession of the ducal title due to the little Gian Galeazzo's son.

The main anagram-story is the funeral of the duke Gian Galeazzo, and, in this context, the members of the Sforza family are identified by their name or nickname. A series of decoded sentences also reveals that the location of the 'Double portrait' was Vigevano (**VIGEN)**, where il Moro had his residence and Galeazzo Sanseverino owned the fortress, La Rocca Nuova (ROCA). In 1495, Leonardo worked in Vigevano on the hydraulic project called la Roggia Mora (ROGIA), a canal to irrigate the fields and crops., Starting from the year 2010, I decoded from the inscription IACO.AR.VIGENNIS P.1495+MUSCA at least three hundred decoded perfect anagram-sentences concerning this Sforza family history around 1495.

The inscription "IACO BAR VIGEN / NIS P.1495" is universally recognized by scholars of artistic, scientific and mathematical disciplines as an unsolved enigma. The solutions given to date are lacking of scientific basis. My theory presupposes a thorough knowledge of the history of the Sforzas and courtly environment of the time, in which cryptography was an indispensable instrument of chancelleries and a fashion in vogue among courtiers. Leonardo knew he was surrounded by the spies of the Moor, and Isabella of Aragon's letters to his father attest that she and the Duke Gian Galeazzo Sforza were surrounded by spies.

The cruelty of the Sforza towards the traitors is proved by the atrocious death that was inflicted on the conspirators who in 1476 killed the duke Galeazzo Maria, father of Gian Galeazzo: they were slaughtered and dismembered alive. My initial suspicion was that the cartouche had been coded by Leonardo to conceal a secret courtly affair (connected to the poisoning of duke Gian Galeazzo), and that he feared being discovered. Both the interpretation of the acronym and the anagram-sentences decrypted on the basis of the alphabetic composition of the inscription "IACOBARVIGENNISP1495 + MUSCA" have contributed to validate this conjecture..

The interpretation of the acronym IACO.BAR.VIGEN / NIS P.1495 has been confirmed by the plot of the stories that emerged from the three hundred anagram-sentences signed VINCI that I formed

with the very same alphabetical letters of the inscription of the cartouche, because these stories are corresponding to the history of the Sforza family and its members around the year 1495.

I hypothesized that Leonardo selected the alphabetical letters of the inscription of the cartouche in order to form - together with the keyword "MUSCA" – "the names///the nicknames///the initials/// the acronyms// the symbolic references".to identify all the "characters" of the plot of the Sforza story, and that – adopting a probabilistic calculation - he tested the concrete possibility of forming with those letters a large number of significant Latin anagram-sentences which he considered essential for the development of the story itself.

The inscription IACOBARVIGENNIS P.1495 was formed on the calculation of probability. So Leonardo was not aware of all the possible solutions but he was able to foresee a great number of theese possible anagrams all signed VINCI. My research discovered hundreds of these possible anagrams (perfect anagrams) with a repeatable and reproducible methodology. I adopted also further strategy of general control on the research checking the method and the result of the decryption of IACO.AR.VIGENNIS. P.1495 with the method and the result of the specular decryption of the motto VIRTUTEM FORMA DECORAT, painted by Leonardo on the scroll on the back of the Ginevra Benci's portrait The specular repetition of the same method and the related achievement of specular results validated the hypothesis and corroborated the theory

The alphabetic letters forming IACO.BAR.VIGEN/NIS P.1495+MUSCA are all recurring in the names///the well recognizable nicknames///the initials///the acronyms//the symbolic references" .identifying all the "characters" of the plot of the Sforza story:

G.S. = Galeazzo Sanseverino.

B.S. or BSS = Bianca Sforza or Bianca Sforza Sanseverino

VINCI (constantly present in every sentence) = Leonardo da Vinci himself.

P. 1495 = Pictus (painted) or Pictor (painter), but also Papia (Pavia) – 1495 Investiture of il Moro.

ABACUS = Luca Pacioli (Pacioli was a master of the abacus).

BAR = Duke of Bari (Ludovico il Moro).. The acronym is written **B AR** in order to focus **AR**

AR = Isabella d' Aragona or Aragona family.

AGNUS = Gian Galeazzo Sforza (called 'the immaculate lamb' by the Sforza's historian B. Corio).

MORUS = Ludovico il Moro Sforza.

ISA = Isabella Sforza Aragona.

BEA = Beatrice d'Este.

AMBROSIUS = Ambrogio da Rosate (Gian Galeazzo's doctor, astrologer and court magician)

The names of the locality and possessions of the Sforza are also recurring in the alphabetical repertoire of the inscription IACO.BAR.VIGENNIS P.1495: **VIGEN** = Vigevano, the Moro's residence; **ROCA** = the Rocca Nuova : the fortress property of Galeazzo Sanseverino in Vigevano.

ROGIA = the Roggia Mora in Vigevano.

As synthesizes Jerzy K.Kulski in the chapter entitled "Carla Glori's decryption with a little help from a black fly" (in the book "Leonardo da Vinci and the Pacioli code", 2019, page 392):

- "The initials of the names were used only in cases where the phrases uniquely identified the persons involved and who were documented in a historical biographical context. In the case of the commander of the ducal army Galeazzo Sanseverino, nicknamed also 'mas/male' his initials G.S. distinguished him in the majority of the sentences. For Gian Galeazzo Sforza, the nickname ' agnus ' ('immaculate lamb', in B. Corio, History of Milan) was used constantly. For Bianca Sforza, the eldest daughter of the Moor, both B.S. (Bianca Sforza) and B.S.S. (Bianca Sanseverino Sforza) were indicated always in contexts related to her marriage with Galeazzo Sanseverino or a wedding portrait commissioned to the Painter (P). Ludovico il Moro Sforza was called with his nickname Morus, whereas Ambrogio da Rosate was Ambrosius. The abbreviations Isa and Bea were used for Isabella Sforza Aragon and Beatrice d'Este, respectively. The variants of place names ROCA and ROGIA (Rocca Nuova , Roggia Mora), referred to Vigevano, incorporating VIG or VIGE".

THE ALPHABETICAL LETTERS OF "IACO.BAR.VIGENNIS P.1495 + MUSCA"
ARE THE SAME ALPHABETICAL LETTERS OF THE ACRONYMS
WRITTEN ON THE THREE LUNETTES OF THE LAST SUPPER
WHERE THE ABBREVIATIONS ARE REFERRED TO THE MEMBERS
OF THE FAMILY OF THE DUKE IL MORO (1495-1498)

I hypothesized that the choice of the letters of the hermetic inscription IACO.BAR.VIGEN / NIS P.1495 was logically and historically coherent with the year 1495 written on the cartouche.

The Last Supper - whose beginning is dated with some oscillation around 1495, the same year written on the cartouche of Capodimonte - offers a point of reference concerning the inscriptions on the three lunettes, where there are some abbreviations formed with the identical initial letters recurring on the cartouche. The inscriptions of the lunettes are also written in capital letters and the abbreviations refer to the duke il Moro and his family around 1495. Besides the acronyms on the lunettes are in Latin as well as the anagrams taken from IACO.BAR.VIGEN / NIS P.1495 + MUSCA.

All these similitudes suggested to me the existence of a connection between the inscriptions on the three lunettes and the iscriptions of the Capodimonte cartouche. Moreover Leonardo was aware that the acronyms he had chosen for the lunettes were deeply rooted in the tradition and dynastic history of the Visconti Sforza. At the basis of the persistent mystery of the generation of anagrams there are rational choices and a strictly logical path that I aimed to reconstruct

The analysis of the acronyms of the Last Supper
The acronym IACO.BAR.VIGENNIS P.1495 is similar to the acronyms
written on the three lunettes of The Last Supper (C.1495-1498)

On the left: **M** (aria) **SF** (ortia) **CO** (mes) **AN** (glus) **M** (a) **X** (Massimiliano Sforza) **P** (a) **P** (iae)

On the central lunette**:** **LV** [dovicus] **MA** [ria] **BE** [atrix] **EST** [ensis] **SF** [ortia] **AN** [glus] **DV** [x] Mediolani

The lunette on the right: **SF** (ortia) **AN** (glus) **DVX** (Duke) **BARI**

M S F C O A N M X P P L U M A B E E S T S F A N D U S F A N D U X B A R I= total letters on lunettes

I A C O B A R V I G E N N I S P+M U S C A P
The inscription has the same alphabetic repertoire of the lunettes except the lacking **V G**
note:*the alphabetic repertoires of the three lunettes contains these overflowing letters:* **L T F D X**

on the left:**M** (aria) **SF** (ortia) **CO** (mes) **AN** (glus) **M** (a) **X** (Massimiliano Sforza) **P** (a) **P** (iae)

On the central lunette**: LV** [dovicus] **MA** [ria] **BE** [atrix] **EST** [ensis] **SF** [ortia] **AN** [glus] **DV** [x] Mediolani

The lunette on the right: **SF** (ortia) **AN** (glus) **DVX** (Duke) **BARI**

In fact, the central lunette presents an inscription in capital letters referring to Ludovico il Moro and Beatrice d'Este as dukes of Milan («**LV** [dovicus] **MA** [ria] **BE** [atrix] **EST** [ensis] **SF** [ortia] **AN** [glus] **DV** [x] Mediolani »). This inscription can be dated with highest probability, after May 1495, when the ducal title of Ludovico il Moro was made official and publicized. Therefore in both inscriptions the dating also coincides

The other two lunettes have the following inscriptions:

The lunette on the left: «**M** (aria) **SF** (ortia) **CO** (mes) **AN** (glus) **M** (a) **X** (Massimiliano Sforza was born on January 25, 1493 and, as the firstborn, boasted the title of Duke of Pavia) **P** (a) **P** (iae)»

The lunette on the right: «**SF** (ortia) **AN** (glus) **DVX** (Duke) **BARI**: the title of Duke of Bari was reserved for the second son Francesco (Ludovico himself had brought it until May 1495).

The statistical correspondence of the letters found on the inscriptions of the two different artworks – the Last Supper and the Double portrait - refers to the two different figurative contexts and allows a significant correspondence to be established between the respective alphabetical repertoires:

I A C O. B A R. V I G E N N I S + M U S C A P.1495 : all the selected letters of the inscription are included in the three lunettes, except for the letter G V (the only two letter overflowing on the cartouche: the letter **V** was necessary solely in order to form the marK **V**INCI, obviously lacking on the lunettes).

M S F C O A N M X P P L U M A B E E S T S F A N D U S F A N D U X B A R I (L,T, F,D, X are overflowing on the lunettes: these letters were necessary only referring to the Sforzas Francesco (F) and Maximilian (X) that don't appear in the anagram-stories; the letters of the lunettes L and D, identifying il Moro were unuseful , because he is identified in the acronym as **BAR** (Duke of Bari), and the identification is confirmed in the decrypted anagrams, where he is called **MORUS** and **COMES**; the letter T of ESTE is included on the lunettes, but Beatrice d'Este is already sufficiently identified with the recurring nickname BEA

The letters chosen to form the inscription (IACOBARVIGENNISP) of the cartouche and the keyword (MUSCA), all coincide - except for the "V" and the "G" - with the letters referred to the abbreviated titles and names of the Sforza ducal family on the lunettes, and it is therefore evident that the choice of the alphabetic letters is regarding the Sforza family context.

The overabundance of the letters "L, T, F, D, X" on the three lunettes can be explained first of all by the need to avoid a too long inscription that cannot be contained in the cartouche format, and with the fact that the chosen inscription IACO.BAR.VIGENNIS (+the keyword MUSCA) can be considered sufficient in itself to identify, through the decipherable perfect anagram-sentences, not only the family members, but also a larger circle of subjects who interacted in the Sforza history in anagrams,

The repetition of some letters of the lunettes, that recur in the inscription of the cartouche, inspired me to the interpretation of the enigmatic acronym IACO.BAR.VIGEN/NIS P.1495. In fact, the letters chosen to form the inscription of the cartouche "IACOBARVIGENNISP" and the keyword "MUSCA", all coincide – exception "V" and "G" - with the letters which, on the lunettes, quote the

initials of the traditional titles and names of the Sforza ducal family, and it is therefore evident that the choice of alphabetical letters concerns the Sforza context.

The overabundance of the letters "L, T, F, D, X" on the three lunettes, (which are missing on the cartouche) can be explained first of all by the need to avoid too long an inscription which cannot be contained in the cartouche format, and with the fact that the alphabetical repertoire of the inscription can be considered sufficient in itself to identify not only the family members through the perfect anagrams, but also a wider circle of subjects interacting in the history of the Sforza Court,

In the same way, the repetition of some alphabetic letters of the lunettes, which are reproduced in the inscription of the cartouche, directed my attention to the Sforzas and their entourage, (including Luca Pacioli and Leonardo), in the interpretation of the acronym IACO.BAR.VIGENNIS P.1495.

There are revealig correspondences between the respective inscriptions:

*Also on the lunettes the word **AN(glus)** is recurring to celebrate the Sforzas prestige: this nobiliar title derives from the Visconti tradition.

*Also the words **COmes (**CO) and (duke of) **BAR(I)** are recurring to identify Ludovico il Moro.

*Also **BE(Atrix**) appears like **BEA** in the anagrammatized sentences deciphered from the iscription of Capodimonte.

*On the lunettes the letter **P** is here related to **PaPia** (Pavia) and this interpretation is also alternatively available for the letter **P** followed by the date 1495, which is primarily referred to **Pictus** (painted) in 1495 (Jerzy Kulski prefers to refer the letter P to Pavia, "the place where Gian Galeazzo Sforza died and where Leonardo loved to visit him and his wife")..

The interpretation of the acronym of the Double Portrait

We can see that the acronyms of the Last Supper and of the Portrait of Luca Pacioli are similar, but the inscription of the cartouche of Capodimonte hides a secret that, according to my hypothesis, is symbolized by the black fly.

This is the interpretation that I hypothesized on the acronym
IACO.BAR.VIGEN/NIS.+MUSCA+P (the wildcard letter) **1495.**

Illustris **A**ugustus **CO**mes **BAR**. **VIG**ievin**EN**sis (or even **VIG**i**E**vi**N**e *) / **NIS**., where **NIS** placed at the head stands for **N**ominatio **I**mperialis **S**fortiae (or even **N**ominatione **I**mperiale **S**fortiae), but that can be read also as **N**epotis **I**nterrupti **S**uccessor. **P**ictus 1495. (NB * *Vigievine***:** usually used by Leonardo for Vigevano). Duke Sforza is designated in documents with the titles of Augustus and

Augustissimus, but traditionally as '*Anglus*', in reference to the Visconti's title of Count of Angera or Angleria, as a descendant of Anglo, 'Son of the Trojan hero, Aeneas' (according to the tradition of Giangaleazzo Visconti).

1). **IACO.BAR** = **[I]** Illustris **[A]** Anglus **[CO]** Comes (CoRegent or Commanding Officer), **[BAR]** Duke of Bari, who is Ludovico Sforza and the Uncle of the under-aged duke, Gian Galeazzo Sforza, ruling in his own right (Comes i.e., general lieutenant and tutor).
The word BAR on the cartouche is written **[B AR]**, where the **[AR]** (joined together) refers also to the Aragon family of Naples who were related to the Sforza by marriage

2). **VIGEN/NIS** I) **VIGEN.**= the acronym is referred to Vigevano that is often written **VIGIEVINE** by Leonardo (for this reason it is preferred to the Latin toponym Viglebanum). Vigevano was the favorite residence of il Moro, and Galeazzo Sanseverino, (the Pupil), who was the owner of the fortress La Rocca Nuova in Vigevano.; II) **NIS** might mean **N**ominatio **I**mperialis **S**fortiae or **N**ominatione **I**mperiale **S**fortiae, (for the Imperial investiture of the Sforza in 1495); but **NIS** can be interpreted alternatively as **N**epotis **I**nterrupti **S**uccessor (Successor of the Killed Nephew, where interruptus=broken up). In fact Gian Galeazzo had his life and his ducal family tree broken up because he was poisoned by il Moro and and his dynastic branch was cut off.

3) **P.1495** The year 1945 is the official investiture of Ludovico il Moro as Duke of Milan by the Holy Roman Emperor Maximilian I. In the summer 1494 il Moro obtained from the Emperor Maximilian the investiture to the Duchy for himself and his heirs before the death of his nephew Gian Galeazzo Sforza, the Duke of Milan, with an agreement that he would make it public only in May 1495 when there were three investiture ceremonies. The third ceremony was in the Cathedral of Pavia on May 28 where Ludovico il Moro was invested with the title of Count of the city, stealing the title from his grandnephew Francesco Sforza, the son of Isabella Sforza Aragon. The letter **P** – interpreted primary as Pictus - can therefore refer also to Pavia [like **P**(a).**P**(ia) written. in the lunette of the Last Supper] The "1495" reveals a macroscopic distortion in writing the **"5"** (the number sacred to Pacioli), and the **"4"** is also deformed, perhaps due to the fact that the two years 1494 (death Gian Galeazzo Sforza) and 1495 (investiture of the Moro), were "desecrated" by a crime and coincided with the period of the end of a dynastic right and the usurpation of ducal power, and therefore the two-year period **1494-5** takes on an emblematic value.

The decryption of the cartouche is falsifiable and refutable

The decryption is falsifiable because it can be proven false by observation and targeted checks. It involves the possibility of punctual refutations, which are not abstract and generic but aimed at the

precise objectives. The anagram sentences can be refuted and verified on their exact formation and on the correspondence and conformity with the subjects and objects related to the painting, the historical-biographical documentation and many other variables.

Furthermore, the decryption of each perfect anagram (= corresponding to an experiment) can be regularly reproduced by whoever carries out the experiment (= decryption of the perfect anagram phrase) in the prescribed way, having the scientific requirements of repeatability and reproducibility. Every discovery (= every decrypted perfect Latin anagram) is not expected to change over time, and this requirement also applies to the amagram phrases and constructs formed with them (= the stories that coincide with the documented history of the Sforza around 1494/95).

The decryption of every perfect anagram is falsifiable at various levels: linguistic,textual,grammar,structural, historical. methodological, mathematical, artistic, cultural

- ***linguistic***: concerning the correctness of Latin anagram-sentences and their relevance to the characters involved and to the Sforza stories
- ***textual***: concerning the logical and structural coherence of the text (the stories) that the Latin anagrams form
- ***structural***: as each anagram-phrase is necessarily composed of a sentence with meaning and the VINCI mark -
- -***grammatical:*** because each anagram-phrase, even if necessarily contracted, must comply with the rules of Latin grammar (although obviously it cannot correspond to classical Latin, but still falling within the use of Renaissance Latin)
- ***methodological:*** regarding the process of deciphering and control of anagrams and of the sentences and stories they form
- ***mathematical***: concerning the numerical exact correspondence (the matching) one to one of the alphabetic letters of the anagrams with the alphabetic letters of the inscription on the cartouche+keyword
- ***arithmetic;*** see above: concerning the computation of the alphabetical letters
- ***geometric:*** concerning 1) the polyhedra, which recall the Compendium of Luca Pacioli and the illustrations made by Leonardo during the first Milanese stay at the court of Ludovico il Moro; 2) the geometric shapes drawn by Pacioli on the blackboard; 3) Euclid's theorem etc.
  mathematical tools and objects : concerning the mathematician's tools and the objects painted on the table
- ***historical*** (*history of the Sforza family focused on the period 1494-1496*) : as the anagram-sentences, the respective subsets in which they are iscribed and the "universe" they form must find historic correspondence with the reconstruction of the Sforzas historians and chroniclers focused on the period 1494-1496

- **_biographic:_** concerning the biography of the characters portrayed (Luca Pacioli and Galeazzo Sanseverino) and the members of the Sforza family between 1494-1496
- **_cultural_**: regarding the environmental context, as an expression of the Milanese and Sforza culture (during the second half of 1490), and concerning the courtesan fashion (hair, cap ,dress of the pupil Galeazzo Sanseverino)
- **_Other topics_** to be found by those who aim to invalidate the scientific nature of the research

Repeatability and reproducibility

- *We do not take even our own observations quite seriously, or accept them as scientific observations, until we have repeated and tested them. Only by such repetitions can we convince ourselves that we are not dealing with a mere isolated 'coincidence', but with events which, on account of their regularity and reproducibility, are in principle inter-subjectively testable.* Karl Popper, The Logic of Scientific Discovery

I have verified that my experiment (= the decryption of each anagram and anagram-sentence) can be regularly reproduced by anyone who carries out the appropriate experiment in the way prescribed.

REPEATABILITY: For each anagram I deciphered, I repeated the same experiment several times in order to confirm my finding. My finding never shows variation and it can be predicted to recur even when experimental conditions may vary to some degree

REPRODUCIBILITY: I verified that my finding (the anagram and anagram-sentence that I deciphered) never shows variations if the experiment is carried out by different individuals, at different locations, with different conditions.

Test/re-test reliability demonstrates that the scientific finding (the deciphered anagrams) and constructs (the stories I formed with the anagrams, coinciding with the documented Sforza history around 1494/95) are not expected to alter over time.

SOME EXAMPLES: A SAMPLE OF PERFECT ANAGRAM-PHRASES:

REPEATIBILITY, REPRODUCIBILITY AND THEIR RELEVANCE TO THE OBJECTS AND SUBJECTS

INVOLVED IN THE "DOUBLE PORTRAIT OF LUCA PACIOLI AND PUPIL"

[The sample comprehends a selection of examples on: THE FLY, LUCA PACIOLI, THE MARK "VINCI"]

The "anagram-phrase" that expresses the enigmatic spirit of the Double portrait:

THE ENIGMA UNDER THE SACRED

The "Double portrait of Capodimonte" is permeated by the enigma.

Some of the anagram-phrases formed by the inscription of the cartouche

illuminate the complexity and depth assigned to this word by the Painter

ENIGMA

AENIGMA SUB SACRO – VINCI (P.1495)

IACO.BAR.VIGENNIS.-- MUSCA P.1495

3A - 1E - 2N - 3I - 1G -1M - 2S - 1U - 1B - 2C - 1R - 1O - 1V.- 1p (jolly:.....)

THE ENIGMA UNDER (that's hidden under) *THE SACRED – VINCI (P.1495)*
I highlighted in color one by one the letters of this anagram-sentence in order to visualize the formation of the perfect anagram in which all the alphabetical letters of the starting phrase (i.e. the inscription of the cartouche) form a new anagram-phrase of different meaning. In this anagram phrase - as in all the others that I formed - the word VINCI appears constantly in visible alternation with the word MUSCA. Given the difficulty of coloring by hand every single letter from the keyboard, this example applies to all the other perfect anagram- phrases to follow.

EXAMPLES WITH THE SAME DIDACTIC PRESENTATION: 7 sentences on the fly

1-2) DESCRIPTION OF THE FLY PAINTED ON THE CARTOUCHE

Black fly, you stand out from the black stain

MUSCA ABES A NIGRO – VINCI P.1495

IACO.BAR.VIGENNIS.-- MUSCA P.1495

3A - 1E - 2N - 3I - 1G -1M - 2S - 1U - 1B - 2C - 1R - 1O - 1V.- 1p (jolly:.....)

You COME OUT FROM THE BLACK STAIN OH BLACK FLY – VINCI P.1495
Or
You BLACK FLY DIFFER FROM THE BLACK STAIN - VINCI P.1495

And also

DIFFERENTIATE FROM THE BLACK STAIN OH BLACK FLY! - VINCI P.1495
In fact, as you can verify, on the cartouche the fly is distinguished in an unclear way from a black stain on the background, on which it is laid ---*" Abes", in addition to being the 2nd person singular of the indicative present, is also the 2nd person of the irregular imperative*

Other examples where you can verify with colors the exactness of the perfect anagram-phrases

Get fat oh black fly!

Or also

Obese black fly

OBESA MUSCA NIGRA – VINCI p.1495

IACO.BAR.VIGENNIS.-- MUSCA P.1495

OBESE BLACK FLY – VINCI P.1495   .
and also

GET FAT OH BLACK FLY ! - VINCI P.1495

The fly is fat and formless: this is irrefutably true –*"Obesa" is also the 2nd singular person of the imperative mood*

**

3)-4) *THE FLY COMES FROM THE SFORZA COURT*

3) You fly came from the Court / came from the ducal family

MUSCA IBAS A REGNO – VINCI P.1495

IACO.BAR.VIGENNIS.—MUSCA P.1495

You FLY CAME FROM THE KINGDOM (i.e. from the Court) - VINCI P.1495
and also

You FLY CAME FROM THE ROYAL FAMILY – VINCI P.1495

The context of provenance of the fly is unequivocal.Many anagram-sentences confirm that the fly comes from the Ducal court of il Moro *Regnum= Royal family in Caes BC3,106,1; Court in Sall.Iug,10.1*

**

O fly that you act within the perimeter or in the circle*

*(the perimeter refers to the walls of the ducal palace and the circle refers to the group of courtiers)

MUSCA AGAS IN ORBE – VINCI P.1495

IACO.BAR.VIGENNIS.-- MUSCA P.1495

OH BLACK FLY, THAT YOU ACT IN THE PERIMETER (of the Court) – VINCI P.1495

and also
OH FLY, THAT YOU ACT IN THE CIRCLE (of the Courtiers) - VINCI P.1495

Where references are made to the perimeter or walls (of the ducal palace), *Curt., Lev 3,6,9,12, and also to the group (of the courtiers) OV, Fast, 2, 127*

**

5) AVERSION TO THE BLACK FLY

5) Oh fly, may you disappear!

OBEAS MUSCA NIGRA – VINCI P.1495

IACO.BAR.VIGENNIS.—MUSCA P.1495

OH FLY, MAY YOU DISAPPEAR! - VINCI P.1495

**

6) CONFIRMING THE PROVENANCE OF THE FLY FROM THE DUKE "IL MORO"

6) You fly (come) from the circle of the king (the duke)

MUSCA AB ANO REGIS – VINCI P.1495

IACO.BAR.VIGENNIS.—MUSCA P.1495

You BLACK FLY COME FROM THE CIRCLE OF THE DUKE *- VINCI P.1495*
Anus= circle or a group of people, a circle of close friends (in this case the conspirators against Gian Galeazzo and his wife Iabella d'Aragona). This anagram sentence refers to the historical mystery of the death of Gian Galeazzo Sforza which develops in the hundreds of anagram-phrases that reconstruct the history of the Sforza family around 1495, when il Moro poisoned the young duke and usurped the ducal title.

**

7) THE FLY IS SYMBOLICALLY LINKED TO DEATH AND IN THE CONTEXT OF THE ANAGRAM-STORY IT IS LINKED TO THE FUNERAL PIRE OF GIAN GALEAZZO SFORZA
6) You fly escape flying from the funeral pyres

MUSCA ENAS AB ROGIS – VINCI P.1495

IACO.BAR.VIGENNIS.—MUSCA P.1495

You FLY ESCAPE FLYING FROM THE FUNERAL PYRES – VINCI P.1495

EVALUATION OF THE RESULTS OF THE DECRYPTION:
REQUIREMENTS AND CHARACTERISTICS OF THE ANAGRAM-PHRASES

The Latin sentences above, regarding the fly (MUSCA), are accompanied by short comments which highlight their direct relationship with the fly that we see on the cartouche. As I premised, in this summary I have included a selection of anagram-phrases referring to Pacioli and to the geometric shapes and polyedra. I have also added some examples of the anagrams concerning the onnipresent signature VINCI These limited samples have the advantage to be more simple and linear, in order to offer a clear idea of the results concerning a selection from the three subsets, (the fly/the mathematician Pacioli/the signature VINCI), extrapolated from the vast and branched plot of the stories coded in the cartouche.

The hundreds anagram-sentences, (necessarily omitted in this context), that tell the story of the Sforzas, have the same characteristics of the previous examples. They are similar to telegraphic epigrams signed VINCI and have a concrete and verifiable correspondence with the documents and the reconstruction of the historians and chroniclers of the time. The Sforza's anagram-sentences are linked together in homogeneous subsets referring to historical and biographical episodes. All these subsets, joined together, form a sort of "stories tree" with a coherent and well-founded plot, where we are able to recognize the documented reconstruction of the Milanese Court history around 1495-98, after the death of Duke Gian Galeazzo Sforza and his usurpation, when Luca Pacioli and Leonardo were in the service of Ludovico il Moro.

ABOUT THE UNIVERSE OF OVER THREE HUNDRED SENTENCES AND THEIR CHARACTERISTICS

Among the anagram-phrases, the most complete, understandable and significant are largely in the majority. Only a few sentences achieve comprehensibility by associating them with other analogous ones,The rare phrases apparently bearers of doubts or ambiguities are revealed to be coherent with the textual contest and anyway compatible on the basis of documentary, historical and linguistic analysis. No sentences emerged that would produce contradictions. They are all carriers of information referring to the Sforza biographical-historical reconstruction and they are also concerning the other two portrayed persons, (Luca Pacioli and Galeazzo Sanseverino). There are also references to the geometric shapes and other existing painted details. The anagram-phrases can be logically connected in a structured , systemic and meaningful text .Furthermore, they are characterized by a high linguistic / structural / semantic homogeneity.

THE REQUIREMENTS OF THE THE DECRYPTED PHRASES

1 they are all anagram-phrases formed with the letters of the inscription IACO.BAR.VIGENNIS P.1495 + the keyword MUSCA

2 they all contain the mark " VINCI" (in absence of this mark,they are penalty inadmissible)

3- all the anagram-sentences, although telegraphic, have logic and complete meaning or in any case they are understandable and justifiable by the context in which they are inscribed

4) all the anagram-phrases satisfy the essential requirement of the scientific experiment, namely "repeatability", in fact each sentence can be re-submitted to the alphabetical re-composition procedure with the same letters of the "inscription + keyword", obtaining the same result , which in turn can be re-checked.

5) each anagram-phrase is qualified for the requirement of "reproducibility" because the decryption of every perfect Latin anagram and the historic interpretation of the "construct" (as the set of all documented stories of Sforzas formed within the text made of anagrams) should not change over time.

6) the perfect anagram-sentences that I have deciphered are falsifiable on many levels including linguistically, textually, grammatically, structurally, historically, methodologically, biographically and artistically.

7 - they are all syntactically correct, in compliance with the Latin cases and declinations without any derogation (although the "telegraphically" contracted structure in any case has involved minimal additions or approximations, which however do not alter or manipulate the meaning and the formation of the perfect anagrams)

8) they are all semantically coherent and correlated in the textual context in which they are inscribed

9) all the anagram sentences correspond to the criterion and to the control of the mathematical exactness: in fact the alphabetical matrix of the sentences is "IACOBARVIGENNIS + MUSCA", and the verification must ascertain that each decoded phrase marked with VINCI is formed on the basis of the calculation of the letters of the inscription.

10 - they refer to the documented biography of the mathematician Luca Pacioli and the pupil Galeazzo Sanseverino; overall they refer to the documented history of the members of the Sforza family and of the circle of courtiers, who are identified by their names or nicknames

11- they refer in part to the geometric shapes and polyedra painted in the "Double portrait" and in any case to geometry

12) they refer to the activity of the abacus master Pacioli

13) they are verifiable on the basis of documents and written testimonies of chroniclers and historians of the time

14) they all are referable to the date 1495 written on the cartouche, and to the period (from 1496 to 1498) in which Pacioli wrote his Compendium in Milan at the Sforza Court

15) each anagram-sentence coincides with a group of words, usually containing verb, that expresses with telegraphic brevity a complete or anyway an understandable idea; it is consisting of

Latin terms attested by common dictionaries used in high schools; my research has used Castiglioni Mariotti, Campanini Carboni and other middle school dictionaries, and only in doubtful cases I made use of Du Cange and Forcellini

16) the anagram sentences are all connected to the general context in which they are included; this organic textual connection is not lost even in the rare phrases having minimal imperfections due to the limited and fixed repertoire of the usable letters

17) the majority of the decoded anagrams have the verb at the second person singular, due to the absence of the letter T (= Latin third singular person) in the alphabetic repertoire (inscription + keyword); it is noteworthy the peculiarity that Leonardo in his writings often used the second person singular, even when he is the subject of the discourse and writes about himself.

18) there are at least thirty anagram sentences marked VINCI , and, for the most part written in the first person singular of the verb, which reveal that the mark VINCI identifies the painter

<p style="text-align:center">A SAMPLE OF ANAGRAM SENTENCES :
(1°) LUCA PACIOLI - (2°) THE GEOMETRIC FIGURES</p>

I checked: **(1°)** if the anagram-sentences were referred to Luca Pacioli, who is identified with certainty in the portrait, and **(2°)** if they mentioned geometric figures. This controls were aimed to be sure that the anagram-phrases that I formed were concretely a) referable to the mathematician and b) referable to the painted geometric figures and the tools that the observer can see with his own eyes, or anyway to other geometric figures.

(1°) *Can you obtain any anagram concerning the portrayed Luca Pacioli and the painted geometric figures?*

My basic hypothesis focuses on the inscription of the cartouche with the disquieting black fly and on the events related to the inscription referring to the Sforza family.I decoded from the inscription + keyword, a story with a coherent plot corresponding to the historical and archival documents around the year 1495. Besides I discovered many anagram-sentences concerning the portrayed figure of Pacioli, the mathematical operations that he performs and the geometric shapes of the painting. The figure of Luca Pacioli is marginal with respect to the history of the Sforzas, that forms three hundred anagram phrases. but   I consider rationally justified the fact that the anagrams referred to Luca Pacioli are relatively few. The formed "anagram sentences" are unequivocal, because there are many Latin words used in mathematics and geometry: ABACUS; BASIS (of the triangle, Cicero); MENSURABO in Vegezio and MENSURA in Plinio (used in the pictorial field to designate perspective and usually referred to measurement); NORMA can be "rule", but it is also used to designate "the drawing tool used in geometry"; ORBIS (Cicero, Pliny, Ovid, Caesar etc.) used to designate the circle and the sphere, PRISMA, CONUS, CUBE connected to Pacioli's work on geometric solids etc.

EXAMPLES:

1) **IACO.BAR.VIGENNIS. P1495+MUSCA becomes: PINGO SACRUM A BASE* – VINCI 1495. I PAINT THE SACRED FROM THE BASE (OF THE TRIANGLE)*- VINCI** (I used the **wildcard letter "P"** *)
For Pacioli geometry is sacred and the mathematician is just drawing a circumference with a triangle on the blackboard Also in this anagram-sentence there is the concept of the sacred, as in AENIGMA SU SACRO-VINCI,p.45 [*Note. In Latin "BASIS" is a word used in geometry = base of the triangle*]

2) **IACO.BAR.VIGENNIS.P 1495+MUSCA becomes: AGAS ACUMEN ORBIS ! – VINCI P.1495 =**
THAT YOU TAKE CARE (OR ALSO LET YOU TAKE CARE) OF THE SHARPNESS (or SHARPENED POINT) OF THE CIRCLE! – VINCI P.1495 [*It is an exhortative expression and the subjunctive is here used in the present tense to express an exhortation *see following note**]
Here ORBIS indicates the idea of wholeness and omniscience, referring to Pacioli. But ORBIS also has peculiar nuances of meaning because it implies references to mathematical research, scientific concepts and philosophical theory according to Pacioli's multidimensional cultural work.
In particular, ORBIS is remembering the related words "CIRCLE / SPHERE / WHEEL OF THE DESTINY" etc. The mathematician Pacioli is intrinsically multifaceted, considering mathematics also a sum of arithmetic, geometry, astrology, music, perspective, architecture and cosmography. But we must concretely observe that on the blackboard the circular shape is associated with the triangle: the triangle is inscribed in a circumference, its angles are acute and its vertex touches the circumference at the top. The word ORBIS is referring to this circumference and ACUMEN can be referred to the sharpness of the vertex and generally to the acute angles of this inscribed triangle.

- Argante Ciocci writes: *" It is quite likely that Pacioli, when he began dealing with problems concerning dodecahedrons and rhombicuboctahedrons, noticed an astonishing coincidence: the two solids in fact are inscribable in the same sphere. The enigmatic numerals that appear on the blackboard where Pacioli writes (478+936+621=2034) constitute a puzzle whose plausible solution can only be found if we suppose that the ciphers refer to the value of the sides of the two polyhedrons and of the radii of the spheres circumscribing them, used in the preliminary mathematical operations carried out by Luca before arriving at the discovery that the side of a dodecahedron is the same as that of a rhombicuboctahedron inscribed in the same sphere "* (Ciocci A., LUCA PACIOLI La Vita e le Opere, English version by Karen Pennau Fronduti, pag. 28, Quaderno n.14,Serie "R&D" Ricerca e Didattica, Centro Studi "Mario Pancrazi" di Sansepolcro, University Book of Digital Editor srl).

In general, the mathematical problem of squaring the circle is crucial for Luca Pacioli (for example, he deals with it in his Summa with reference to Archimedes).This problem is fundamental also from a philosophical and speculative point of view, and it fascinated Leonardo in the years 1496-98, when he collaborated with the mathematician and created illustrations for the Compendium .

*Note: The exhortative tone of the "anagram phrase" in this case is linked to the use of the verb in the subjunctive. Regarding the use of the second person of the verb, I note that Leonardo often uses it even when he writes about himself and in the "anagram sentences" the verb necessarily appears always declined to the second person because the absencr of the letter "t" in the alphabetic repertoire of the inscription prevents the formation of the third person of the verb.

3) **IACO.BAR.VIGENNIS.P1495+MUSCA becomes AGIS AC MENSURABO* – VINCI P.1495 = YOU EXERCIZE (or also TALK) AND I WILL MEASURE (PERSPECTIVE) – VINCI P.1495**
While the teacher Pacioli is standing in the center of the painting, the painter will measure the

perspective [* *"MENSURO"= this Latin word was used in the pictorial field in relation to perspective*]

4) IACO.BAR.VIGENNIS.P1495+MUSCA becomes MUCRO SIGNA A BASE! – VINCI P.1495 = POINT OF THE STILUS MARK FROM THE BASE OF THE TRIANGLE! [MUCRO: *Latin declension of the vocative case* – SIGNA: *to outline the action to be performed, the imperative verb is used here to issue a command or instruction to the stylus+*.]

The stilus (MUCRO= the sharp point or metallic point) was used during the Middle Ages and the Renaissance principally as a writing instrument and in drawing. The different types of metal employed as writing/graphic instruments were various: for a long period the most common was that of lead or a lead-tin alloy. The use of silver was prevalent in the Renaissance drawings during the 15th century. Leonardo was a master in the use of the silver point.The rhombicuboctahedron was magistrally drawn with silver point.

I add also some other "anagram-sentences" quoting: cone (CONUS), conical projection (MUCRO as a term used in geometry), prism (PRISMA), cube (CUBUS).

Since the anagram phrases, in addition to not being expressed in classical Latin (given the Renaissance dating and the typical contraction of the anagram), cannot have mathematical rigor, I have chosen to also accept sentences that deviate from a precise disciplinary interpretation. The Franciscan friar is illustrating the eighth proposal of the thirteenth book of Euclid's Elements: with the index finger of his left hand follows the Euclidean text; with his right he draws on a blackboard the geometric figure relating to the theorem, an equilateral triangle inscribed in the circle. That said, beyond the orthodox interpretation of Pacioli's exact operation, I deemed to accept the Latin term "MUCRO" also in its other geometrical meaning of "CONICAL PROJECTION", because anyway it is a reference to geometry.
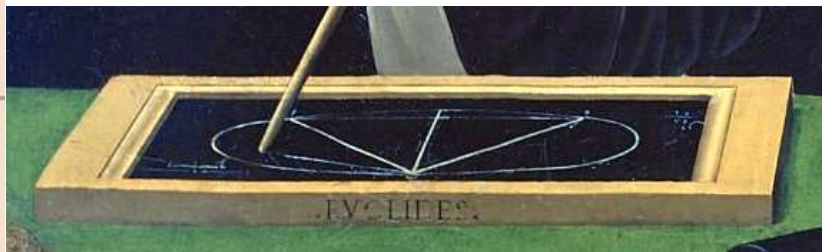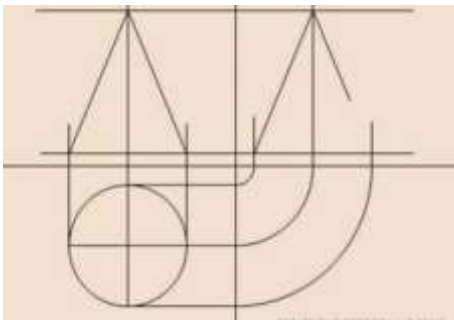
Orthogonal projection of the cone -   The circumference and the triangle

5) IACO.BAR.VIGENNIS.P1495+MUSCA becomes MUCRO PANGIS (conum) A BASE - **VINCI P.1495 = THE PROJECTION OF THE CONE COMPOSES (the cone) FROM THE BASE** [BASE and BASI are both correponding to the Latin ablative case - Here I used **the wildcard letter "P"**]

I quote other two anagrams with the word "CONUS":

6) IACO.BAR.VIGENNIS.P1495+MUSCA becomes CONUM GERAS A BASI - VINCI P.1495 = THAT YOU (Pacioli) CAN MAKE THE CONE STARTING FROM THE BASE

And with a similar concept::

7) IACO.BAR.VIGENNIS.P1495+MUSCA becomes CONUM REGAS A BASI - VINCI P.1495 = THAT YOU (Pacioli) CAN MANAGE (the drawing of) THE CONE FROM THE BASE

[NOTE: *The verbs of the anagram-sentences 6) and 7) are conjugated to the subjunctive, as described in the previous note, point 2)*]

There are other anagram-phrases formed by the inscription in which Pacioli works on geometric solids

8) IACO.BAR.VIGENNIS.P1495+MUSCA becomes GENAS PRISMA A CUBO - VINCI P.1495 = THAT YOU (Pacioli) GENERATE A PRISM FROM THE CUBE [PRISMA is the Latin accusative case of prisma – Geno is an archaic form that Du-Cange inscribes in the Glossarium Ad Scriptores Mediae et Infimae Latinitatis as a late medieval lexical form - In this sentence the **wildcard letter "P"** is used – The verb is conjugated to the subjunctive]
This anagram phrase could refer to an equivalence problem between the two solids that Pacioli ordinarily faces in his mathematical work

9) IACO.BAR.VIGENNIS.P1495+MUSCA becomes AGENS PRISMA A CUBO - VINCI P.1495 = (You Pacioli are) BUILDING A PRISM FROM A CUBE
This anagram-sentence is referred to a problem on the equivalence of a prism with respect to a cube (In this sentence the **wildcard letter "P"** is used)

PACIOLI: THE "ABACUS MASTER"

(2°) *Can you build a narrative starting from Luca Pacioli's "anagram-sentences" or can you carry out a coherent discussion of a topic starting from a significant word that occurs in this mathematical context?*

THE ANAGRAM PHRASES WITH THE WORD "ABACUS"

 I deciphered about thirty "anagram phrases" signed by VINCI which formed a significant and coherent text concerning Pacioli and the geometric figures of the painting: so there was a confirmation that the "anagram phrases" signed VINCI directly and concretely concerned the person portrayed and his biography, the geometric and mathematical objects painted, the proximal dating of 1495 fixed on the cartouche (after the publication of the "Summa", which appears in the painting) and the Milanese period, when Pacioli began to collaborate with Leonardo for the Compendium in the service of Ludovico il Moro. ABACUS is a word strictly related to Pacioli, who was abacus master and some "anagram-sentences" identify Pacioli with this term.

EXAMPLES:

1) IACO.BAR.VIGENNIS.P1495+MUSCA becomes ABACO REGIS MANUS – VINCI P.1495 = YOU GUIDES YOUR HANDS (or YOUR WORK) USING THE ABACUS : [NOTE:"*Manus*" is the declension of the plural Latin accusative]
 I intend this sentence as referred to the traditional use of the abacus with a repertoire of rules and algebra exercises «necessarie a' mercanti» (for use by merchants). That is, Pacioli used the abacus, at various level of complexity, for his mathematical work.

 2) IACO.BAR.VIGENNIS.P1495+MUSCA becomes SUGE NORMAS ABACI!– VINCI P.1495 = ABSORB (or UNDERSTAND) THE RULES OF THE ABACUS! [NOTE: *the imperative verb is used here to outline the action to be performed*]

3) IACO.BAR.VIGENNIS.P1495+MUSCA becomes MENS ARGUIS ABACO – VINCI P.1495 = MIND YOU (are able to) MAKE DEMONSTRATIONS THROUGH THE ABACUS

4) IACO.BAR.VIGENNIS.P1495+MUSCA becomes MAGNUS ERIS ABACO – VINCI P.1495 = YOU (Pacioli or the reader of the anagram-sentence) WILL BE GREAT THROUGH THE ABACUS

Pacioli will be (the time of the verb is in the future) the greatest teacher of abacus for posterity. To confirm this statement, there are other anagram phrases which celebrate Pacioli's greatness as an abacus master. I quote two other sentences that coherently develop this concept: the verb SURGIS = to rise, to lift, to grow and it refers both to the highness or greatness of Pacioli as a master of abacus.

5) IACO.BAR.VIGENNIS.P1495+MUSCA becomes ENIM SURGAS ABACO – VINCI P.1495 = THEREFORE THAT YOU (Pacioli) RISE THROUGH THE ABACUS! [NOTE: *the verb is conjugated to the subjunctive*]

**6) IACO.BAR.VIGENNIS.P1495+MUSCA becomes NAM SURGIS E ABACO - VINCI P.1495 =
IN FACT YOU (Pacioli) MAKE YOURSELF GREAT THROUGH THE ABACUS**

CHECKING THE CORRESPONDENCE BETWEEN THE DECODED MARK "VINCI" AND THE SIGNATURE OF LEONARDO

(3°) THE MARK "VINCI" ON THE ANAGRAM-SENTENCES- After checking on the deed of the notary Antonio de Capitani (1483), where Leonardo signed exactly with the surname VINCI, I tried to find out any anagram phrases that revealed a direct connection with the "VINCI" mark, which constantly recurs in all the anagram phrases decoded from the inscription, and I tried to demonstrate that these phrases were suitable for linking Leonardo's signature with the onnipresent "VINCI" mark.
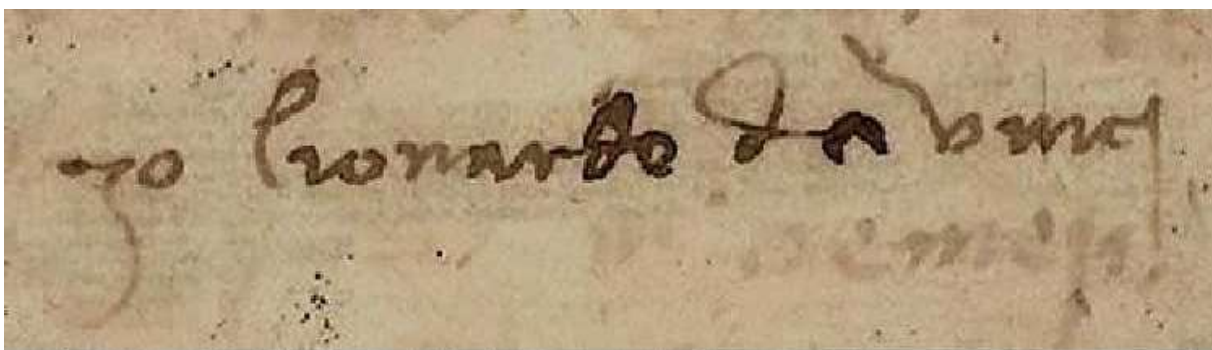
"Io lionardo da **Vinci** " **:** he signed the contract for the "Virgin of the Rocks" with his right hand and from left to right direction, writing his first name with a lowercase letter

(3°) *Are you able to establish a correlation between the mark VINCI which recurs in the anagram-phrases and the Leonardo da Vinci's signature?*

It is certain that Leonardo signed himself in full with the surname da Vinci since his signature appears in the notarial deed of Antonio de Capitani signed in 1483 together with the de Predis brothers for the assignment of the Virgin of the Rocks. I decripted over thirty "anagram-sentences" all marked VINCI that were dedicated to the signature itself. You can verify the existence of a connection between the mark and the signature "VINCI" in the following examples:

IS QUI SIT SIGNO, NON NOMINE DICAM (Ovidio, Met. 15,595)

THAT I TELL WHO HE IS THROUGH HIS MARK, NOT BY NAME

EXAMPLES:

1) IACO.BAR.VIGENNIS. P1495+MUSCA becomes OBSCURA SIGNA MEA - VINCI P.1495 =   MY OBSCURE (or DIFFICULT TO DECIPHER) SIGNS –
or alternatively also **:=   MY HIDDEN SIGNATURES** In fact the "VINCI" marks are hidden in the "IACO.BAR.VIGENNIS P.1495" alphabetical formula and they are difficult to decipher

2) **IACO.BAR.VIGENNIS. P1495+MUSCA becomes   A! SIGNO ACERBA - SUM VINCI P.1495 = AH! I SIGN ADVERSITY – I AM VINCI P.1495;**
We can correctly also translate **=   BY MEANS OF THE MARK (I sign) PAIN – I AM VINCI** The "adversity" and the "pain" are due to the events of the Sforza family in 1495 and to the tragic fate of Duke Gian Galeazzo poisoned by the Moro, who usurped the title of Duke;(here SIGNO=verb)

3) IACO.BAR.VIGENNIS. P1495+MUSCA becomes AC SUB SIGNA PARO ME – VINCI 1495 =   AND UNDER THE SIGNS I PLACE MYSELF (or MY IDENTITY) - VINCI 1495 (NOTE: In this "anagram-sentence" I used the **wildcard letter P**).

4) **IACO.BAR.VIGENNIS.P1495+MUSCA becomes A SIGNO ACERBA – SUM VINCI P.1495 = BY MEANS OF THE MARK (I sign) CRUEL (or PAINFUL) THINGS – I AM VINCI**
The meaning of this anagram is similar to that expressed in the previous number 2), because the the story of the Sforza family told by the anagrams is cruel and painful (here SIGNO= ablative case)

5) **IACO.BAR.VIGENNIS.P1495+MUSCA** becomes **A! ACRE SIGNABO – SUM VINCI P.1495** =
AH! I WILL SIGN BITTERLY (or PASSIONATELY) – I AM VINCI
We can correctly also translate **AH! I WILL SIGN VERY MUCH – I AM VINCI** (Indeed all hundreds of anagram-sentences are marked VINCI)

6) IACO.BAR.VIGENNIS.P1495+MUSCA becomes OPUS ACRE SIGNABAM - VINCI P.1495 = STRONGLY (or ENERGICALLY) I SIGNED THE ARTWORK
The inscription of the cartouche of the "Double portrait of Luca Pacioli with a Pupil" encoded the sign " VINCI" which, with clear evidence, I hypothesize as Leonardo's signature

7) IACO.BAR.VIGENNIS.P1495+MUSCA becomes AC AMARE SUB SIGNO - VINCI P. 1495 = AND BITTERLY (I am) UNDER THE SIGN - VINCI
The identity of the painter is hidden under the word VINCI which marks all anagram-phrases

8) IACO.BAR.VIGENNIS.P1495+MUSCA becomes OBSIGNEM A CAUSA - VINCI P.1495 = THAT I SIGN ACCORDING TO A GOOD CAUSE [*The verb is conjugated to the subjunctive*]

APPENDIX

Some questions in regard to refutations and controls

Every aspect of decoding research is refutable. In order to control some significant points of my thesis, I have tried to falsify them.

I present a limited sample of the numerous checks carried out. These are just a few examples, because I think that the refutation and falsification of my theory are the responsibility of scientists or authors of an alternative theory who are interested to test and to refute my work,

REFUTATIONS AND CONTROLS

1) **First refutation: the keyword MUSCA is an "arbitrary alteration" of the alphabetic repertoire of the original inscription, this "arbitrary alteration" makes possible the formation of the anagrams-sentences signed VINCI. In order to prove that it is possible to form the perfect anagram-phrases signed VINCI without the keyword MUSCA we must obtain the anagram-phrases solely from the original inscription**

   I deciphered about three hundred "anagram-sentences"marked VINCI with the help of the Latin key-word MUSCA, The choice of the keyword MUSCA was justified

   1) because the black fly (MUSCA) is the unique figure on the cartouche and it is located strictly closer to the inscription;

   2) because the method that I used for this decryption is entirely similar to the method I used to decipher the motto on the reverse of the portrait of Ginevra Benci by Leonardo, where I choose the keyword IUNIPERUS because the sprig of juniper was located in the middle of the scroll with the inscription. (see :LA STORIA DI GINEVRA BENCI NELLE CINQUANTA FRASI ANAGRAMMATE DAL MOTTO VIRTUTEM FORMA DECORAT+IUNIPERUS, Academia edu.)

   In order to eliminate the doubt that the keyword MUSCA was an arbitrary variable added to generate the anagram-sentences, I tried to form the anagram-phrases signed VINCI only on the basis of the original inscription IACO.BAR.VIGENNIS P.1495, without the help of "MUSCA" I decoded around thirty meaningful and very contracted "anagram-sentences" signed VINCI, proving that the original alphabetic repertoire was "programmed" from the beginning to form the anagram-sentences signed VINCI, and that the key-word MUSCA was functional to complete and better clarify these too contracted "anagram phrases" and to extend the topics and the narrative. I was able to comprehend the sense, the connection and the textual context of these twenty anagram-phrases only after I found many sentences with the help of the keyword.MUSCA. In fact – given the very restricted original alphabetic

repertoire – the anagrams were telegraphic and difficult to be immediately understood.

I concluded::

- that keyword MUSCA was determined with logical consistency by the artist and therefore it can be identifiable by everyone on the basis of the elementary logical process, that takes into account the uniqueness of the figure of the fly on the cartouche and its position near the inscription;
- that the original alphabetical repertoire "IACO.BAR.VIGENNIS P.1495" had been "programmed" by the artist to generate in an embryo the anagrams with the names of the members of the Sforza family and the other connected topics
- - that the importance of the keyword MUSCA was to offer the possibility of completely forming the anagram-sentences, which however (although much contracted and in smaller numbers) could have been obtained even in his absence.

The key word therefore served to complete, expand and diversify the narration of the stories, but it was not essential to form the anagram-sentences signed VINCI. Most of the anagram-phrases formed without the word MUSCA coincide with those completed with this keyword, as I brought for example on the pages 45-47. Other anagram phrases without "MUSCA", despite their telegraphic contraction, have a meaning attributable to the themes of the Sforza stories already deciphered with the help of keyword, and they are also indicating the names of the Sforza family (some examples of these phrases are also shown below).

THE ANAGRAM-PHRASES REFERRED TO THE FLY AND FORMED WITHOUT THE KEYWORD "MUSCA" HAVE MEANING AND DEMONSTRATE THAT, ALREADY AT THE ORIGIN, THE ALPHABETICAL REPERTOIRE "IACO.BAR.VIGENNIS P.1495" IS ABLE TO GENERATE SIGNIFICANT ANAGRAM-SENTENCES SIGNED "VINCI", IDENTICAL TO THOSE FORMED WITH THE ADDITION OF THE KEYWORD.

The examples below demonstrate that:

- By removing the word MUSCA, you get very contract and telegraphic anagrams, but with an understandable meaning and containing the mark VINCI
- If the absent keyword MUSCA is replaced by the image of the fly, figured rebuses are obtained: it is an enigmistic genre in which Leonardo excelled. The presentation of anagrams in the form of figured rebuses refer to Leonardo's vast production of rebuses;
- The following presentation of the anagram-sentences in the form of figured rebus proves with visual evidence the assumption that the artist made his choice of the keyword MUSCA on the basis of an elementary logical process easily repeatable by anyone.

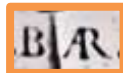**2A - 1E - 2N - 3I - 1G - 1S - - 1B - 1C - 1R - 1O - 1V.- 1 P(jolly)**

The anagram-phrases formed with the only original alphabetical repertoire

without the keyword MUSCA
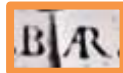
ABES A NIGRO – <u>VINCI</u> p.1495

You .....DIFFER FROM THE BLACK STAIN - <u>VINCI</u> P.1495
and also

DIFFERENTIATE FROM THE BLACK STAIN....! - <u>VINCI</u> P.1495

OBESA **NIGRA** – <u>VINCI</u> p.1495

OBESE BLACK ..... *– <u>VINCI</u> P.1495*
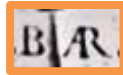*and also*

GET FAT OH BLACK .....! - <u>VINCI</u> P.1495

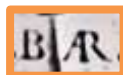**IBAS A REGNO** - <u>VINCI</u> P.1495

You ..... CAME FROM THE KINGDOM (i.e. from the Court) - <u>VINCI</u> P.1495
and also

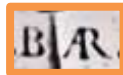*You .....CAME FROM THE ROYAL FAMILY – <u>VINCI</u> P.1495*

OBEAS ***NIGRA*** - ***VINCI*** *P. 1495*

OH ***.....*** *MAY YOU DISAPPEAR! - VINCI P.1495*

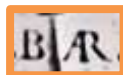**AGAS IN ORBE – VINCI** P.1495

OH ***.....*** *THAT YOU ACT IN THE PERIMETER (of the Court) – VINCI P.1495*
and also

OH ***.....*** *, THAT YOU ACT IN THE CIRCLE (of the Courtiers) - VINCI P.1495*

AB ANO REGIS – VINCI P.1495

You ***.....*** *COME FROM THE CIRCLE OF THE DUKE -* VINCI *P.1495*

ENAS AB ROGIS – VINCI P.1495

You ….. ESCAPE FLYING FROM THE FUNERAL PYRES – VINCI P.1495

OTHER ANAGRAM-PHRASES FORMED WITHOUT THE KEYWORD "MUSCA", REFERRING TO THE HISTORY OF THE SFORZA FAMILY DECRIPTED PREVIOUSLY WITH THE HELP OF THE KEYWORD

Without using the keyword "MUSCA", I have decrypted other anagram-sentences having meaning that - however much contracted - were understandable in the light of the history of the Sforzas that I had deciphered with the help of the keyword. They contain the same names and nicknames of the members of the the Sforza family already mentioned in the previous hundreds of sentences.

SOME EXAMPLES

The inscription IACO.BAR.VIGENNIS P 1495 + MUSCA generates at least three hundred perfect anagram-phrases all signed VINCI, which are fully understandable and create a plot of stories that coincides with the history of the Sforzas around 1495. These stories will be published in a book currently in preparation. The following anagram-sentences, as they are formed without the keyword MUSCA, are based on an alphabetical repertoire of ten letters instead of fifteen letters (including + the wildcrd letter P and apart from the five letters of the VINCI brand); For this reason they are very contracted, but they are still understandable, and through the reference to the plot of the previous anagram stories of the Sforza family we are able to give them a well-founded interpretation.

There is a group of anagram-sentences formed without the keyword that correlate Ludovico il Moro, the duke of Bari, with the nickname BAR and the black fly.. For example **(I) BAR EA SIGNO - VINCI P.1495** means **The DUKE OF BARI** (is located) **THERE THROUGH THE SIGN (**the fly) **– VINCI P.1495** and alternatively **(II) BAR EA – SIGNO VINCI P.1495** means **THE DUKE OF BARI** (is) **THERE – I SIGN "VINCI" P.1495** These anagrams are referred to the position of the nickname BAR on the cartouche. The anagram (musca) **SIGNA EO BAR– VINCI P.1495** (where SIGNA is present imperative II sing.) means (you fly) **MARK THERE BAR – VINCI P.1495** (referring to the position of the fly on the cartouche, which seems to indicate toward "BAR"). The understanding of some anagrams formed without the keyword is made possible through the reference to the anagram-stories that lead to the poisoning of Gian Galeazzo Sforza by the Moro: : for example **SIGNA AB REO – VINCI P.1495** means **THE PROOFS (come) FROM THE GUILTY – VINCI P.1495**

The names of the characters of the Sforza family and their stories appear in telegraphic hints also in the phrases deciphered from the original inscription without the help of the keyword. The anagram **OS AGNI AB RE - VINCI P.1495** means "**THE FACE (the identity) OF THE LAMB (is revealed) BYTHE THING (the cartouche) – VINCI P.1495**", cites the nickname AGNUS of the late Gian Galeazzo, called "immaculate lamb" by the historia Corio. Also ISA (Isabella d'Aragona) and BEA (Beatrice d'Este) that are quoted in many historical episodes appear in these contracted anagrams. For example.(I**) BEA(trice) NIGRAS OS – VINCI P. 1495** means **BEA (trice) YOU DARKEN YOUR FACE – VINCI P.1495**: this anagram is referred to the great scene of the funeral

of Gian Galeazzo, described in hundreds of complete anagram-sentences, formed with the help of the keyword, where Beatrix appears in mourning.; (II) **ISA** (musca) **AB REGNO – VINCI P.1495** means **ISA** (bella) (the black fly comes) **FROM THE KINGDOM (**or **THE COURT** or **THE DUCAL POWER)- VINCI P.1495**, and the fly is the symbolic representation of il Moro

OTHER REFUTATIONS AND CONTROLS

- *2)* ***Can you decode any meaningful "anagram-phrase" signed Jacopo de Barbari?***

I observe that the requiement of the anagram-phrases are

- 1)they must be perfect anagram;
- 2) the words that are forming the anagrams must be correct, and anyway recognizable on the basis of the text formed, which must be historically documented at the date 1495;
- 3) they must be marked by a significant distinctive word (in this case the mark "VINCI)

I cannot decode any "anagram phrase" signed Iacopo de Barbari or identify this painter from IACO.BAR.VIGENNIS P 1495+MUSCA.. While the cryptogram IACO.BAR.VIGENNIS P 1495+MUSCA form today about three hundred perfect meaningful anagrams all signed VINCI, I cannot form any "anagram-sentence" or a narrative concerning Jacopo de Barbari. Using the same alphabetic letters of the inscription, I cannot form the name IACOPO, because the repertoire of the inscription is lacking the double "O"; similarly, I cannot form "de Barbari", because of the lacks of the letters "d" and the double "B". The Venetian Painter was also known with other surnames: de Barberi, Barbaro, Barberino, Barbarigo o Barberigo (it is always lacking the double "B").

IACO.BARVIGEN / NIS MUSCA P 1495 + MUSCA cannot form the name IACOPO but only: IACOB or IACOP or IACOPUS, IACOBUM or IAC. But,also with these possible nicknames, when I try to decode meaningful sentences, the alphabetical letters that remain do not form anagrams Moreove the possible nicknames of de Barbari are arbitrary, because they contract or modify his true name. (while the onnipresent name VINCI is perfect). However, the decisive fact is that it is not possible to form anagram phrases even using some possible nickname of Iacopo de Barbari, and not even a story made up of anagrams in which the Venetian artist could be recognizable

- 2) *****Can you obtain any anagram or a narrative concerning Guidobaldo da Montefeltro?***

it is impossible to form the name Guidobaldo da Montefeltro or his nickname recognizable with the letters of the Capodimonte cartouche inscription + the keyword MUSCA. It is not possible for me to form anagram sentences of any kind that make sense and that build a narrative linked to Guidobaldo

P.S.:Regarding the points 2)- 3): I' m not able to elaborate any hypothesis or theory

THE SECRET OF THE CARTOUCHE: THE LOGICAL AND DOCUMENTED SOLUTION

Three points

I) The investigative trail followed in the research on the cartouche was focused on the puzzle of the hermetic inscription

IACO.BAR.VIGENNIS P.1495

The research reached the solution of the acronym and cryptogram .and revealed the Sforzas historical context in which the Double portrait was painted through three hundred anagram phrases marked VINCI scientifically deciphered with falsifiable procedure which lead back to the history of the Sforza family in 1495 and the poisoning of Duke Gian Galeazzo Sforza by il Moro

This summary exposition of the research aims to delineate a methodological path and to offer the exemplification of a sample of the discovered anagrams.

This final part aims to explain the ambivalent paradox created by the Painter, who wanted to evoke the signature of Jacopo de Barbari by assonance, but he macroscopically deformed the name of the Venetian artist and replaced the elegant caduceus with the repulsive fly. The solution to this bizarre puzzle was founded in one way on the historical reconstruction connected to the three hundred anagrams deciphered from the inscription and on the other hand on a heraldic research aimed at the caduceus symbol, that the Painter replaced with the arcane black fly.

The following final part proves that the Painter's "bizarre paradox" coincides with a rigorous logical passage which is based on the caduceus symbol. In fact the heraldic and historical records prove that the caduceus was the "impresa" with the motto UT IUNGOR used exclusively by il Moro**…**

In conclusion I formulate the logical passage which is based on the historical reconstruction and the 360 degree study of the painting, and that finds specific explanations on the basis of the heraldic documentation, for which the black fly of the cartouche is identified with Ludovico il Moro

THE SECRETS OF THE SFORZAS COURT AND THE INVESTIGATION TRAIL FOR THE SCIENTIFIC DECRYPTION OF THE CARTOUCHE

The study and research on the Double portrait of Luca Pacioli with Pupil are converging on Pacioli's stay at the Sforza Court, where he was in the service of Ludovico il Moro together with Leonardo da Vinci. The discoveries I produced (including the forthcoming publication of the reflechtographic dossier with the analytic and comparative study of the Double portrait and the identification of the Pupil as Galeazzo Sanseverino), converge to locate the Double portrait in the Milanese Sforza cultural context around 1495-1498

From the cartouche and the inscription we understand that Leonardo is hiding something from us and that at the same time he offers us the telltale clues to discover what he has concealed. In fact the unfaithful simulation of the name of Jacopo de Barbari and the contextual replacement of the elegant caduceus symbol with the repulsive black fly, at the same time show that the inscription on the cartouche could not be the real signature of de Barbari, and that the absurd fly is the bearer of a secret...

The impossibility of giving a logical explanation about the macroscopic anomaly of the inscription justifies the hypothesis that the inscription hides a secret message Notorially in the Milanese court cryptography was an indispensable instrument of chancelleries and also a fashion in vogue amongte courtiers. The bizarre cartouche could be seen as an artistic detail painted to amuse the courtiers and to celebrate the arrival of Pacioli from Venice; in this context it was plausible also to justify as a joke the .simulation of the signature of the famous Venentian painter and engraver Iacopo de Barbari. But the decryption of the cartouche reveals its true and mortally risky content : the dark intrigues of the courtisan circles against the Duke Gian Galeazzo and the very dangerous power relations at the Milanese court (similar to those of all the Renaissance courts).

The history of the Sforza family around 1495 supports with documentary evidence the escalation of power by Ludovico il Moro, his role in the poisoning of his nephew Gian Galeazzo Sforza and the subsequent usurpation of the ducal title. Gian Galeazzo was the successor of his father Galeazzo Maria, a despotic ruler that was assassinated in 1476 by three conspirators. The survived conspirator, Girolamo Olgiati, was condemned to atrocious tortures and was dismembered alive. But, according to the suspects of Bona Sforza and courtiers, il Moro was secretely involved in the assassination of his brother. Il Moro decapitated Cicco .Simonetta and poisoned some opponents: for example in 1485 he also poisoned Count Luigi Dal Verme and expropriated the Dal Verme family, and donated those possessions to Galeazzo Sanseverino (the

Pupil). The three hundred anagram-phrases marked VINCI that I **scientifically** decoded from IACO.BAR. VIGENIS P.1495 prove that the inscription is a cryptogram in which Leonardo hid the historical mystery of the death of Duke Gian Galeazzo.

Leonardo was forced to hide those Sforza family events, as the Moro court was notoriously full of spies. The Sforza - like the other powerful families of the Renaissance - were merciless with the traitors and opposers.In the inscription there is encripted not only a historical mystery, but also the report of the courtesan intrigues of the time, and in particular the testimony of a real historically documented "coup d'etat". Therefore in the cartouche Leonardo hid very dangerous messages.

The fly has been interpreted since ancient times as an infernal symbol, also linked to the dead and evil. However, the reference to the Moro can also be understood in a precise sense, because Ludovico Maria was called Morus, (referring to the mulberry), and also Maurus, due to the dark complexion of his skin. This peculiarity associates him with a "black man" and relates him by analogy with the "black fly". This correspondence " black man=black fly" supports the hypothesis that the fly was hiding a secret message connected to Ludovico il Moro in 1495

*Jacopo di Martino (?) - Ludovico Maria Sforza (il Moro) Duke of Milan appoints Ambrogio Crivelli as ducal helper - Notary Enrico Scaccabarozzi, 1495-02-11, Mailand , Ospedale Maggiore, Archivio, Perg. 32
*Giovan Pietro Birago, Sforziade, illumination, (incunabulum of Ludovico il Moro), British Library, Londra

The heraldic documentation relating to the caduceus - the Moro's exclusive "impresa" - is decisive to prove the logical relationship based on the equivalence "caduceus = de Barbari's signature = il Moro's signature". This information sheds light on the hidden motive - otherwise inexplicable - for which Leonardo simulated the name of Iacopo de Barbari and deformed it in IACO.BAR.VIGENNIS with the result of leaving us grappling with an unsolved mystery, The historical datum of the heraldic enterprise of the caduceus as a telltale sign of the Moro's identity is essential for establishing a well founded connection between the Moro's identity and Barbari's signature always associated with the caduceus, giving us the key to reveal the secret of the cartouche.

I provide the logical solution in the following pages.

THE LOGICAL SOLUTION TO THE ENIGMA OF THE INSCRIPTION OF THE CARTOUCHE

THE CADUCEUS WITH THE MOTTO UT IUNGOR

WAS THE PERSONAL "IMPRESA" OF LUDOVICO IL MORO

Il Moro created this "impresa" and used it in an exclusive way

Anonimo Lombardo, XV secolo, Milano, Biblioteca Trivulziana, Codice, 2168 - The CADUCEUS "impresa" is formed by a stick with two intertwined dragons and it is topped with a winged hat. The motto is UT IUNGOR (HOW I AM JOINED) . The motto appears also as "UT IONGOR" because the Sforzas used to write the words of their motto in dialect or in foreign language, and often they created mottos with invented words

Caduceus "impresa": clipeus and capital, Castello Sforzesco, Cortile Rocchetta, Milan, 1480/99

**Milano: Castello Sforzesco, cortile della Rocchetta. Decorazione delle volte**

The CADUCEUS with the motto "UT IONGOR" (= UT IUNGOR: as I am jointed) is the exclusive impresa of Ludovico Maria Sforza, called il Moro, The CADUCEUS is included in the center of the impresa "IL SOLE RAGGIANTE" (the radiant sun), which was created by Giangaleazzo Sforza, the first Duke of Milan This "impresa" is described by Teodora Angeli in a letter dated 1493 to Isabella d'Este (Portioli, 1882, pp. 328…)

.

The Caduceus impresa appears in Moro's personal and official documents. He was particularly attached to this impresa. This is shown by the fact that Il Moro had marked the Caduceus on the box in which he kept the State correspondence, and the Caduceus is mentioned in various official documents. It is noteworthy that this impresa was also mentioned in the political will of il Moro, where he indicates the CADUCEUS on the left of the LION GALEATO WITH THE BUCKETS, thus equating the impresa which he created with the ancient prestigious Visconti impresa "LEONE GALEATO CON I SECCHI" by Galeazzo II Visconti (1355-1379:

- "… in la cassetta coperta cum le piastre de ferro argentate alla damaschina, sopra el coperto de la quale è l'arme nostra ducale coniuncta cum quella de la Ill.ma nostra consorte, cum li nomi de tutti dui: et **al lato dextro li è el leone cum le sechie, et al sinistro el caduceo**" (Testamento 1836, p. 11; -- Malaguzzi Valeri 1913, p. 394; -- Beltrami 1918).

The Caduceus with the motto UT IUNGOR is depicted in great evidence on the left side of the illumination attributed to the " Maestro delle Ore Sforza ". In this illumination the other prestigious Visconti-Sforza "imprese" are depicted together on the right side (l'Ascia e il tronco, il Morso, la Scopetta, il Buratto), and the whole space on the left side is reserved for the Caduceus, to highlight the primary importance assigned by il Moro to this favorite "impresa".
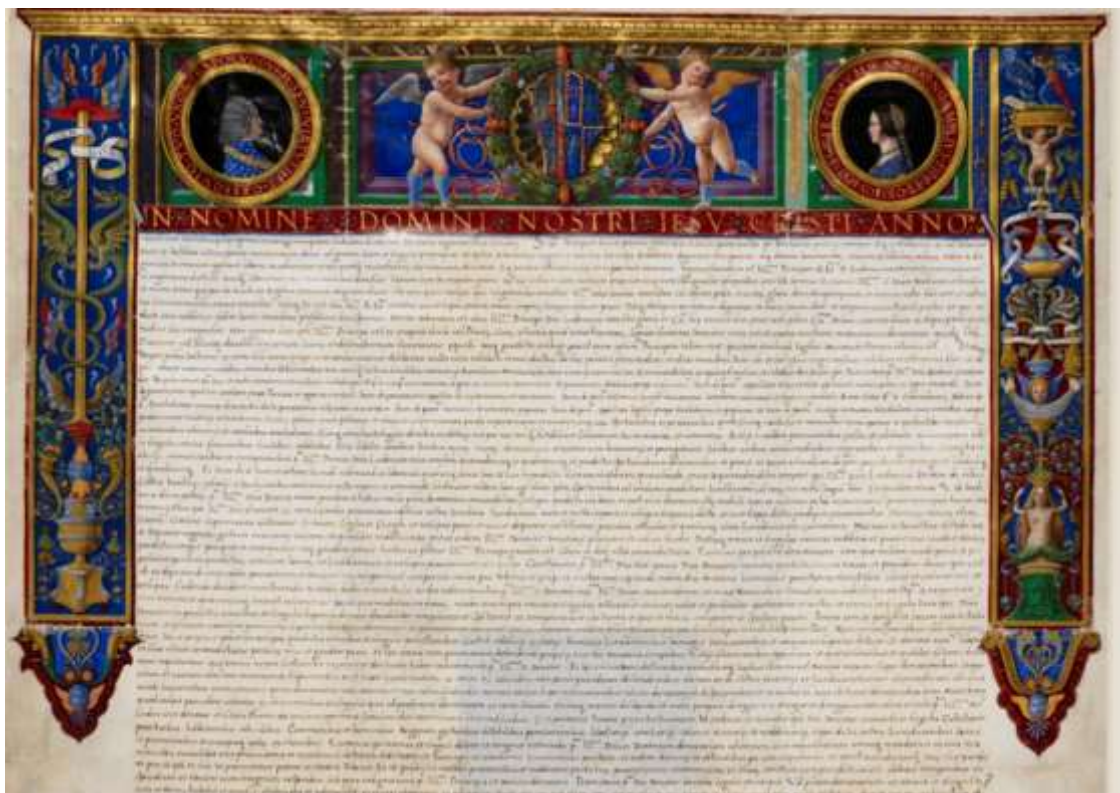
"Maestro delle Ore Sforza", Undated notarial deed by Stefano Gusperti, notary of Cremona and ducal chancellor: Ludovico Maria Sforza "il Moro" gives his wife Beatrice d'Este property in the territories of Novara, Pavia and Milan. Vigevano, 1494-01-28 London, British Library, Ms. Add.21.413).

In the CADUCEO "impresa" il Moro replaced the original snakes with the "Biscioni" ("Dragons" or large grass snake' also known as the "Vipera" also called in Milanese "Bissa"); in fact he did not keep the two ancient snakes, but he transformed them into dragons to evoke the traditional heraldic emblem of the Visconti dynasty.

The other personal Moro''s "imprese" were the following:

- - The SCOPETTA with the motto MERITO E TEMPORE, which il Moro had inherited from his father Francesco Sforza
- - The impresa " I DUE FARI" with the motto "Tal trabalio mes places por tal thesaurus non perder" conceived by il Moro to celebrate the conquest of Genoa
- - TESTA DEL MORO (dark skinned man): this impresa is inspired by the cult of San Maurizio and it is depicted in the deluxe incunabulum of the Sforziade of the British Library, that was owned by il Moro; noteworthy that the head of the dark-skinned man is at the top center

In particular, in the London illumination, the Caduceus appears at the base of the right side, in the form of mythological figures. On this prestigious miniature appear solely the personal "imprese" of il Moro. On the right side we can see the CADUCEUS and I DUE FARI, - which are depicted on his chest - and on the left side the SCOPETTA, that he had adopted by his father Francesco Sforza., called "pater patriae" Above, in the center, there is the head of the dark skinned man, , his other personal impresa (see page 64.). None of the dynastic imprese of the Visconti Sforza appear on this official miniature, because il Moro wanted to enhance his role as "new prince and founder".

On the left side, barely visible, the SCOPETTA and in the center, the impresa I DUE FARI embroidered on the dress. On the right side the depiction of the CADUCEUS in mythological styleAmong the personal "imprese" cited, the most prestigious for Moro were SCOPETTA and CADUCEO, which had similar symbolic value, referring to a similar concept of "good governance".

The SCOPETTA had been conceived by his father Francesco (called Pater patriae) to "sweep" the peninsula from the evils and calamities that afflicted it, while the CADUCEO was created by il Moro to act as a new prince and mediator able to work the synthesis between the opposing factions and between the extremes. The caduceator was the herald, the negotiator, and the CADUCEO impresa was considered by il Moro to be his creation, in which he reflected his political role and his dynastic prestige. It was therefore equivalent to the Moro's ideal signature.

The CADUCEO is mentioned by Beltrami (1897, p. 18): as the Moro's favorite impresa together with the SCOPETTA("brush"), which in the excerpt quoted is improperly cited as "pennello" -"…al motivo dominante degli stemmi sforzeschi, il ricamo nella fascia superiore del pallio d'altare contrappone un fregio d'imprese sforzesche…. **il caduceo coi draghi, ed il pennello — imprese favorite del Moro".**

Altar front in silk embroidered in gold and silver brocade donated by Ludovico il Moro to celebrate his wedding with Beatrice d'Este; Museo Baroffio di Santa Maria del Monte (Varese) - The CADUCEO in the center and the SCOPETTA on both sides

The excerpt by Beltrami mentioned above, refers to the artistic artifact in silk embroidered in gold, brocade of gold and silver, 110x229 cm, preserved in Santa Maria del Monte (Varese), Baroffio Museum, where appear the coats of arms of Ludovico il Moro and Beatrice d'Este, with the exploits of the CADUCEO, the SCOPETTA and the ANELLO CON IL FIORE DI GAROFANO (the ring with the carnation flower of Beatrice) In addition, Ludovico il Moro possessed a splendid jewel, an authentic masterpiece, with the CADUCEO design, valued as many as 25,000 ducats and who was committed to the Count of Somaglia for 6,000 ducats:

- "**El rubino grosso con la insegna del Cadaceo** de carrati 33 con una perla de carrati 24 estimato ducati venticinquemila. Duc. 25.000. In mano del conte Zo. Antonio de la Somalia per ducati seymilla, Duc. 6000" (Trivulzio 1876, pp. 530-534)
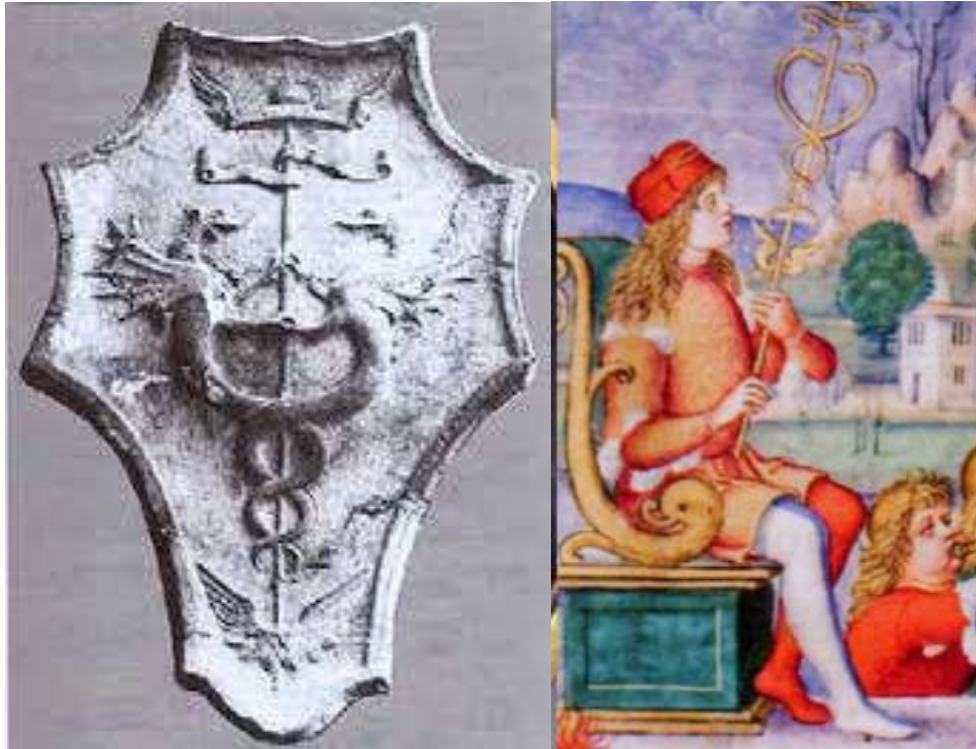
Ludovico il Moro preferred this enterprise, which was his creation, for its esoteric implication and classical tradition: in fact the Latin word caduceus derives from the Greek κηρύκειον, that is to say "stick of the heralds" (from the Greek κῆρυξ "messenger, herald"), and the myth associates the caduceus to Hermes and Aesculapius. Furthermore, the Moro was notoriously linked to the world of the occult (as evidenced by his dependence on Ambrogio da Rosate, and the numerous magicians and fortune-tellers at his service in the court), and the caduceus was believed to be charged with magical powers. The link between the caduceus and the omniscience of Hermes Trismegistus is emblematic .

After this documented heraldic investigation we are able to establish the following equivalence: the caduceus, which was equivalent to de Barbari's signature, was also equivalent to the signature of Ludovico il Moro because this is the typical case in which the exclusive Moro's "impresa " was also the symbol of individual identification of the dynastic character who created and chose it.

In light of the investigation conducted so far,
we can justify this first logical conclusion: the caduceus is a probative element that identifies the signatures of Ludovico il Moro and Jacopo de Barbari and link them together

THE LOGICAL SOLUTION

The impresa of il Moro :the Caduceo with the motto UT IUNGOR- The caduceus of Jacopo de Barbari

The altered inscription IACO.BAR.VIGENNIS P.1495 evokes the name "Jacopo de Barbari" by assonance, but at the same time it is evident that this ostentatious simulation could not be the true signature of de Barbari. The macroscopic signature distortion was an artifice created by the Painter to induce us to establish a connection with de Barbari's signature (who used solely this symbol).

Since the inscription IACO.BAR.VIGENNIS P.1495 is the replacement of de Barbari's signature, then the fly is the substitute for the caduceus, which identified the Venetian painter.

But the heraldic documentation relating to the caduceus shows that it was the exclusive "impresa" that identified il Moro, and therefore it was equivalent to Moro's signature

This fact justifies the logical equivalence:

"caduceus/signature"by il Moro = "caduceus/signature" by de Barbari"

The replacement of the caduceus with the fly is equivalent to connect

the black fly with the Moro's caduceus and with the Moro himself

(who had also the exclusive "impresa" with the HEAD OF THE MOOR)

The motto UT IUNGOR means HOW I AM JOINED And

regarding the cartouche it can be interpreted as

"HOW I AM JOINED TO THE FLY"

In conclusion:

Black fly =Caduceus = Signature of Ludovico il Moro = Ludovico il Moro

NOTE: The decrypted three hundred anagrams signed VINCI reconstruct the history of the Sforza family around 1495, focusing on the historical mystery of the death of Duke Gian Galeazzo Sforza, which the historians and chroniclers of that time attributed to Ludovico il Moro.
The decryption of the inscription is scientific and falsifiable

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…Foliis tantum ne carmina manda…
Virgilio, Eneide, (6. 42-101)

…But don't herald your oracles to the leaves…
(Glori C.)