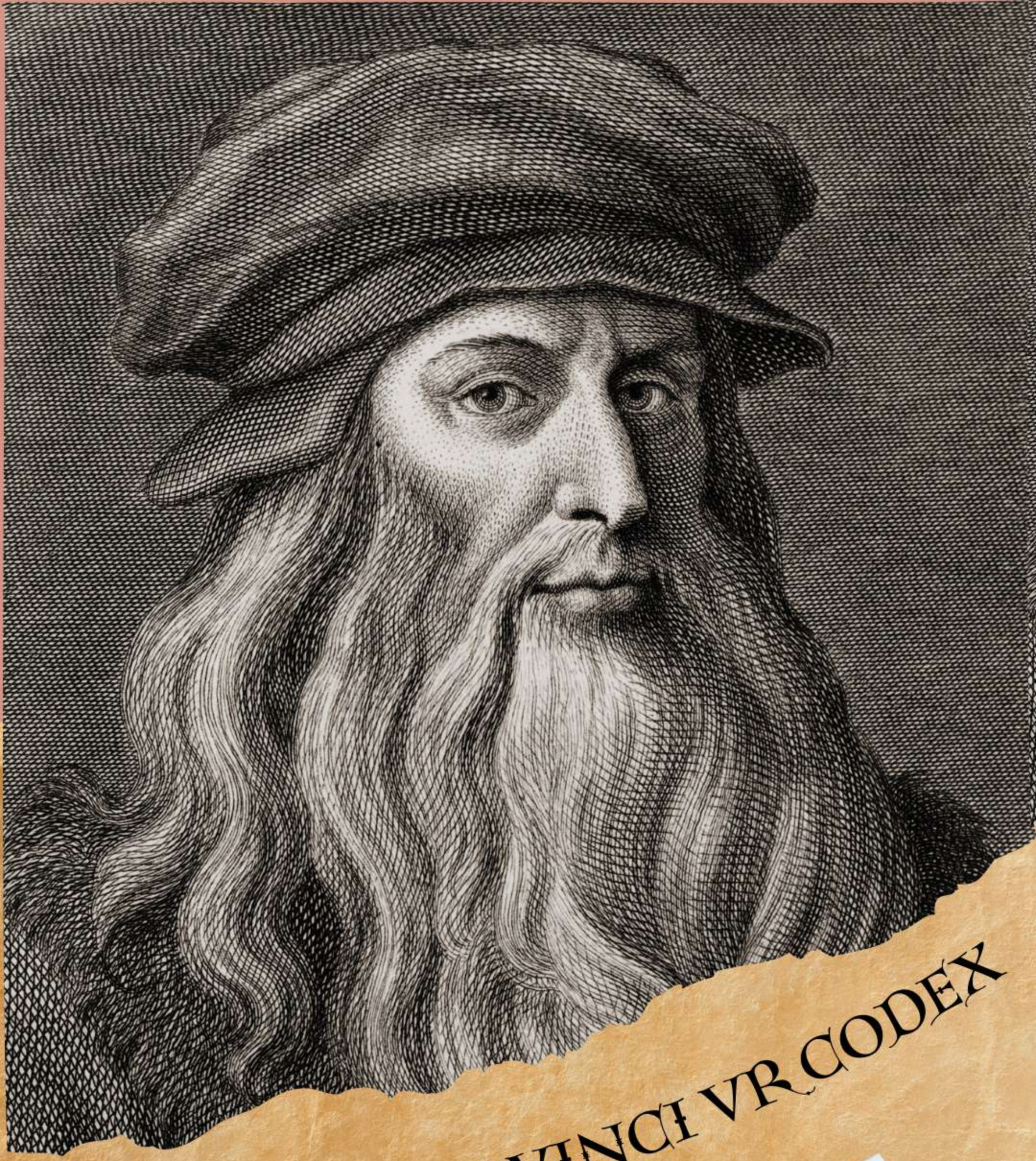

LEONARDO DA VINCI VR CODEX

Written by

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Introduction

Welcome to the Sforza Castle in Milan. The city has been invaded by the French army and is now ruled by Charles II of Amboise, admiral and marshal of Louis XII, King of France. Charles summoned Leonardo da Vinci to Milan due to his profound admiration for him, and for a short time, Leonardo established his workshop in the very castle.

During these years, Leonardo's inquisitive mind strayed from the practice of painting and focused mainly on scientific disciplines such as geometry, geography, anatomy, the nature of water, etc. Therefore, his disciples and assistants played a leading role in the workshop by producing new paintings and diverse versions of existing ones out of his master's designs, who retouched or corrected particular details.

Filarete Tower, Sforza Castle

The Sforza Castle

The Sforza Castle was built around the mid-fifteenth century upon the remains of another castle belonging to the former rulers of the city, the Visconti family. The new castle was commissioned by Francesco Sforza, a former mercenary under the service of the Visconti rulers who due to a series of lucky events and his sharp guile ended up seizing the title of Duke of Milan in 1450.

Placed on the outskirts of the city, the castle was not merely designed as a military building but also housed the Sforza palatial court. Notable engineers of the time participated in its construction, among these Antonio di Pietro Averlino, called "Filarete" stands out. He designed the central tower of the castle which is named after his nickname.

The castle lived its golden age around the last decades of the fifteenth century under the rule of Ludovico Sforza, nicknamed "Il Moro" (the Moor) due to its darker skin tone. It was then that one of the most refined courts of the Renaissance originated, bringing together artists, philosophers, poets, and humanists from around Italy and Europe. One of the most remarkable was Leonardo da Vinci, who carried out engineering works, devised and organised theatrical spectacles and events for the court as well as decorated a few rooms of the castle, such as the called Sala delle Asse.

Leonardo da Vinci and workshop, Sala delle Asse, 1498, tempera on plaster, Sforza Castle, Milan.

Matteo Florimi, Map of Milan, 1595.
Basado en el grabado de Antonio Lafréri,
Bibliotèque Nationale de France, CPL
GE DD-2987 (5129), Paris .

This period ended abruptly in 1499 when Milan succumbed again to the whimsical Italian and European politics of the time, continuously changing rulers. French and Sforza alternated the control of the territory in a series of attacks and retreats until, eventually, in 1535, the duchy was annexed to the already vast dominions of Charles V, Holy Roman Emperor and King of Spain. From that point onwards, the geometric defenses that surround it were built and the castle ceased to be used as a palatial residence to become a military and commercial edification. The Spanish dominion of Milan lasted until the eighteenth century.

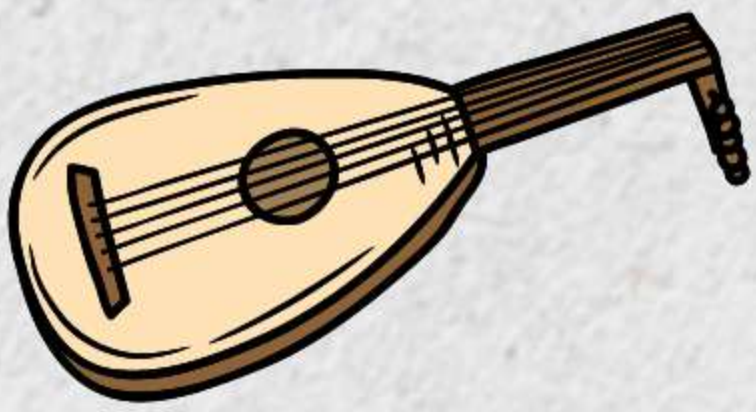
For this experience, we have decided to make a free recreation of Leonardo's workshop since many of the original rooms and decorations in the castle have been altered (if not completely disappeared) over the centuries, as well as the exact location which Leonardo's workshop was set up at, is still unknown. To do a convincing recreation of the place, we have used several real and original architectural elements and decorations still preserved as our references. Thus, our version of Leonardo's workshop room is placed on the first floor of the Rocchetta courtyard and it is decorated with the coat of arms of the Sforza dynasty and the initials of the different dukes up to Ludovico Sforza. On the wall above the chimney, we can observe the combined coat of arms of Ludovico and his wife Beatrice d'Este.

Music in Renaissance Italy

During the Renaissance, music was considered within the so-called 'liberal arts', regarded mainly as a strong theoretical and mathematical art able to create perfect harmonies. Leonardo himself categorised it as one of the 'arts of time' along with poetry due to its fleeting and invisible nature.

Fifteenth-century Italy was rather a spectator than a player on the European music scene of the time, with the French and Flemish being the protagonists. However, there also was a strong musical tradition in Italy which permeated every layer of society, from the princely and humanists' courts to religious and popular festivities. Music was remarkably popular among artisans of every guild, including painters. Indeed, many painters, sighing for being socially considered as highly as poets, philosophers, architects, and the kind, learnt musical theory and in particular the mathematical mechanisms of musical harmony.

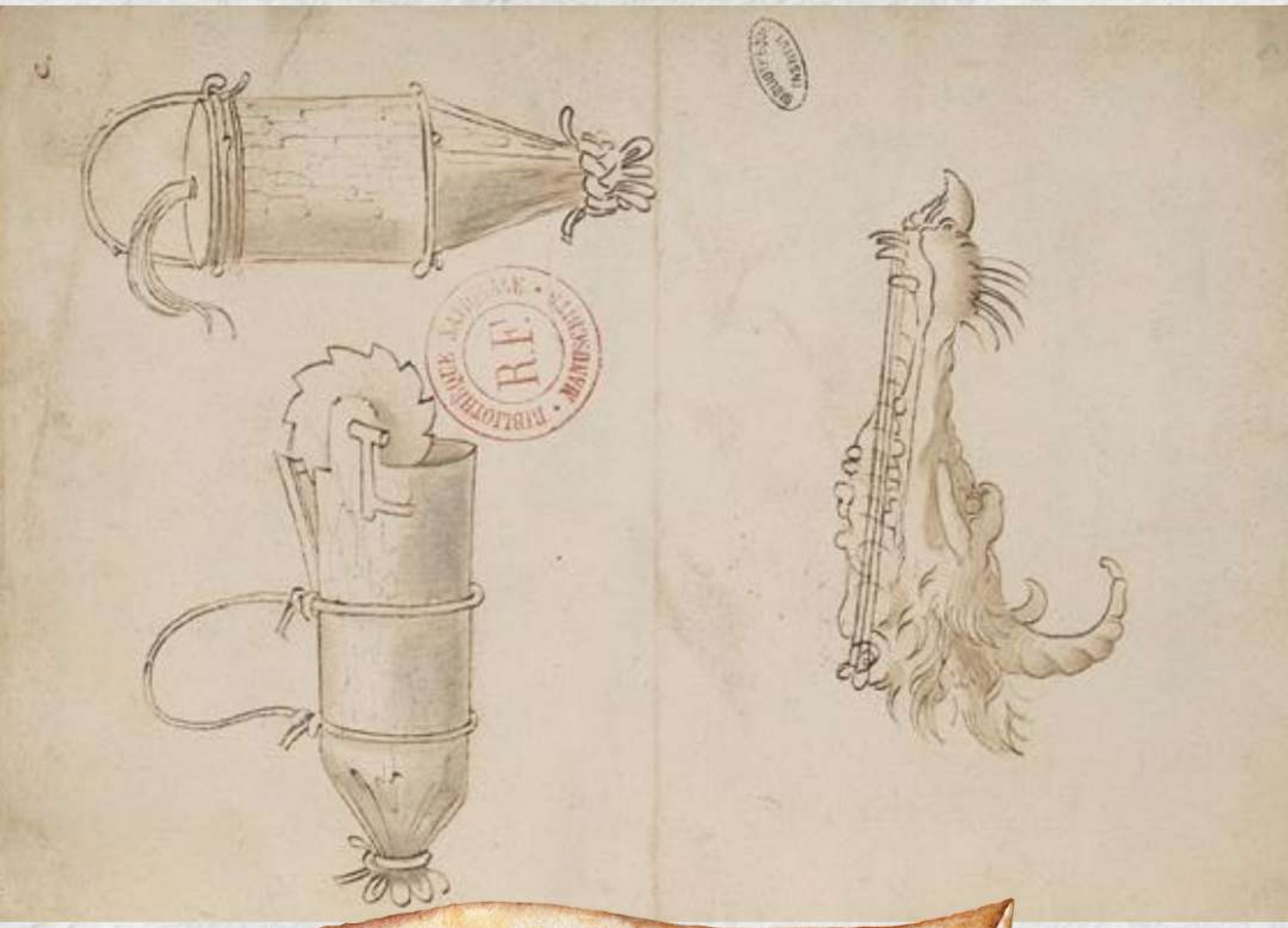
The remarkably influential Roman architect Vitruvius wrote in his treatise on architecture that musical theory was as fundamental as the mastery of drawing for an architect. Therefore, there weren't few masters who delivered musical lessons to their apprentices so they could apply them to their pictorial compositions and also most likely to enliven the leisure hours in the workshop. The Florentine sculptor Benvenuto Cellini wrote that many of the musicians performing in the numerous festivities of the city were also very respectable artisans. Leonardo is a fine example of this for he learnt how to play the lyre (*lira da braccio*) during his apprenticeship under his master Andrea Verrocchio, a fine lute performer himself.



Music at the Sforza Court

Lorenzo Costa, concert, h. 1488-90, oil on board, 95.3 x 75.6 cm, NG2486, National Gallery, London.

As in many other courts around Italy, the Sforza encouraged a strong presence of music throughout its territories by attracting diverse musicians such as the Flemish Josquin des Prez or Franchino Gaffurio, the most important composer from Lombardy at the time. One of the versions of the motive of Leonardo's first travel to Milan in 1482 is related to his great skills as a lira da braccio performer. One of his contemporaries wrote that the Florentine painter was sent to Milan along with other musicians as a gift by Lorenzo de' Medici to Ludovico Sforza. Although this theory has not been proven true as yet, what is certain is that Leonardo spent hours of his time in Milan writing about music and devising extravagant designs for musical instruments.



Leonardo da Vinci, designs of musical instrument, h. 1487-1490, Manuscrit B, Fol7-recto, Bibliothèque de l'Institut de France, Paris.

Leonardo himself was considered by his contemporaries as one of the best improvisers in verse of his generation and it is known that the young apprentice hung around a circle of poets called *burchellieschi* (after the poet Domenico Burchiello) who were famous for their improvised sonnets with a strong satirical component. These were recited in the Tuscan language known as *vulgar* (literally "vulgar", in opposition to Latin, the language of the elite classes and humanists). Many times, these poems were accompanied by improvised music. Most likely Leonardo also taught musical notions to his apprentices.

The Lute

The lute was the most popular musical instrument of Europe and beyond, above all since the XII century. It was rather a small instrument which used to be played with a rounded plectrum, although from the XVI century onwards the fingers were increasingly preferred. These could produce a wider and richer spectrum of sounds. Its remarkable popularity can be testified through the diverse representations in many paintings of the time, both in religious and secular scenes.

Michelozzo da Forlì, angel playing a lute, 1480, fresco, Vatican Museums, Rome.

The lira da braccio

The *lira da braccio* was part of the medieval family of fiddles and a forerunner of the modern violin, being also played with an arch. The main difference with its modern equivalent is that the *lira* has two extra strings (seven in total) that run along the others but off the fingerboard, adding more nuances to its sounds. It became one of the most played instruments of Renaissance Italy as it was associated with the mythological lyre of Orpheus and therefore with Classical Antiquity.

Leonardo da Vinci and the art of sculpture

Despite the lack of autographed sculptures by Leonardo da Vinci, it is known with solid certainty that the Tuscan artist practised the art of sculpture for a large part of his life. His master, Andrea del Verrocchio, was one of the best sculptors of his generation and most likely taught its principles to his apprentices.

Apart from his ill-fated plaster model for the equestrian monument of Francesco Sforza, we find references to other possible models scattered throughout his manuscripts which probably were used as visual guides for the correct representation of anatomy or proportions both for Leonardo and his workshop.

Andrea del Verrocchio or Leonardo da Vinci, Richardson draperies, h. 1473-77, inv. 1895,0915.489, The British Museum, Department of Prints and drawings, London.

To know further:

During his apprenticeship under Verrocchio, who was considered a sculptor rather than a painter, Leonardo most likely learned most of the theoretical base and techniques of sculpting. It has been noticed for long the similarities between Leonardo's early drawings and his master's sculptures, for example, the drawing of a warrior in profile by the young artists and Verrocchio's relief of the same topic, also the famous studies of draperies which are known to be drawn from real textiles dipped into plaster and placed on sculptured models.

Although Leonardo always considered and argued how sculpture was inferior to painting due to its rather physical than intellectual nature and therefore, be a simpler art, there also are testimonies of his close relationship with it.

Left: Andrea del Verrocchio's workshop, head of a warrior, 1483-85, marble, 55.9 x 36.7 cm, 1956.2.1, National Gallery of Art, Washington. Right: Leonardo da Vinci, drawing of a warrior, 1474-76, metal point on coloured paper, 28,7 x 21,1 cm., inv. 1895,0915.474 The British Museum, Department of Prints and Drawings, London.

For example, we know that he often used small figures made of wax or clay as guides for painting. These figures are called 'pivotal representations' for they were useful to artists when depicting bodies seen from different points of view. They were very common in most of the Florentine workshops at the time, being Verrocchio and the Pollaiuolo brothers were the first in using them. Whether these figures were made by Verrocchio and Pollaiuolo themselves or by external artists is unknown, but their use became a standard in the next centuries. Leonardo most likely adopted this resource from his master and thus we find a list by his hand mentioning 'heads of the Virgin', 'heads of Christ Child', as well as 'legs', 'arms', and so on.

Andrea del Pollaiuolo's workshop?, figurine of Marsias, XVc., bronze, 72145, Galleria Estense, Modena.

During his stay in Florence between 1503 and 1506, Leonardo had a close relationship with the local sculptor Giovan Francesco Rustici, who also collaborated with Verrocchio. Indeed, Leonardo stayed at Rustici's house for some time during these years and a clear Leonardesque influence can be seen both in the large sculptural group Rustici made for the city baptistery and the small group of figures representing a battle which is a clear reference to the wall painting Leonardo was carrying on upon the walls of the Palazzo della Signoria.

However, the best-known story of Leonardo's activities as a sculptor is his long frustrating relationship with equestrian monuments. During his Milanese years at the Sforza court, the Tuscan artist spent several months working on the design of a sculpture to commemorate Ludovico's father, Francesco Sforza.

Eventually, the large model was built in plaster and was highly praised by his contemporaries; yet, the incoming war against France changed Ludovico's plans, and the bronze hold for the statue was used to make cannons. After the Sforza were expelled from Milan, the French army used Leonardo's model of the horse as a target in their shooting practices, destroying it completely. Years later, again in Milan but under French rule, Leonardo was commissioned another equestrian statue, this time to commemorate the mercenary Gian Giacomo Trivulzio (fig. 8), and in his last years in France, a similar project for the French King Francis I. However, none of these materialized.

Giovan Francesco Rustici, St. John Baptiste preaching, 1506-10, bronze, 256 cm high, Museo dell'Opera del Duomo, Florence.

Leonardo da Vinci, design for the Sforza monument, 1485-88, metal point on blue coloured paper, 11.6 x 10.3 cm, RCIN 912357, Royal Collection Trust, Windsor.

The making of pigments and varnishes

The choice and preparation of pigments were one of the most important and time-consuming tasks for every painter and their workshop. In fact, what pigments were used in a commission was a key element to determine its monetary and prestige-wise value of it. The most common practice within a workshop was the acquisition of raw pigments by the master and their laborious preparation by their assistants and apprentices. On some occasions, however, many painters also purchased specific ready-made pigments from other specialists in the subject.

Lapis lazuli pigment

During the Renaissance, most pigments came from minerals, although there also were pigments extracted from animals and plants. In general, the preparation of pigments usually involved complex and several (and in many cases harmful) steps which, in some instances, lasted for days, even weeks. Thus, painters not only relied on what their masters taught them during their apprenticeships but also on treatises that carefully compiled and explained the use and preparation of many pigments.

Leonardo da Vinci was known for experimenting with these processes to achieve subtle pictorial effects unknown until then and which better fit his slow workflow. It is known that these experiments did not end up well on some occasions.

To know further:

If there was a chore that occupied a large part of a Renaissance painter's daily life, this was not precisely painting, but the choice and elaboration of pigments and varnishes. In fact, Pope Leo X plaintively joked about how Leonardo used to start thinking about the varnishes for the final stage when the designs of painting were not even conceived. The Pope ignored that in those varnishes dwelled Leonardo´s most famous innovation, the sfumato.

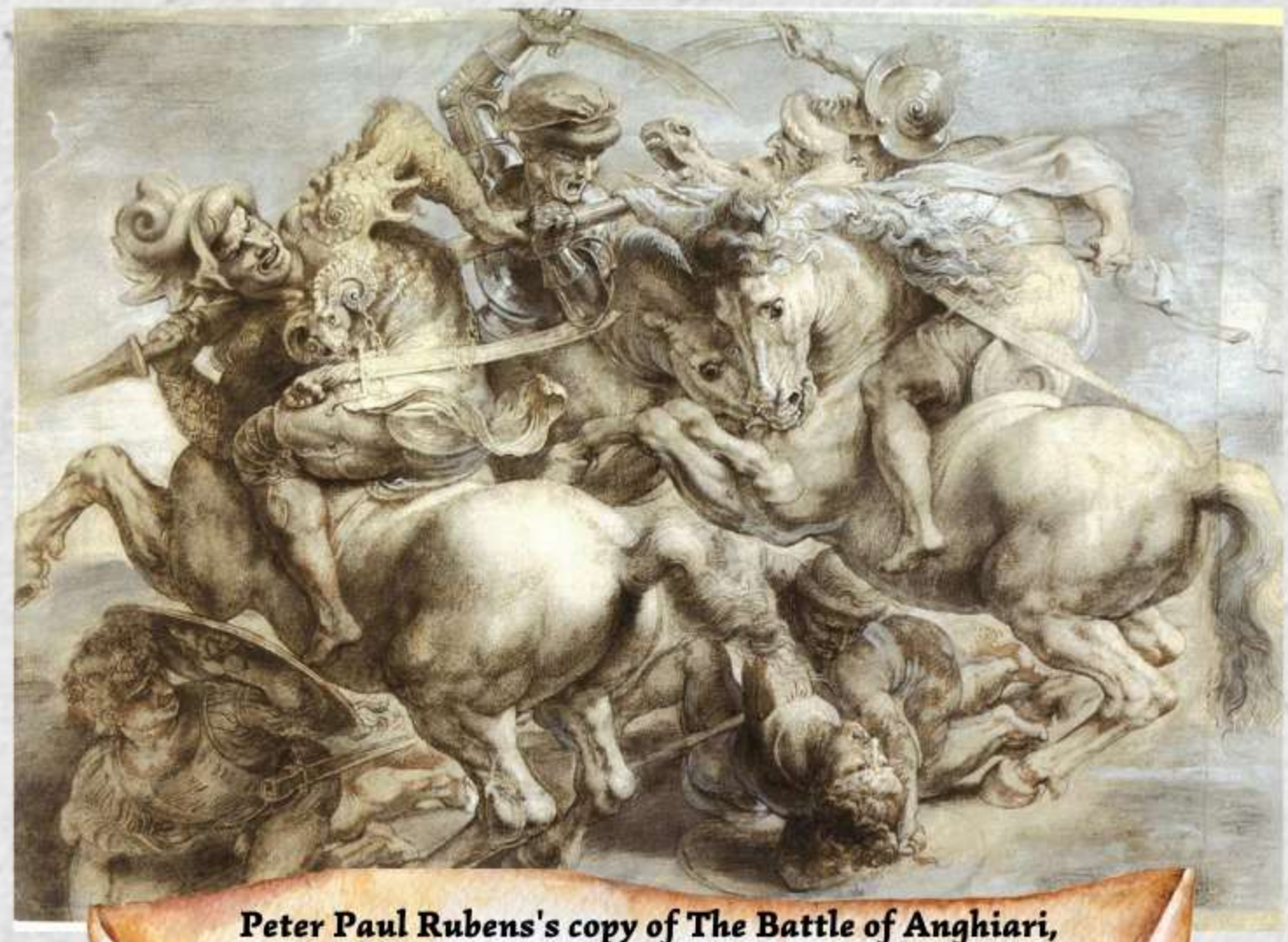
Jan van der Straet, known as Stradanus, detail from Color olivi, 1596, print, 20.1 x 27 cm, inv. 18404353, Cooper Hewitt Collection, New York.

Pigments used during the Renaissance were all extracted from a natural source, most of them had a mineral origin, although there were also a few ones deriving from animals and plants. The rarest and most valued pigment at the time was the *lapis lazuli* or ultramarine, of intense blue colour, was extracted in Afghanistan (hence it was also called 'ultramarine', literally, 'from beyond the sea') and it was worth more than twice its weight in gold; so much so that the richest patrons stipulated in the contracts how much lapis lazuli had to be used, becoming an indispensable factor to estimate the value of a work of art at the time as well as the patron's wealth.

Pigments were usually purchased in their raw form, as minerals o plants, and were manually elaborated in the workshops via long and complex processes. Some of these steps could be highly toxic so they must be carried out carefully. In some cases, painters bought ready-made pigments from other specialists such as other artisans or monks with a centenarian tradition of illuminating books. The most common practice was the acquisition of the pigments by the master and their elaboration by the assistants and newest apprentices, so they could learn the methods and properties. Apart from learning these processes from their masters and other artisans, painters could also look up treatises such as Cennino Cennini's, one of the most famous at the time which contains a list of pigments and details on their use, elaboration, and even warnings about their chemical reactions when used along with other pigments.

Once the pigments were extracted from their source, these were powdery, so in order for them to be applied in painting, these had to be mixed with water and any binding substance to make them viscous. Up to the end of the fifteenth century, the most popular technique for painting in Italy was called tempera, consisting of mixing the pigments with egg yolk as a binder. However, from the middle of the century onwards, a new technique originated in Northern Europe began to be adopted in Italy; this used vegetable oil (linseed, walnut, poppy seed oils among others) as the binding substance, which allowed painters to display vivid colours and, above all, subtle transitions between them. It was quite a revolution that changed the way of painting in Europe, although many painters did use both techniques, sometimes even in a single painting.

Apart from pigments, other chemical substances such as colourless varnishes and resins were also applied over the painting layers, generally at the latest stages, to obtain diverse effects both for protection and aesthetics. These substances required more careful handling of elaboration due to their toxicity.



Peter Paul Rubens's copy of The Battle of Anghiari, 1603, Black chalk, pen in brown ink, brush in brown and gray ink, gray wash, heightened in white and gray-blue, INV 20271, Département des Arts Graphiques, Museé del Louvre, Paris.

Leonardo belongs to the generation that adopted and began to domain the new technique, the oil painting, and although he was also trained in the use of the traditional tempera, ended up becoming one of the prime Italian exponents of the new one. In fact, Leonardo experimented with new processes and substances more than any of his contemporaries to get that hazy effect (called sfumato) that characterised his style. Moreover, the Tuscan painter was known for having a significantly meditative and slow workflow, above all when painting on walls, for the traditional fresco technique required determined resolution and quick action by painters as the paint used to dry rapidly. Thus, Leonardo experimented with the processes and substances in order to adapt them to his slow pace. This has caused many conservation issues over the coming centuries such as in his world-famous Last Supper, if not the destruction of the work as happened with his Battle of Anghiari.

The profetie

In the years that Leonardo da Vinci worked for Ludovico Sforza, one of his commitments was to create new ways of entertaining both the Duke and his guests. Among these activities are his riddles or profetie, many of which possessed a sombre and apocalyptic tone. These depicted ordinary events interpreted in such a way that reflects both the times they were conceived and Leonardo´s values and personality.

To know further:

Whereas Leonardo defined himself as an engineer and inventor rather than as an artist when he offered his talents to Ludovico in 1482, the truth is that once he got a position in the court, he usually spent much of his time as a master of entertainment.

The Sforza court was one of the most refined of its period, counting renowned poets, philosophers, artists, musicians, and mathematicians. Like in every European court of the time, these celebrities produced largely in order to exalt and spread the governor and his dynasty´s prestige. In addition, Ludovico was particularly fond of puns, games, and complex allegories, sometimes enigmatic.

Leonardo da Vinci, design for a theater stage, 1496, pen and brown ink, 20.2 x 13.3cm, 17.142.2, Metropolitan Museum, New York.

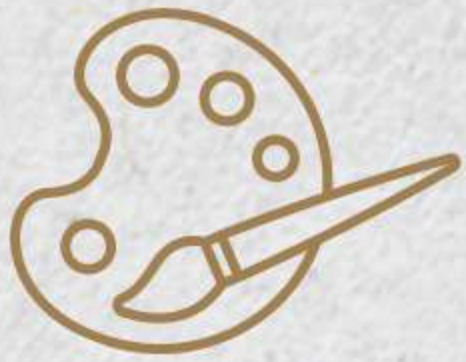
Thus, Leonardo was in charge of organising theme parties, triumphal ceremonies, portraits for the court, pictorial allegories, theatrical spectacles, and so on. Within these ludic activities are the riddles (Leonardo called them *cose filosofiche*). Gathered in just a few pages of the Codex Atlanticus, these brief sentences depict beings, events, or actions, commons of the time, but viewed through a different perspective, some of them are meant to be comical but many are tainted with a catastrophic and pessimistic filter.

Disguised man, 1517-18, black chalk, pen and ink on paper, 16.1 x 15.3 cm, RCIN 912575, Royal Collection Trust, Windsor.

This apocalyptic layer that Leonardo applies was in tune with many spiritual and religious movements happening at the end of the Fifteenth-century. As the century was coming to its end, some voices raised warning of a drastic change in the world. The most famous example is that of the preacher Girolamo Savonarola, whose radical sermons and prophecies terrified the whole city of Florence in the last decades of the century. Therefore, Milanese listeners of Leonardo´s "prophecies" were used to those threatening sentences which would find funny as they referred to ordinary and vulgar things. Furthermore, Leonardo quite likely used these "prophecies" to indirectly mock not only preachers and new prophets like Savonarola but also followers of esoteric fields such as astrologers, called "quacks" by the Tuscan artist.

What is certain is that many of these riddles portray with noticeable crudeness the human being's treatment of the natural world, stressing its cruelty. This is Leonardo´s own perspective and a clear sign of his unusual sensitivity toward Nature. This written empathy is easily supported by other testimonies of Leonardo´s contemporaries who described him liberating birds from their jails in the market (after paying for them) or as a vegetarian in his last years.

Leonardo's workshop



Like many other artists and artisans of his time, once Leonardo da Vinci finished his apprenticeship, he decided to become independent and establish his own workshop (*bottega* in Italian), adopting his apprentices and hiring his assistants. These would help him to carry out commissions as he trains them.

The workshop he set up during his first Milanese period (1483-1499) is the most known and probably the most important of his career, with dozens of pupils and assistants, some very talented such as de Predis brothers, Marco d'Oggiono or Giovanni Boltraffio. From 1500 onwards, Leonardo's workshop took a really important role when the master´s own production slowed down even when this was already scarce in comparison to his fellow artists. On one hand, this is due to the instability in Leonardo´s life, for he had to travel continuously, and, on the other hand, also due to his decision of focusing on other fields. Consequently, his apprentices and assistants did materialise into paintings of many of Leonardo´s pictorial ideas, although none of them was capable of mastering Leonardo´s most known trademarks such as the sfumato.

To know further:

Renaissance Italian and European workshops were the most common center of training for future artists and artisans. Tightly regulated by the guild of the city, workshop masters took in disciples in exchange for a regular fee (provided by their families and under a contract) and trained them both theoretically and practically in the profession for an average of 6 to 10 years. Thus, apprentices were meant to begin their training in their early teens and become independent artists in their early or mid-twenties, although there were exceptions. Many would remain in their master´s workshop working as his assistants and helping him in the training of newcomers as well as in the daily management of such a busy place. On not a few occasions, when the workshop was not a family business, a fully trained assistant would inherit it and so become the new master.

Leonardo's workshop, Leda and the swan, 1505-1515, oil on panel, 130 x 77,5 cm. Inv. 1890 n. 9953, Galleria degli Uffizi, Florence.

Giovanni Pietro Rizzoli, Giampetrino, semi-kneeling Leda or Leda with her children, 1520-1530, oil on panel, 128 x 105,5 cm, inv. GK 966, Gemäldegalerie Alte Meister, Kassel.

Workshops essentially became the new home of apprentices and some assistants, living together most of the year along with their masters. Therefore, pupils could devote most of their time to their artistic education. Throughout the years they had to spend there, they were taught the theoretical basics such as proportions, perspective or anatomy; the elaboration of pigments and varnishes; the most common pictorial techniques such as tempera, oil painting, or fresco among many other things depending on the master´s specialization and skills.

Due to the communal lifestyle of the workshops, women were practically excluded from the professions for they were not allowed to live along with any man out of marriage or if they were not family. This is one of the main reasons why very few female artists are known in the Renaissance. Only those fortunate whose father or any other family member runs their own workshop could have access to the training.

Once the training years were finished, painters who wanted to work independently and set up a workshop had to register in the city guild encompassing their profession; in the case of Florentine painters, this was the Arte dei Medici e Speziali which also included physicians and apothecarics. There also were associations dedicated only to artists, such as the Saint John's Company which existed in many cities throughout Europe and served all artistic professions.

As for Leonardo, in his Treatise on Painting he mentions that before even touching the brushes, pupils must train their hands by copying figures from the best artists; later on, draw sculptures or bas-reliefs to exercise modelling and, finally, draw from nature. In this way, Leonardo stressed the necessity of mastering drawing as the primordial skill all visual arts were based upon.

Indeed, drawing was for Leonardo the most essential means of expression as he used it not only for his artistic ideas but also for his scientific studies.

Leonardo da Vinci, Lansdowne Madonna, 1501-1510, oil on panel transferred to canvas, 50,2 x 36,4 cm, private collection.

In spite of his continuous trips, Leonardo kept his workshop busy at all moments, housing several apprentices and assistants who produced works from the master´s paintings and cartoons. These copies and versions were training exercises as well as commercial products generating income. After all, workshops were a business, and Leonardo´s was not an exception. For instance, we know that during Leonardo´s stay in Rome, he officially complained to his patron about one of his assistants, a German mirror-maker, for secretly setting up his own business within Leonardo´s workshop.

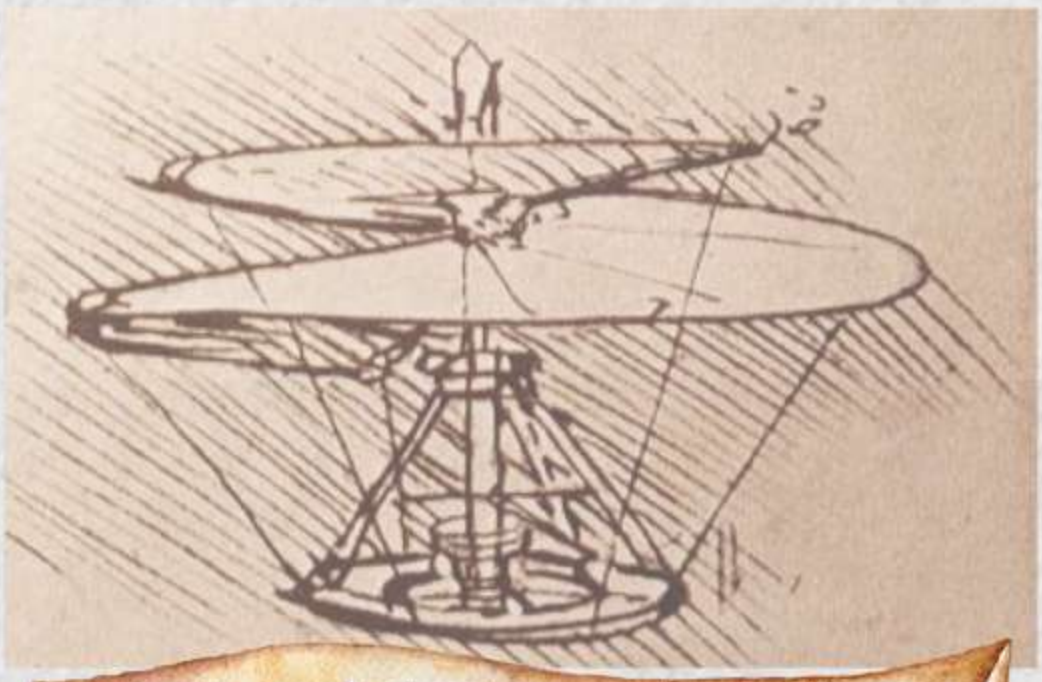
From 1500, after his first Milanese period ended, Leonardo devoted less and less time to the practice of painting, slowing down his already slow pace of finished works. This is in part due to the constant travels he had to undertake during the first decade of the century but Leonardo himself seemed to have prioritised his other projects, mainly scientific and engineering. Notwithstanding, workshop paintings had to meet a quality standard. Commitments who commissioned works from Leonardo´s workshop were expecting to find a particular style and characteristics. Therefore, despite Leonardo's continuous mental and physical absence, many of his disciples' works were corrected and retouched by him.

Leonardo da Vinci's workshop, Salvator Mundi (Ganay version), 1505-1515, oil on panel, 68,2 x 48,8 cm., private collection.

In addition to putting his hand in the works of his apprentices and allowing them to make copies of the works he was carrying out at that time, Leonardo also provided preparatory cartoons with new compositions so that they could create new works with the master´s trademark style. This would explain the exasperating absence of an original painting by Leonardo when various works of his circle are known, for instance, the versions of Leda and the swan, the Virgin with the spindle, or the Salvator Mundi.

However, even though the Vincian painter had several outstanding disciples who accompanied him for most of his life, the truth is that none of them knew how to master the pictorial and aesthetic novelties that his master introduced (the sfumato, the use of sketches as the main means for the analysis of compositions, "scientific" representation of pictorial elements, etc.). In fact, after Leonardo's death, only artists outside of his workshop, such as Correggio or Andrea del Sarto, managed to internalize some of his concepts.

Aerial screw (known as "the helicopter").

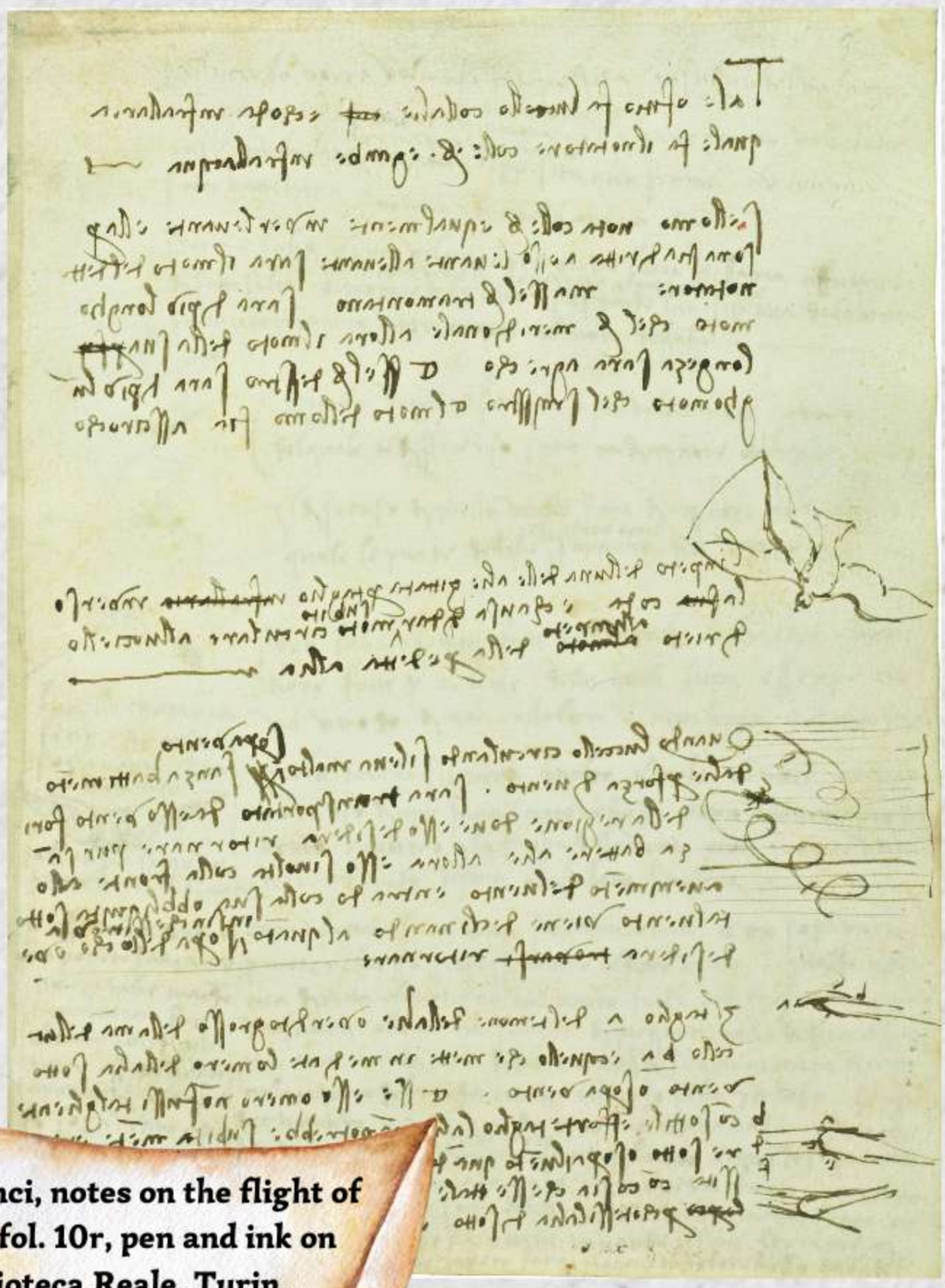


Leonardo da Vinci, aereal screw, late 1480s, pen and ink on paper, detail of folio 83v, Manuscript B Institut de France, Paris

The aerial screw is one of the most famous machines of Leonardo´s repertoire. Although known as the "helicopter", this machine has nothing in common with a modern aircraft. Indeed, this is most likely another example of a gadget conceived by Leonardo to test some of his observations on specific characteristics of natural elements. In this particular case, how helicoidal shapes when rotated take advantage of currents of air (but could also be water) to move forward and/or elevate. Neither could it be discarded that the purpose of this gadget was to be the amusement of the Milanese courtesans.

As Leonardo conceived it, this "screw" should be rotated from its base by several people, just like animals usually did in mills at the time, up to when the upper part would separate from the rest of the base to elevate to the heights propelled by the currents of air. In this way, Leonardo could experimentally demonstrate the benefits of helicoidal shapes which had already been studied in medieval times. Indeed, Leonardo had witnessed and recorded in his notebooks how birds sometimes draw whirls in the air in order to elevate without beating their wings.

However, due to the large size and heavy weight this machine should have had according to Leonardo´s conception, it would have been impossible to get it worked.



Leonardo da Vinci, notes on the flight of birds, c. 1505, fol. 10r, pen and ink on paper, Biblioteca Reale, Turin.

Leonardo and his military machines

If there ever was a subject more worrisome than any other for most Italian Renaissance rulers thisundoubtedly was politics and, in particular, war. In fact, except for a few years of peace, the political scene in Italy (and Europe in general) during the XV and XVI centuries was repleted of conspiracies, coup d'états, and, above all, military campaigns. It is for this reason that military engineering was one of the most cultivated and spread fields at the time. The desire of most of the Italian territories for being at the top of military innovations entailed that many intellectuals devoted a large part of their efforts to these subjects, regardless it was not their specialty.

Leonardo da Vinci, cannons foundry, 1487, pen and ink on paper, Royal Librarian, London.

Leonardo is a good example of this. His fascination with engineering gadgets, largely due to Filippo Brunelleschi´s inventions, encouraged him to try his skills in the military field. Following a long tradition, the Tuscan artists adopted many ideas and machines already existent in order to analyse, prove and improve them. The acquired knowledge during his formation years had to be significant for Leonardo to define himself mainly as a military engineer in his letter to Ludovico Sforza around 1480-82. This letter is full of mentions of devices that surely awed Ludovico despite them being barely described; their ins and outs were the "secrets" Leonardo would disclose once he gets a position.

Leonardo´s military devices, as in many other areas of knowledge he works on, usually contain a notable component of fantasy, making impossible the materialization of a large part of his ideas. And here we run into an apparent contradiction in Leonardo's mind. On the one hand, we find his fascination with amazing inventions which amaze the human minds and which compete not only with those of the great intellectuals of antiquity (the most common referents in the Renaissance) but also with nature itself (the ultimate referent of all things for Leonardo).

Leonardo da Vinci, details of underwater device, 1500, pen and ink on paper, f 24v Codex Arundel, British Library, London.

On the other hand, we come across his absolute animosity towards the war and its consequences, which even leads him to keep to himself the operation of some inventions to dive and move underwater due to "the evil nature of human beings who would use them to bring war and its atrocities to the bottom of the sea".

Leonardo's library

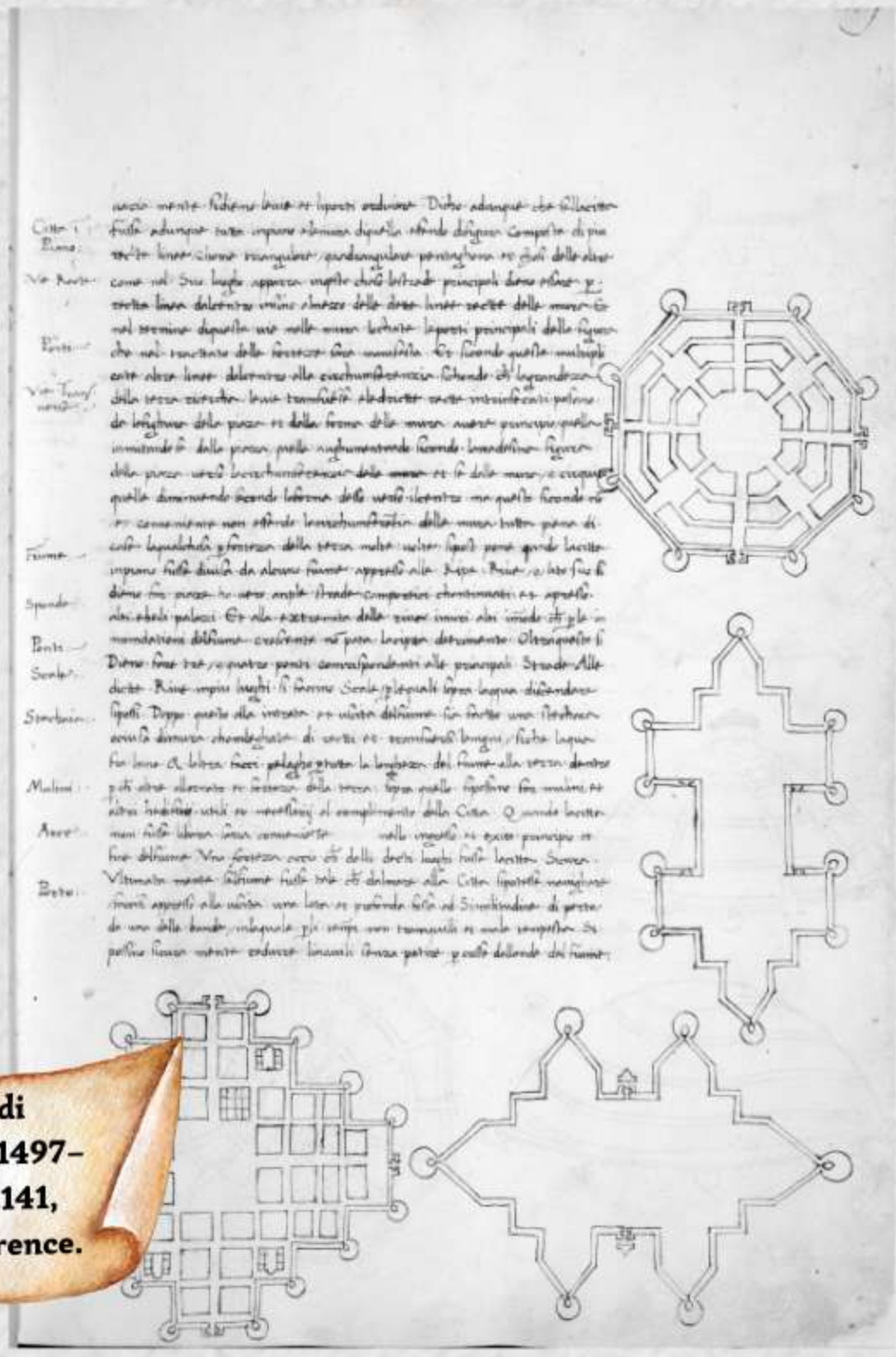
Like many in his generation, Leonardo da Vinci also took advantage of the revolutionary invention of book printing. Despite their high prices, printed books were more easily accessible and cheaper than manuscripts and significantly more than illuminated ones. It is documented that Leonardo owned around 150 books, both manuscripts and printed ones. Indeed, apart from his owned books, his manuscripts are full of reminders of borrowings of volumes from people of his circle.

It does not come as a surprise that his books cover a wide variety of subjects which certainly mirror Leonardo's manifold curiosity. Among these books, we find subjects related to anatomy, philosophy, ancient history, optics, poetry, geometry, religion, Latin grammar, and so on.

To know further:

Despite the various critiques that Leonardo addresses to those whose knowledge is based on what others have written and said, the truth is that he could not ignore the timeless wisdom that books enclose, gathering a personal library of around 150 volumes.

Leonardo was part of the generation that witnessed the flourishing of the printing industry (Johannes Gutenberg's German version of the Bible printed in 1455 is considered the first printed book in the Western world) and throughout his life, hundreds of new books, editions of Classical and Medieval books proliferated throughout the continent. In Italy, the focus of the book printing industry was in Venice, the meeting point between Orient and Occident, as well as between Northern Europe and the Mediterranean countries. Nevertheless, many other Italian cities such as Milan, Vicenza, and Florence, also developed their own printing houses.



Francesco di Giorgio, Trattato di Architettura, version II, Folio 29r, 1497–1500, Codex Magliabechiana II.I.141, Biblioteca Nazionale Centrale, Florence.

Two lists of books from Leonardo have come down to us and quite often their titles are too vague, requiring experts to identify their real titles and editions properly. However, only one book has been doubtlessly identified, Francesco di Giorgio Martini's treatise on architecture nowadays held in the Vatican, which contains annotations by the very Leonardo on its margins.

The most numerous books are those dedicated to the diverse sciences such as medicine, astronomy, botany, optic, meteorology, geometry, etc. but there also is a noticeable quantity of volumes related to philosophy or religion, including the Bible or a biography of Saint Ambrose, the saint patron of Milan.

Literature books abound in his lists, not only Greco-Roman classics so popular at the time but also contemporary ones, not the least in verse. Among them, Dante's most famous work, The Divine Comedy stands out, but there also are works of poets that Leonardo knew personally such as Gaspare Visconti and the Tuscan Il Burchiello. Among the classics, we can find Ovid's Metamorphoses or Aesop's Fables.

16

IL BVRCHIELLO

POETA FIORENTINO.

17

LE RIME

DEL POETA BVRCHIELLO FIORENTINO.

Accomodate per il Negligente Academico Pellegrino.

COMENTO DELLA PRIMA PARTE.

LA Gloriosa fama de i Dauitti,
Che Minerua cantò con dolci verſi;
Sendo gli Hebrei ſpiriti peruerſi
Dal maluagio Phiton morti & traſitti;
Et perche i Granchi ſon miglior riſritti;
Pietà mi venne & si gli ricoperſi;
In Galilea vbi Pietro i perſi
Ante muſica Gal' ter negauitti.
Choche da Buſior, ſtine, talecche,
Feſte fu mittatur, & guzzi nonne
Irabis ter, le Zucche ſenza ſprecche.
Allabli, ſimble si, talba meonne
Leiſelec ſcaſac ſalem Moſecche
Alga grazir marà gran Calbeonne;
Diſſe Domine nonne
Al General che ſtaua con riguardi;
Nõ ſunt, non ſunt piſces pro Lombardi.

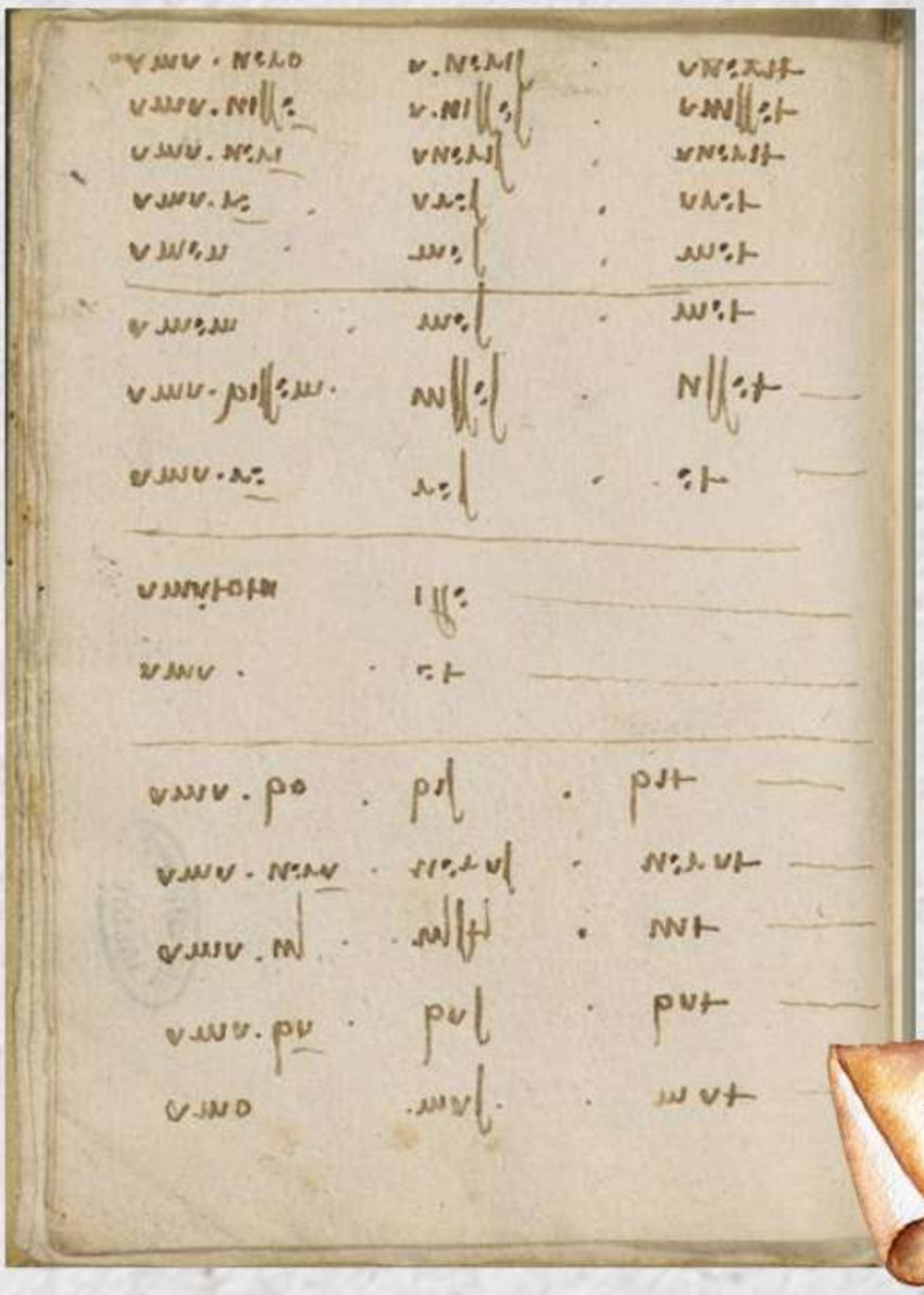
Maeſtro Burchiello Poeta fantaſtico, fu ſi ſtitico ne ſuoi Capricciacci, che non è ſtato mai Gurnea alcuna, che habbi marauiglato aſſibbiare gli vn comento adoſſo, o dargli di becco a pſtillarlo; & ecci ſtato le dazzine a ſomettere i Danti & sgangherare i Petrarchi ſal zo quelli che l'hanno inteſo) Benedetto ſia il Bernia, che ci meſſe lo ſtile, ma il Collegio di Parnaſo veduto il ſuo ardire lo fece citare & egli, credendoſi cauarne qualche al legeria bella, dalle riuerenze di quei dilà, diſteſe le gambe, & andò di luogo; ne mai piu c'è tornato a ſtarlo. Io, che ho mezzo lega con le ſue albagie; piu volte mi ſon ſitto a leggere queſti Sonetti pazzi, et cauatone poco vtile, cento volte l'ho gettato in ter-

B

Le Rime del poeta Burchiello fiorentino, printed by Marcolini Francesco, 1553, Venice. Private Collection.

In addition, Leonardo owned many books about Latin grammar, a language he could never have a good command of regardless of his continuous efforts.

And the fact is that the bulk of Leonardo's books is not in Latin, the language in which most of the books of the time were written, especially those of great literary and scientific relevance, but rather in the Tuscan language (called *volgare*, which is, in essence, modern Italian) due to the great proliferation of translations that arose to spread the culture to other layers of society inevitably excluded from access to the university and the teaching of Latin.



Leonardo da Vinci, list of Latin declensions, 1493-94, Manuscript H, r. 004, Ms 2179, Bibliothèque Nationale de France, Paris.