

LEONARDO DA VINCI  
1452-1519

Under the patronage of  
the President of the French Republic,  
Emmanuel Macron

**Exhibition curators:**

**Vincent Delieuvin**, Department of Paintings,  
Musée du Louvre

**Louis Frank**, Department of Prints and Drawings,  
Musée du Louvre

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**Due to fragility, some drawings and paintings  
will not be displayed for the entire duration  
of the exhibition.**

# LEONARDO DA VINCI

1452-1519

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1.

LIGHT,  
SHADE,  
RELIEF

2.

FREEDOM

3.

SCIENCE

4.

LIFE

Musée du Louvre

24 October 2019–24 February 2020

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# LEONARDO DA VINCI

## 1452-1519

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*Lionardo di Ser Piero da Vinci* was born to Ser Piero in the town of Vinci (near Florence) in the early hours of 15 April 1452, and died in Amboise (in the Loire valley of France) on 2 May 1519. He is one of the most prominent figures of the Italian Renaissance and the ultimate icon of European painting.

During Leonardo's youth in Florence, he was apprenticed to the sculptor Andrea del Verrocchio. Around 1482, he moved to Milan, where he painted the *Virgin of the Rocks*. While in the service of the duke of Milan, Ludovico Sforza, he created the *Last Supper* – a work that made him one of the most famous artists of his time. In 1500, he returned to Florence and produced a series of masterpieces: *Saint Anne*, the Mona Lisa, *The Battle of Anghiari* and Saint John the Baptist. In 1506, he went back to Milan, where he stayed until the election of the Medici Pope Leo X in 1513, which led him to move to Rome. He left Italy for France at the invitation of the French king François I in 1516, and spent his last years in Amboise, on the banks of the river Loire.

The essence of Leonardo's revolutionary approach to painting can be summarised as follows: to reproduce the reality of life within an infinite space made up of light and shade, he developed a uniquely free style of drawing and painting that enabled him to endow his figures with the nature of movement. He aimed to make painting a science encompassing the whole physical world, able to express the truth of appearances. Leonardo ushered in a modernity that would surpass antiquity and pave the way for future forms of art.

A number of full-sized infrared reflectograms of Leonardo's paintings are presented in the exhibition. This imaging technique is used to trace the carbon beneath the layers of paint and thus reveal the underdrawings made on the ground. Leonardo often changed his mind during the creative process; these images allow us to see his initial drafts and how he perfected his compositions. They also provide insight into the first steps he took in rendering skin tones, using his expertise to create careful transitions between light and shade.

# 1. LIGHT, SHADE, RELIEF

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In 1464, the young Leonardo began an apprenticeship in Florence with Andrea del Verrocchio, one of the greatest sculptors of the 15th century. While in Verrocchio's workshop he studied the sculptural nature of form, movement (on which reality depends and all narratives are constructed) and chiaroscuro (the use of light and shade to create a sense of drama). His prime source of instruction was *Christ and Saint Thomas*, a monumental bronze sculpture cast by Verrocchio for the Florentine church of Orsanmichele. In this work, Verrocchio demonstrated a profoundly pictorial conception of sculpture, from which Leonardo drew the basis of his own art: the idea that space and form come into being through light and exist only in the play of light and shade. Leonardo's monochromatic *Drapery Studies*, painted on linen after clay figures covered with pieces of cloth dipped in clay, resemble Verrocchio's studies for the figures of Christ and Saint Thomas and were inspired by this innovative perception of space.

*The Annunciation*, the *Madonna of the Carnation* and the *Portrait of Ginevra de' Benci* reflect Leonardo's transition from sculpture to painting. This shift was boosted by his interest in the work of his contemporaries at a rival Florentine workshop run by the Pollaiuolo brothers, and in the innovations brought to Florence by Flemish painters – three-quarter view portraits and the use of oil.

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# Andrea del Verrocchio

Florence, about 1435–Venice, 1488

## 001 *Christ and Saint Thomas*

Bronze with gilt inscriptions  
1467–1483

Verrocchio was commissioned in 1467 by the Tribunale di Mercanzia (merchants' court) to produce this large bronze sculpture for its niche on the eastern facade of the church of Orsanmichele in Florence. According to the Gospel of Saint John, Thomas the Apostle refused to believe in the Resurrection until he had seen or touched the wounds of Jesus's crucifixion for himself. The entire sculpture is designed to convey a sense of movement and drama through chiaroscuro – the play of light and shade. During his apprenticeship to Verrocchio, Christ and Saint Thomas was Leonardo's prime source of instruction.

Chiesa e Museo di Orsanmichele, Florence

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On the basis of modern editions of Vasari's *Lives*, Leonardo's models for the drapery studies were long thought to be complete three-dimensional figures, due to a misunderstanding stemming from the alteration of a word in Vasari's text. The restoration of the original term clarified the fact that Leonardo placed his draperies on large relief medallions, comparable to the bronze of Orsanmichele, on which the light also created similar effects. Presented together on this rare occasion, these famous studies have been named after their first known owner for this exhibition.

## 002 *Reconstruction of the Relief Sculpture for the Saint Morys Drapery Study*

Clay and cloth dipped in clay

This work is an experimental reconstruction of the relief sculpture for the most famous of all Leonardo's Draperies, the Saint Morys drapery study, on display here.

Reconstruction made by the painter and sculptor Leticia Leratti, 2019

## Workshop of Andrea del VERROCCHIO

### 003 *Jabach III Drapery Study for a Standing Figure*

Distemper on linen  
About 1473–1477

It seems to have been customary in Verrocchio's workshop to produce painted studies of draped clay or wax models intended for the composition of sculptures.

This figure resembles a mirror image of the figure of Christ in the sculpture of *Christ and Saint Thomas*.

Musée des Beaux-Arts, Rennes, inv. 794-1-2507

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## Andrea del VERROCCHIO or Leonardo da VINCI

### 004 *Richardson Drapery Study for a Kneeling Figure*

Distemper on linen  
About 1473–1477

The model's kneeling position recalls many depictions of the Virgin Mary kneeling in adoration before the Infant Jesus.

The British Museum, London, inv. 1895.0915.489

Andrea del VERROCCHIO  
or Leonardo da VINCI

**005** *Medici Drapery Study 433 for  
a Standing Figure*

Distemper on linen  
About 1473–1477

The folds and the gesture of the hand on this draped nude figure are strikingly reminiscent of the figure of Christ in the Orsanmichele sculpture.

Gabinetto Disegni e Stampe degli Uffizi, Florence, inv. 433 E

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Andrea del VERROCCHIO  
or Leonardo da VINCI

**006** *Jabach VIII Drapery Study for  
a Standing Figure in Profile*

Distemper on linen  
About 1473–1477

This standing figure in profile recalls Thomas the Apostle in the bronze sculpture at Orsanmichele.

Department of Prints and Drawings, Musée du Louvre, Paris, RF 1081

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 007 *Jabach IV Drapery Study for a Kneeling Figure*

Distemper on linen  
About 1473–1477

The drapery recalls the clothing of the angel in Leonardo's painting of the Baptism of Christ, commissioned from Verrocchio for the church of San Salvi in Florence and now in the Uffizi Gallery. It also resembles the drapery of the Archangel in Leonardo's first painting, the Annunciation, also in the Uffizi.

Department of Prints and Drawings, Musée du Louvre, Paris, RF 41904

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 008 *Medici Drapery Study 420 for a Kneeling Figure*

Distemper on linen  
About 1473–1477

Gabinetto Disegni e Stampe degli Uffizi, Florence, inv. 420 E

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 009 *Jabach I Drapery Study for a Kneeling Figure*

Distemper on linen

About 1473–1477

This study represents a breakthrough. The perception of space, composed of light and shade, is perfectly harmonious and the drapery has become almost secondary – an abstract support for a study of the effects of light.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2256

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 010 *Jabach IX Drapery Study for a Standing Figure in Profile*

Distemper on linen

About 1475–1482

This study is focused on the lower part of the drapery of a standing figure in profile, turned to the right.

Once again, it recalls the figure of Thomas in Verrocchio's bronze sculpture.

Department of Prints and Drawings, Musée du Louvre, Paris, RF 1082

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 011 *Jabach XIII Drapery Study for a Seated Figure*

Distemper on linen  
About 1475–1482

Department of Prints and Drawings, Musée du Louvre, Paris,  
RF 41905

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 012 *Jabach XIII Drapery Study for a Seated Figure*

Distemper on linen  
About 1475–1482

The drapery studies, most of which belonged to the collector Everhard Jabach, were associated from the 18th century onwards with a passage from *the Life of Leonardo da Vinci* in the second edition of Giorgio Vasari's *Lives of the Most Eminent Painters, Sculptors and Architects*, published in 1568. Vasari describes the specific technique used by Leonardo, which consisted of modelling clay figures and covering them with cloth dipped in clay.

Fondation Custodia, Paris, inv. 6632

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 013 *Saint-Morys Drapery Study for a Seated Figure*

Distemper on linen  
About 1475–1482

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2255

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 014 *Study of a Tuscan Landscape*

Pen and brown ink  
Dated 5 August 1473

This is the earliest dated drawing by Leonardo. The upper part bears the following inscription in his left-handed mirror writing: *the Day of Our Lady of the Snow, the fifth day of August 1473*. The scene is a landscape in the Arno valley, probably in the region of Leonardo's home town of Vinci. The artist used brisk strokes to simplify parts of the panorama – such as the fields in the valley – but endeavoured to capture the flow of the waterfall and the trembling of the leaves on the trees.

Gabinetto Disegni e Stampe degli Uffizi, Florence, inv. 8 P

## 015 Infrared reflectogram

of *The Annunciation* by Leonardo da Vinci

Oil on panel. About 1470–1474  
Uffizi Gallery, Florence.

Leonardo's first painting, *The Annunciation*, was found in the 18th century in the church of San Bartolomeo in Monteoliveto. It dates from the early 1470s.

The image is a traditional one – the Archangel Gabriel blessing the Virgin Mary before telling her that she is to bear the son of God – but the scene is set in the garden of Mary's house. Infrared reflectography highlights every trace of carbon in a painting, revealing the underdrawing – which is extremely precise and meticulous in this instance.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 016 *Study of an Arm for The Annunciation, Fragment of a Study of a Head*

Pen and brown ink, wash, red chalk  
About 1470–1472

This is a study of the angel Gabriel's gesture of blessing with his right arm for the painting of *The Annunciation*. The infrared reflectogram shows that the ribbon wound around the angel's upper arm was very precisely reproduced on the painted panel in the Uffizi Gallery. Leonardo modified the drawing during the course of its execution, giving it a greater sense of movement and creating the impression that the Archangel has just landed.

Christ Church, Oxford, inv. 0036

## Andrea del Verrocchio's workshop, Leonardo da Vinci (?)

### 017 *Study of the Head of a Young Man*

Pen and brown ink, wash  
About 1470–1472

This head recalls that of the Virgin Mary in the painting of *The Annunciation* in the Uffizi Gallery. Some art historians have concluded that it is a study drawn from a live model prior to the composition of the painting. The left-handed hatching, drawn from right to left, is characteristic of Leonardo, but the attribution of the drawing is still debated and some experts believe it to be a copy.

The Morgan Library & Museum, New York, inv. IV, 34A

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### 018 **Infrared reflectogram** *of The Baptism of Christ* by Andrea del Verrocchio and Leonardo da Vinci

Distemper and oil on panel. About 1468–1478  
Uffizi Gallery, Florence

The work was probably painted by Verrocchio, assisted by Leonardo, for the altarpiece in the church of San Salvi in Florence. This infrared reflectogram shows the schematic preparatory drawing for the Baptist's drapery, painted by Verrocchio, and tree trunks in the landscape, which Leonardo later replaced with misty mountains along a river. We can also see differences in the modelling of the figures: a much softer approach has been used for the body of Christ and face of the angel to the left, both painted by Leonardo.

## Attributed to Lorenzo di CREDI

Florence, about 1457/1459–1536

### 019 *A Miracle of Saint Donato of Arezzo* *The Annunciation*

Oil on panel

About 1480–1485

These two panels formed the predella, or lower part of the altarpiece, in the oratory of the Madonna di Piazza in the cathedral of Pistoia, near Florence. Verrocchio was commissioned to produce this work in about 1475–1477, but entrusted the task of painting it to his pupil Lorenzo di Credi, who completed it around 1485.

The small *Annunciation* on the predella was inspired by Leonardo's large panel painting.

Worcester Art Museum, Worcester, inv. 1940.29

Department of Paintings, Musée du Louvre, Paris, MI 598

## Andrea del VERROCCHIO and his workshop

Florence, about 1435–Venice, 1488

### 020 *Tobias and the Angel*

Distemper on panel

About 1470–1475

The original destination of this painting, which illustrates a passage from the Book of Tobit in the Old Testament, is unknown. Tobit, a blind old man, was cured by the gall, heart and liver of a fish caught by his son Tobias on his journey to Ecbatana, under the guidance of the Archangel Raphael. Discrepancies in the quality of the painting technique have led most art historians to conclude that the more naturalistic elements – the fish and the dog – were painted by Leonardo.

The National Gallery, London, NG 781

# Andrea del VERROCCHIO

Florence, about 1435–Venice, 1488

## 021 *Study of a Head*

Black chalk heightened with white, pricked outlines  
About 1470–1475

The few drawings attributed to Verrocchio include studies of heads drawn in black chalk with subtle stumping, foreshadowing Leonardo's *sfumato* – the blurring of edges to create soft transitions from light to shade. This technique gives a particular relief to the face and brings the expression to life. The contours of the face were pricked for transfer to another support – probably a painting that has not yet been identified.

Kupferstichkabinett, Berlin, KDZ 5095 recto

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## Andrea del Verrocchio (?)

Florence, about 1435–Venice, 1488

## 022 *Publius Cornelius Scipio*

Marble  
About 1464–1469

This low-relief marble sculpture by Verrocchio was inspired by models by the Florentine sculptor Desiderio da Settignano. It shows the profile of Scipio, the Roman general who defeated Hannibal at Zama in 202 BC. Wearing a helmet and armour, the handsome young hero embodies the qualities of strength and piety attributed to him by ancient sources. Leonardo also tried his hand at classical-style profile portraits of this kind.

Department of Sculptures, Musée du Louvre, Paris, RF 1347

# Attributed to Piero del POLLAIUOLO and his workshop

Florence, about 1441/1442–about 1496

## 023 *The Battle of Pydna* *The Triumph of Aemilius Paulus*

Distemper on panel  
About 1470–1475

These two panels from *cassoni* (decorative chests) are painted with scenes from Roman history. They were produced in Florence for the Mannelli family, whose arms are featured on the shield of one of the *putti* decorating the triumphal chariot. They are attributed to the workshop of either Verrocchio or the Pollaiuolo brothers. The figures' intense expressions, the anatomical details and the sensitive rendering of the landscape recall the style of Leonardo. Some historians believed he may have contributed to these works.

Musée Jacquemart-André, Paris, inv. MJAP-P-1822-2  
and MJAP-P-1822-1

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## Alesso BALDOVINETTI

Florence, about 1425–Florence, 1499

## 024 *Virgin and Child*

Distemper and *tempera grassa* on panel  
About 1464

In Florence, Leonardo was able to see the works of Alesso Baldovinetti, one of the first painters to experiment with mixed techniques to create new effects of realism. This majestic *Virgin and Child*, which has recently undergone conservation treatment, features a magnificent naturalistic landscape reminiscent of the valley of the Arno; the gradations of colour and shading of the flesh tones give it a particular softness. The painter's innovative technique also enabled him to depict the transparency of the Virgin's veil.

Department of Paintings, Musée du Louvre, Paris, RF 1112

## 025 Infrared reflectogram

of the *Virgin and Child*, known as the *Madonna of the Carnation*, by Leonardo da Vinci

Distemper and oil on panel. About 1474–1476  
Alte Pinakothek, Munich

The Virgin Mary is showing Jesus a carnation whose shape evokes a nail, symbolising his crucifixion. The infrared reflectogram reveals how the architectural structure and windows behind the figures were drawn out. Leonardo prepared the compositions of his first paintings so meticulously that very few changes needed to be made during the painting process, which was also perfectly executed.

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## Hans MEMLING

Seligenstadt, about 1435–Bruges, 1494

## 026 *Portrait of a Man (Bernardo Bembo?) with a Roman Coin*

Oil on panel  
About 1471–1474

Some art historians have identified the sitter for this portrait as the Venetian patrician Bernardo Bembo because of the palm tree and laurel leaves – features of his personal emblem, which appears on the back of Leonardo's earliest portrait, *Ginevra de' Benci*. Bembo served as the Venetian ambassador to the court of Burgundy from 1471 to 1474, and Memling's portrait is thought to date from that period.

Koninklijk Museum voor Schone Kunsten, Antwerp, inv. 5

## 027 Infrared reflectogram

### *Portrait of Ginevra de' Benci* by Leonardo da Vinci

Distemper (?) and oil on panel. About 1475–1476  
National Gallery of Art, Washington

The young woman in this portrait is standing in front of a juniper tree (ginepro in Italian) – a reference to her name, Ginevra de' Benci. The work was commissioned in 1475 by Bernardo Bembo, the Venetian ambassador to Florence. Bembo and Ginevra had a platonic love affair inspired by Petrarch's love poetry, which was greatly in vogue in the circle of Lorenzo de' Medici, ruler of the Florentine Republic at that time. The infrared reflectogram reveals pounce markings around the contours of the face, indicating that Leonardo used the spolvero technique to transfer a drawing from paper to panel. His rough draft of the juniper foliage, smudged by fingertip, can also be seen.

© National Gallery of Art

# 2.

# FREEDOM

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Around 1478, building on what he had learned from Verrocchio, Leonardo began to explore new paths. To grasp the truth of form – which is illusory, being constantly broken apart by an ever-changing world – the painter needed to acquire an intellectual and technical freedom that would enable him to capture its very imperfection. In his drawing, this was expressed as a violent attack on form – a direct juxtaposition of incompatible states that sometimes produced nothing but black. This approach, required by the absolute necessity of conveying movement, was described by Leonardo as *componimento inculto* – ‘intuitive composition’. The *Madonna of the Cat* and the *Madonna with a Fruit Bowl* are the first remarkable illustrations of this new compositional style.

Leonardo’s art was transfigured by the freedom he found in *componimento inculto*. This creative freedom fostered a tendency to incompleteness which would become a characteristic of Leonardo’s painting, exemplified by the poignant figure of *Saint Jerome*. This creative period continued in Milan, where Leonardo moved to in 1482 and where he painted the *Virgin of the Rocks*, the *Portrait of a Musician* and *La Belle Ferronnière*.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 028 *Study of the Virgin and Child, known as Madonna with a Fruit Bowl*

Leadpoint reworked with pen and brown ink  
About 1478–1480

The *Madonna with a Fruit Bowl* illustrates the remarkable freedom that suddenly infused Leonardo's art. Jesus appears to be offering his mother a piece of fruit, symbolising the eradication of original sin. Unlike Leonardo's previous drawings, this sketch does not attempt to clearly define the forms; instead, it seems to rage against them in an extraordinary struggle to capture the essential reality of *movement*. This drawing is strongly reminiscent of the *Benois Madonna* (no. 040).

The *Madonna with a Fruit Bowl* belonged to the great collector Horace His de La Salle, whose drawings are currently on display in the Louvre.

Department of Prints and Drawings, Musée du Louvre, Paris, RF 486

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 029 *Female head*

Silverpoint and metalpoint, heightened with white,  
on pale grey prepared paper  
About 1485–1490

This drawing attests to Leonardo's expertise in the use of silverpoint – a virtuoso technique allowing for no corrections. The loose, confident lines transcribe the slightest variations of light and shade with beautiful simplicity. This drawing probably served as a model for the *Madonna Litta* (now in the Hermitage Museum), once attributed to Leonardo but more likely by Giovanni Antonio Boltraffio or Marco d'Oggiono, two of the master's future pupils in Milan.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2376

## Andrea del VERROCCHIO

Florence, about 1435–Venice, 1488

### 030 *Studies of Children*

Traces of metalpoint or black chalk, reworked  
with pen and brown ink  
About 1470–1480

Leonardo stayed in Verrocchio's workshop until at least the late 1470s. The poses in these studies of children are found in other works by Verrocchio: the blessing putto can be seen in a *Virgin and Child* and the reclining putto in several sculptures. The brisk pen strokes and simplified, discontinuous outlines recall the technique developed by Leonardo at the same time.

Department of Prints and Drawings, Musée du Louvre, Paris,  
RF 2 verso

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 031 *Recto: Studies for a Madonna and Child with the Infant Baptist; Human and Animal Profiles*

Pen and brown ink  
About 1478–1480

The brisk strokes, broken lines, anatomical deformations and overlapping ideas reflect the artistic freedom Leonardo developed in the late 1470s. Playing on similarities between human profiles and the animal world became a recurrent feature of Leonardo's drawing.

The Royal Collection, Windsor, RL 12276 recto, loaned by  
Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **032** *Verso: Studies of Human Profiles*

Pen and brown ink

About 1478–1480

Leonardo drew the same subjects on the verso of the sheet: ideally beautiful children, male figures in the prime of life and old men with deformed features.

The Royal Collection, Windsor, RL 12276 verso, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **033** *Study for a Virgin and Child with Saint John the Baptist (?)*

Pen and brown ink

About 1478–1480

A sheet of studies held in the Uffizi Gallery bears an inscription by Leonardo indicating that he had started work on two Virgin Marys towards the end of 1478; this quick sketch was probably related to that project.

Department of Prints and Drawings, Musée du Louvre, Paris, Inv. 2316

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 034 *Study for a Virgin Mary Washing her Son's Feet; the Buttocks of a Child*

Black chalk reworked with pen and brown ink,  
brown wash

About 1478–1480

Faculdade de Bellas Artes, Porto, inv. 99.1.1174

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The magnificent *Madonna of the Cat* studies are probably also related to Leonardo's project of 1478 for two Virgin Marys. They feature variations on the theme of Jesus playing with a cat, sometimes in an affectionate and sometimes in a fearful manner. In the most accomplished sheets in the series, the cat – a symbol of Evil – is depicted trying to break free of the Child's embrace.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **035** *Studies for a Madonna of the Cat; Profiles*

Leadpoint reworked with pen and brown ink  
About 1478–1480

The British Museum, London, inv. 1860,0616.98

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **036** *Study for a Madonna of the Cat*

Leadpoint reworked with pen and brown ink  
About 1478–1480

Musée Bonnat-Helleu, Bayonne, inv. 152

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **037** *Study for a Madonna of the Cat*

Leadpoint reworked with pen and brown ink,  
brown wash

About 1478–1480

Private collection

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **038** *Studies for a Virgin and Child; Heads in Profile; Geometric Drawings*

Metalpoint reworked with pen and brown ink  
on pale pink prepared paper  
About 1478–1480

This study is also related to Leonardo's 1478 project for two Virgin Marys. The flower Mary is holding symbolises the future Passion of Christ. This composition foreshadows that of the *Benois Madonna* (no. 040).

The British Museum, London, inv. 1860,0616.100

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 039 *Virgin and Child*, known as the *Benois Madonna*

Oil on panel transferred to canvas

About 1480–1482

The *Benois Madonna* is the result of one of the two projects undertaken by Leonardo in late 1478.

The cross-shaped flower Mary is handing to Jesus prefigures the Passion of Christ. The Child solemnly takes it while his mother smiles in encouragement, joyful in the knowledge that her son's death will procure salvation for humankind. This is the first of Leonardo's paintings imbued with the dynamism of his *componimento inculto* ('intuitive composition').

Hermitage Museum, St Petersburg, inv. GE 2773

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### 040 **Infrared reflectogram** of the *Virgin and Child*, known as the *Benois Madonna*, by Leonardo da Vinci

Oil on panel transferred to canvas.

About 1480–1482

Hermitage Museum, Saint Petersburg

The reflectogram of the *Benois Madonna* reveals the many alterations (*pentimenti*) made during the painting process, particularly with regard to the distance between Jesus and his mother.

The structure of the room is clearly visible, particularly the canopy over Mary's bed in the top left.

© The State Hermitage Museum, St Petersburg, 2019

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 041 *The Hanging of Bernardo Bandini Baroncelli*

Leadpoint reworked with pen and brown ink  
December 1479

On 26 April 1478, in a plot known as the Pazzi Conspiracy, Lorenzo and Giuliano de' Medici were attacked during Easter Mass in the cathedral of Florence, and Giuliano was stabbed to death by Bernardo Baroncelli. Despite the fierce repression that followed, Baroncelli managed to flee the city, finding refuge in Constantinople. He was eventually handed over by the sultan and on 29 December 1479, he was hanged from the windows of the 'Palace of the Captain of the People' (now the Museo Nazionale del Bargello Museum) – an event that left its mark on Leonardo's memory.

Musée Bonnat-Helleu, Bayonne, inv. 659

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 042 *Study for a Saint Sebastian*

Black chalk  
About 1478–1482

The Codex *Atlanticus*, the largest collection of Leonardo's drawings, contains a list of works compiled in about 1482–1483 which includes 'eight Saint Sebastians' – probably preparatory drawings for a painting of the saint. Four sheets on this subject have been identified to date.

Musée Bonnat-Helleu, Bayonne, inv. 1211

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 043 *Study for Saint Sebastian*

Metalpoint, pen and brown ink  
About 1478–1482

Hamburger Kunsthalle, Hamburg, inv. 21489

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 044 *Study of a Maiden with a Unicorn*

Pen and brown ink  
About 1478–1480

The purpose of this drawing is unknown. According to legend, the unicorn – a symbol of chastity – could only be approached by a virgin girl. Its association with portraits of young women is why this drawing has been interpreted as a first compositional idea for the reverse side of Ginevra de' Benci's portrait, but the style is more reminiscent of Leonardo's work from 1478–1480.

Ashmolean Museum, Oxford, inv. WA 1855.83.1

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 045 *Studies for a Saint Mary Magdalene*

Pen and brown ink  
About 1478–1480

The purpose of this composition is also unknown. The saint is depicted in a dynamic pose, opening her perfume vase. The studies evoke the meal at the house of Simon the Pharisee, when Mary Magdalene anointed Christ's feet with oil, and the Entombment, when she held a perfume vase.

The Courtauld Gallery, London, inv. D.1978.PG.80

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Several studies by Leonardo for an *Adoration of the Shepherds* have survived. According to some art historians, they could be traces of an initial project for the main altar of the church of San Donato in Scopeto in Florence, before the artist decided to paint an *Adoration of the Magi*. Others see them as preparatory sketches for an altarpiece commissioned from Leonardo in January 1478 for the chapel of San Bernardo in the Palazzo della Signoria – a work he seems never to have started.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 046 *Study for an Adoration of the Shepherds*

Black chalk or leadpoint reworked with pen and brown ink  
About 1478–1480

Gallerie dell'Accademia, Venice, inv. 256

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **047** *Study for an Adoration of the Shepherds*

Leadpoint reworked with pen and brown ink  
About 1478–1480

Musée Bonnat-Helleu, Bayonne, inv. 658

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **048** *Studies for an Adoration of the Shepherds or an Adoration of the Magi*

Leadpoint reworked with pen and brown ink  
About 1478–1481

The figure on the left, leaning on his stick, recalls the *Adoration of the Shepherds*, but other figures evoke the *Adoration of the Magi* in the Uffizi Gallery – especially the figures near the staircase on the right.

Beaux-Arts de Paris, Paris, inv. EBA 424

Leonardo probably began to compose his painting for the high altar in San Donato in Scopeto in March 1480, but he left Florence for Milan in about 1482 and never completed the work. Several studies show the different variations he contemplated.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 049 *Figure Studies for the Adoration of the Magi*

Leadpoint reworked with pen and brown ink  
About 1480–1481

The figure of the young man in the top left, pointing out the scene to the viewer, was made in preparation for the figure on the far right of the painting, and is believed by some art historians to be a self-portrait of Leonardo.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2258

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 050 *Figure Studies and Decorative Elements*

Leadpoint reworked with pen and brown ink  
About 1480–1481

The figures in conversation and the man hammering a nail have been linked to some of the figures in the *Adoration of the Magi*. The purpose of the other studies is unknown.

Musée Bonnat-Helleu, Bayonne, inv. 660

## 051 Infrared reflectogram

of *The Adoration of the Magi*

by Leonardo da Vinci

Oil on panel. 1480–1482

Uffizi Gallery, Florence

*The Adoration of the Magi* is held in the Uffizi Gallery in Florence. Its reflectogram reveals the extraordinary freedom of Leonardo's 'intuitive' compositional technique. The endless superimposition of ideas transforms the crowd present at the 'manifestation of Christ to the world' into swirling, chaotic darkness. Leonardo never finished the *Adoration*, but the same prodigious inventiveness inspired many of the great compositions of his later career.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 052 *Compositional Study for* The Adoration of the Magi

Leadpoint reworked with pen and brown ink

About 1480–1481

This first version of the composition of Leonardo's *Adoration* is held in the Louvre. It established the position of the Virgin and Child in the centre, breaking with the tradition that placed them to one side.

Department of Prints and Drawings, Musée du Louvre, Paris, RF 1976

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **053** *Perspective Study for The Adoration of the Magi*

Metalpoint, pen and brown ink, brown wash, heightened with white, on cream prepared paper  
About 1480–1481

The large portico structure has moved to the left, the ruins of a temple have appeared on the right, and Leonardo has connected the two buildings with a vast roof.

Gabinetto Disegni e Stampe degli Uffizi, Florence, inv. 436 E

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **054** *Studies of Two Horsemen and a Standing Figure for The Adoration of the Magi*

Metalpoint reworked with pen and brown ink  
About 1480–1481

Leonardo transferred this study to the background of *The Adoration of the Magi*, to the left of the fighting horsemen. The horse on the right, visible in the infrared reflectogram, was covered by the trunk of the tree growing on the rock behind the Virgin and Child.

The Fitzwilliam Museum, Cambridge, inv. PD. 121-1961

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 055 *Studies of a Horseman Fighting a Dragon*

Pen and brown ink, wash  
About 1480–1481

The scene evokes Saint George fighting the dragon, but this horseman is identical to the one in the fighting scene in the background of *The Adoration of the Magi*. It may have been an idea for the painting that was abandoned, or another project that was finally reused for the altarpiece in the church of San Donato in Scopeto.

The British Museum, London, inv. 1952, 1011.2

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# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 056 *The Penitent Saint Jerome*

Oil on walnut panel  
About 1480–1482

The original destination of this painting is unknown. Saint Jerome is depicted in the wilderness of the Holy Land where, tormented by visions of temptation, he mortifies his flesh while gazing at a crucifix. The lion that he helped by removing a thorn from its paw sits in front of him. The absolute freedom Leonardo allowed himself when painting often resulted in him leaving works unfinished.

Pinacoteca Vaticana, Vatican, inv. 337

## 057 Infrared reflectogram

of *The Penitent Saint Jerome*  
by Leonardo da Vinci

Oil on walnut panel. About 1480–1482  
Vatican Museums, Pinacoteca Vaticana, Vatican

The reflectogram shows that Leonardo began by drawing Saint Jerome as a nude figure before partially covering him with a cloak. It also reveals the violent treatment to which the painting was subjected in the first half of the 19th century: the saint's head was cut out – probably to be sold – before finally being reinserted into the panel.

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The *Virgin of the Rocks* was commissioned from Leonardo and the de Predis brothers for the chapel of the Immaculate Conception in the Franciscan church of San Francesco Grande in Milan, on 25 April 1483. The scene was to be part of a carved altarpiece, but a financial dispute arose between the artists and their patrons. The work was then sold to a buyer for whom Leonardo modified the angel's pose, turning the figure to point at John the Baptist while looking at the viewer. The National Gallery in London holds a second version of this painting.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 058 *The Virgin and Child with Saint John the Baptist and an Angel*, known as *the Virgin of the Rocks*

Oil on panel, transferred to canvas  
About 1483–1494

Department of Paintings, Musée du Louvre, Paris, INV. 777

## 059 Infrared reflectogram

*of The Virgin and Child with Saint John the Baptist and an Angel, known as the Virgin of the Rocks by Leonardo da Vinci*

Oil on panel, transferred to canvas. About 1483–1494

The reflectogram of the *Virgin of the Rocks* highlights a signature characteristic of Leonardo's paintings: the artist was never satisfied with the preparatory drawings he transferred onto panel – he reworked them constantly. In this case, he modified John the Baptist's position and Jesus's gesture of blessing. It is also interesting to see the final change made to the figure of the angel; the original position of the head in the reflectogram was transferred exactly onto the *Head of a Young Woman*, now held in the Biblioteca Reale in Turin.

Department of Paintings, Musée du Louvre, Paris, INV. 777

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 060 *Compositional Studies for the Virgin of the Rocks*

Metalpoint reworked with pen and brown ink  
on pink prepared paper  
About 1483–1485

These studies show Leonardo's various ideas for a figure of Mary adoring the Infant Jesus, sometimes accompanied by John the Baptist.

The Metropolitan Museum of Art, New York, inv. 1917.17.142.1

# Workshop of Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 061 *Head of Saint John the Baptist*

Silverpoint, pen and brown ink and wash,  
highlighted with white on beige prepared paper  
About 1485–1490

This head corresponds exactly to that of John the Baptist in the *Virgin of the Rocks*. Recent laboratory tests have shown that the initial silverpoint drawing featured right-handed, then superimposed left-handed, hatching. The head was probably copied in Leonardo's workshop from the preparatory cartoon for the *Virgin of the Rocks*, then reworked by another artist.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2347

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# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 062 *Study for the Face of the Angel in the Virgin of the Rocks*

Metalpoint highlighted with white on ochre prepared  
paper  
About 1490–1494

In the early 1490s, when the *Virgin of the Rocks* was due to be delivered, there was a dispute over the final valuation of the painting. As a result, the work was sold to another buyer, and the angel was altered to focus attention on John the Baptist. Leonardo's study of a woman's face for the new version of the angel is one of the finest existing examples of the art of drawing. The original position of the head, visible in the reflectogram, can be seen here inside the contour of the face.

Biblioteca Reale, Turin, inv. 15572

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 063 *Portrait of a Young Man Holding a Musical Score*, known as *The Musician*

Oil on walnut panel

About 1483–1490

During his first stay in Milan, Leonardo painted at least three portraits with the dark background that corresponded to the Lombard portrait tradition, but he introduced the more natural and dynamic three-quarter pose instead of the usual strict profile view. The identity of this pensive-looking sitter is unknown, but the sheet of music suggests that he was a musician – perhaps Franchino Gaffurio, Josquin des Prez or Atalante Migliorotti. Another possibility is that this unfinished work is a self-portrait of Leonardo.

Pinacoteca Ambrosiana, Milan, inv. 99

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## 64 **Infrared reflectogram**

of the *Portrait of a Young Man Holding a Musical Score*, known as *The Musician*, by Leonardo da Vinci

Oil on walnut panel. About 1483–1490

The reflectogram of *The Musician* shows the structure of the sitter's costume, which is very dark in the painting. It also reveals some first ideas, drawn in brushstrokes. It is worth noting that the musical score was painted onto the costume, which suggests that it was not part of the original image and that the sitter may not have been a musician. The allusion to music may have had a symbolic or emblematic meaning.

## Antonello da MESSINA

Messina, about 1430–Messina, 1479

### 065 *Portrait of a Man*, known as *The Condottiere*

Oil on poplar panel

Signed and dated on the label fixed to the parapet: 1475

In 1475, Sforza Maria Sforza, brother of Duke Galeazzo Maria Sforza, returned from Venice with a portrait by Antonello da Messina; it was formerly suggested that this portrait was the one in question, but there is no evidence of this. The painter was invited to Milan, but declined the invitation. Nonetheless, Leonardo certainly had opportunities to admire da Messina's portraits with their tight framing, powerful expressiveness, and the sharp realism made possible by the use of oil – aspects he developed in his portrait of *The Musician*.

Department of Paintings, Musée du Louvre, Paris, MI 598

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### 066 **Infrared reflectogram** of the *Portrait of Cecilia Gallerani*, known as *Lady with an Ermine*, by Leonardo da Vinci

Oil on walnut panel. About 1485–1490

National Museum, Krakow

This portrait depicts Cecilia Gallerani, who was the lover of the Duke of Milan Ludovico il Moro. The ermine she holds symbolises moderation, gentleness and courtesy. The infrared reflectogram allows us to see the initial brush-painted outlines of her dress, the changes made to the sleeves and the subtlety of the transitions from light to shade.

© Courtesy of the National Museum in Krakow / Image acquired in the Laboratory of Analysis and Non-Destructive Investigation of Heritage Objects / Authors: Piotr Frączek and Michał Obarzanowski

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 067 *Portrait of a Lady from the Court of Milan*, known as *La Belle Ferronnière*

Oil on walnut panel  
About 1490–1497

This portrait was wrongly associated by Ingres with the name of a mistress of the French king François I. The sitter has been identified by art historians as Beatrice d'Este (Ludovico il Moro's wife), Lucrezia Crivelli (his mistress in 1495), or Isabella of Aragon, wife of the rightful Duke of Milan Gian Galeazzo Sforza. This work by Leonardo revolutionised the female portrait genre, introducing dynamic movement, more accurately rendered articulations and an elusive gaze while conveying an impression of intelligence, willpower and, above all, consciousness.

Department of Paintings, Musée du Louvre, Paris, MI 598

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## 068 **Infrared reflectogram** of the *Portrait of a Lady from the Court of Milan*, known as *La Belle Ferronnière*, by Leonardo da Vinci

Oil on walnut panel. About 1483–1490  
Musée du Louvre, Paris

The reflectogram reveals alterations (pentimenti) to the sitter's outfit and necklace. The face is fuller here than in the final version, in which it is sculpted by the chiaroscuro of Leonardo's *sfumato* technique. The rough sketch of the (probably unfinished) parapet is also visible.

© C2RMF / Elsa Lambert

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 069 *Studies of Hands*

Charcoal and metalpoint heightened with white  
About 1485–1492

Art critics do not agree on the date and purpose of this magnificent study of hands, which appear to hold a flowered branch. Although it is often associated with the *Portrait of Ginevra de' Benci* from the 1470s, the expert use of the metalpoint technique would suggest the early 1490s and a possible connection with the *Portrait of Cecilia Gallerani*, the *Lady with an Ermine*.

Windsor, The Royal Collection, RL 12558, loaned by Her Majesty Queen Elizabeth II

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## Gian Cristoforo Ganti, known as Gian Cristoforo Romano

Rome, 1465–Lorette, 1512

## 070 *Beatrice d'Este*

Marble  
About 1489–1490

This bust may have been made shortly before the wedding of Beatrice d'Este and Ludovico il Moro in January 1491. The inscription on the base refers to the 'divine Beatrice', daughter of the Duke of Ferrara. Her dress is decorated with the intertwined emblems of the two families: a diamond ring wound about with leaves for the Este family, and a *buratto* (a sieve held by two divine hands) for the Sforzas.

Department of Sculptures, Musée du Louvre, Paris, ML 10

# THE MILAN YEARS

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While at the Milanese court of Duke Ludovico Sforza – also known as Ludovico Il Moro ('the Moor') – Leonardo turned his skills to court entertainment. He invented mottos, designed emblems and, to celebrate the wedding of Isabella of Aragon and Ludovico's nephew Gian Galeazzo Sforza, created the stage set for a pageant called the *Festa del Paradiso* ('The Feast of Paradise'), written by the poet Bernardo Bellincioni. He also designed a huge equestrian statue in honour of Francesco Sforza, founder of the dynasty, for which he made a clay model of the horse. During the last decade of the century, he was commissioned by Ludovico to paint a *Last Supper* for the refectory in the Dominican convent of Santa Maria delle Grazie in Milan.

Leonardo's workshop was joined by two outstanding artists and painters, Marco d'Oggiono and Giovanni Antonio Boltraffio. Inspired by works such as the *Lady with an Ermine* and *La Belle Ferronnière*, they developed a magnificent style of court portraiture that broke with the Milanese tradition, preserving the black background but replacing the profile view with the more animated three-quarter pose.

On 6 September 1499, the troops of Louis XII of France occupied Milan following the flight of Ludovico Sforza; Leonardo left the city at the end of the same year. Louis XII ruled the duchy of Milan until 1513.

# Leonardo da Vinci Vinci

1452–Amboise, 1519

## 071 *Allegory with Solar Mirror*

Pen and brown ink

About 1485–1490

In a rocky setting overhung by trees, a seated man holds a mirror with which he directs the sun's rays towards the left, where six (mostly fantastical) animals are fighting. This allegory probably has a moral meaning: the virtuous man shines the light of the sun (a symbol of truth) onto the animals (representing the vices).

Department of Prints and Drawings, Musée du Louvre, Paris, Inv. 2247

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# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 072 *Allegory in Honour of Duke Ludovico il Moro (?)*

Red chalk reworked in pen and brown ink

About 1490–1495

The man in the centre, with glasses in his hand, is aided by a person behind him as he points to a fleeing figure; the latter holds out a cloth featuring a bird pierced by an arrow. At the bottom of the sheet is a fragmentary inscription: ... *fleeing as the envious man, having spread dishonest calumny, cannot withstand confrontation...*

Some of Leonardo's writings suggest that this work could depict Ludovico il Moro, aided by Justice as he drives out Envy.

Musée Bonnat, Bayonne, Inv. 656

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 073 *Allegory on the Fidelity of the Lizard*

Pen and brown ink

About 1496

A man has fallen asleep under a tree; on the rock he is using as a pillow, a lizard confronts a snake. An inscription at the top of the composition explains the scene: the lizard is loyal to the sleeping man, but cannot defeat the snake; it therefore jumps onto the man's face to wake him before the snake can attack. The purpose of Leonardo's allegorical drawings is unknown.

The Metropolitan Museum of Art, New York, inv. 17.142.2

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## Attributed to Marco d'OGGIONO

Oggiono (?), about 1470–Milan, 1524

## 074 *Portrait of a Young Man*

Oil on walnut panel

Dated 1494

The composition of this portrait, the sitter's slightly twisted pose and his melancholy expression were undoubtedly inspired by Leonardo's modifications to the conventions of Milanese portraiture. The work is attributed to Marco d'Oggiono, who started training at Leonardo's workshop in 1490. The monogram on the scroll can be read as MAR F – MARCUS FECIT ('Marcus made this').

The National Gallery, London, NG 1665

## Attributed to Giovanni Antonio BOLTRAFFIO

Milan, 1467–Milan, 1516

### 075 *Portrait of a Man*

Oil on panel  
About 1490–1492

The attribution of this portrait is still disputed, but it could be the work of Boltraffio, the most gifted of Leonardo's pupils and collaborators in the early 1490s. It was evidently inspired by *The Musician*. In the top left is a sentence from the essay *On the Shortness of Life* by Roman philosopher Seneca: 'Life is long if you know how to use it.'

Pinacoteca di Brera, Milan, Reg. cron. 2123

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## Attributed to Marco d'OGGIONO

Oggiono (?), about 1470–Milan, 1524

### 076 *Young Girl Crowned with Flowers, Holding a Bowl of Fruit*

Oil on panel  
About 1490–1494

The sitter's pose recalls that of the *Lady with an Ermine*. Rather than a portrait, this could be an allegory of perfect beauty. The young woman has been identified as Pomona (the goddess of orchards and fruit) or a courtesan with a knowing smile, but she could also represent an allegory of a virtue.

The Metropolitan Museum of Art, New York, inv. 91.26.5

## Giovanni Antonio BOLTRAFFIO

Milan, 1467–Milan, 1516

### **077** *Young Girl Crowned with Flowers*

Oil on walnut panel

About 1494–1496

Art historians are uncertain of the sitter's gender, but the costume is definitely that of a girl. The sitter has sometimes been identified as a five or six-year-old girl from the court of Milan; it could be the Duke Gian Galeazzo Sforza's second daughter Bona, born in 1493.

North Carolina Museum of Art, Raleigh, inv. Kress 2190

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## Attributed to Marco d'Oggiono

Oggiono (?), about 1470–Milan, 1524

### **078** *Young Man Holding an Arrow*

Oil on panel

About 1490–1494

Several paintings by members of Leonardo's circle depict a young man in contemporary costume holding an arrow. The presence of a halo suggests Saint Sebastian, but the portraits without halos could be allegorical figures whose arrows, evoking Apollo or Eros, allude to the wounds of love.

Cleveland Museum of Art, Cleveland, inv. 1986.9

## Giovanni Antonio BOLTRAFFIO

Milan, 1467–Milan, 1516

### **079** *Young Man Holding an Arrow*

Oil on panel, transferred to canvas

About 1494–1498

This youth with a halo resembles a Saint Sebastian. His ornate contemporary costume is decorated with specific motifs: the golden lilies recall the emblem of France, while the pendant with a porcupine evokes the French Order of the Porcupine or the emblem of Louis XII. The position of his right hand inside his cloak, near his heart, has sometimes been interpreted as an allusion to the wounds of love, symbolised by the arrow.

Pushkin Museum, Moscow, inv. 2667

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## Attributed to Marco d'OGGIONO

Oggiono (?), about 1470–Milan, 1524

### **080** *Portrait of a Child*

Oil on panel, transferred to canvas

About 1492–1495

The sitter has been variously identified as: Massimiliano Sforza, the oldest son of Ludovico il Moro, born in 1493; his second son Francesco, born in 1495; or another Francesco, the son of Duke Gian Galeazzo, born in 1491. The composition, evidently inspired by Leonardo's innovations, shows the child leaning on a parapet; the goldfinch he holds so tightly in his hand has sometimes been interpreted as a symbol of his early death.

Bristol Museum and Art Gallery, Bristol, inv. K 1653

# 3.

# SCIENCE

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For a person with extraordinary analytical vision, *drawing* is more than the mere reproduction of forms; it is also an expression of relationships between forms or, to put it differently, an act of *thinking*. In Leonardo's case, this intelligence was self-aware. Moreover, it was accompanied by a constant questioning of the world – an insatiable need to understand, which became a desire to demonstrate, then a systematic investigation of every aspect of the physical world.

The result was a vast compilation of notes, studies, experiments, reflections and theories in which writing and drawing were inextricably linked; this body of work, though often wandering and imperfect, nonetheless represents one of the most fascinating chapters in the history of natural philosophy.

The comprehensive nature of Leonardo's quest for knowledge stemmed from the fact that he was no longer content to study appearances; in order to convey their truth, he needed an understanding of phenomena from the inside – an awareness of the laws that govern them which, like Pythagoras and Plato before him, he regarded as fundamentally mathematical in nature.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 081 *A Sheet of Miscellaneous Studies*

Stylus, compass, red chalk, pen and brown ink on paper  
About 1490

The large study sheet from the *Codex Windsor* is symbolic of the extent of Leonardo's intellectual and artistic interest in science. It is centred on the construction of the curvilinear triangle but freely superimposes a wide range of subjects – geometry, botany, meteorology, technology – together with figure studies, reflecting the profound unity of the artist's world.

The Royal Collection, Windsor, RL 12283, loaned by Her Majesty Queen Elizabeth II

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 082 *Meteorology and Zoology*

Left-hand page: *The Wind and Clouds*

Right-hand page: *The Fly*

Pen and brown ink on paper  
About 1510–1511/1515

On the left-hand page, Leonardo studies the various ways in which clouds react to the wind. He shows, for example, that when two opposing winds blow two clouds towards each other, they combine to form a third. On the right-hand page, he studies the flight of a fly.

Institut de France, Paris, Manuscript G, fol. 91v–92r

Ancient scholars developed two conflicting theories of vision. According to the *emission* theory, rays of light were emitted by the eyes themselves, while the *intromission* theory claimed that light entered the eye after being reflected from other objects. The latter theory was supported by the medieval Arab scientist Alhazen (965–1040), on whose findings Leonardo based his own optical experiments.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 083 *Optics: Studies on the Physiology of the Eye* Left-hand page: *Experiments with the Crystalline Lens* Right-hand page: *Binocular Vision*

Black chalk, pen and brown ink on paper  
About 1508–1509

Leonardo carefully studied the anatomical structure of the eye and experimented with the theory of a double inversion that would correct the image reversed by the crystalline lens. For the experiment recorded in *Manuscript D*, he used a glass sphere filled with water to reproduce the lens.

Paris, Institut de France, Manuscript D, fol. 3v–4r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 084 *Optics* Left-hand page: *Shadows Projected onto a Screen* Right-hand page: *Gradations of Penumbra*

Pen and brown ink on paper  
About 1490–1491

On the left-hand page, Leonardo studies the shapes of shadows projected onto a screen by objects illuminated by light sources of different shapes. On the right-hand page, he analyses the gradations from penumbra to pure shade produced by two opaque spheres illuminated by two spherical light sources.

Institut de France, Paris, Manuscript C, fol. 18v–19r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 085 *Optics: Study of Shadows*

Pen and brown ink on paper  
About 1490–1492

The study of shadows – in this instance, the shadows created by a sphere illuminated through a large slit – was a recurrent feature of Leonardo's scientific activity.

Institut de France, Paris, Manuscript A bis, fol. 13v–14r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 086 *Optics: Reflection of a Parallel Beam on a Spherical Mirror; Convergence of Rays Near the Optical Axis; Construction of the Caustic Curve*

Pen and brown ink on paper  
About 1503–1506

These four pages from the *Codex Arundel* show Leonardo's remarkable diagrams of the reflection on a spherical mirror of a parallel beam whose intersecting rays generate a curve known as the *caustic*.

The British Library, London, Codex Arundel 263, fol. 86v–87r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 087 *Optics: Reflection of a Parallel Beam on a Spherical Mirror; Construction of the Caustic Curve*

Pen and brown ink on paper  
About 1503–1506

The British Library, London, Codex Arundel 263, fol. 87v–86r.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 088 *Hydrology and Astronomy* Left-hand page: *The Presence of Water on the Moon; the Nature of Waves* Right-hand page: *The Sun Seen from the Earth; the Moon Seen from the Earth; the Waves of the Sea Reflecting the Sun's Light on the Moon's Surface*

Pen and brown ink on paper  
About 1506–1510

The *Codex Leicester*, now in the collection of the Bill and Melinda Gates Foundation, deals with physics and the mechanics of water – one of the four elements (together with fire, earth and air) that compose the universe. It contains Leonardo's theories on the role of water in the formation and geological evolution of the Earth. Believing the Moon to be a non-luminous body, he supposed that the light of the sun was reflected on its surface by stretches of rippling water.

Bill and Melinda Gates Collection, Seattle, Codex Leicester, fol. 36v–1r

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 089 *Hydrology and astronomy*

Left-hand page: *The Physics of the Earth: Comparison of the Volumes of the Elements; Determination of the Centre of Gravity*

Right-hand page: *The Moon Composed of the Four Elements; Relationship between the Sun, Earth and Moon at the Moon's First Quarter; Ashen Light as a Reflection of Sunlight on the Earth's Seas.*

Pen and brown ink on paper  
About 1506–1510

Leonardo is thought to have been the first to explain the phenomenon of *ashen light*. At the Moon's first quarter, the full globe of the Moon is visible as a grey shadow against the night sky. Leonardo claimed that this resulted from the reflection of sunlight on the Earth's seas.

Bill and Melinda Gates Collection, Seattle, Codex Leicester, fol. 35v–2r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 090 *Optics: the Reflection of the Sun on the Waves*

Pen and brown ink

About 1505

Leonardo was particularly interested in the reflection of light rays on a wavy surface. On this page from the *Codex Atlanticus*, he attempts to show the reflection of the sun on the waves of the sea.

Veneranda Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 555v

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 091 *Rock Stratification*

Pen and brown ink

About 1475–1480

In this drawing, which has been linked with the first version of the *Virgin of the Rocks*, Leonardo studies the geological strata of a cliff with a calm river flowing at its foot. Leonardo used a variety of lithological formations in his landscapes, including that of the *Saint Jerome* and the *Saint Anne*.

The Royal Collection, Windsor, RL 12395, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 092 *Mountains*

Red chalk heightened with white on orange-red prepared paper

About 1508–1513 (?)

While designing the landscape for his painting of *Saint Anne*, Leonardo, who had returned to Milan in 1506, made several studies of the Alps. This particular period in his drawing is characterised by the use of red chalk with stumping, heightened with white on red paper; this enabled him to create some very subtle light transitions, transposed into paint with skilful blends of lapis lazuli and lead white.

The Royal Collection, Windsor, RL 12410, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 093 *Botany: the Growth of Trees*

Pen and brown ink

About 1496–1497

From his observation of the growth of trees, Leonardo inferred a law according to which *all the branches of a tree, at every stage of its height, when put together are equal in thickness to the trunk*. In the late 20th century, the mathematician Benoît Mandelbrot coined the word 'fractal' to describe the kind of phenomenon observed by Leonardo, in which the same pattern is repeated over and over.

Institut de France, Paris, Manuscript M, fol. 78v–79r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 094 *Trees at the Edge of a Field*

Red chalk

#### *Verso: An Isolated Tree*

Red chalk

About 1500–1505

On this sheet, Leonardo studies the effect of light on an indistinct group of trees, where the tones and colour vary according to the density and movement of the foliage; on the verso, he observes the effect of light on an isolated tree. This kind of study probably served for the artist's depiction of a tree in his painting of *Saint Anne*.

The Royal Collection, Windsor, RL 12431r–v, loaned by Her Majesty Queen Elizabeth II

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 095 *Botany: a Branch of Blackberry*

Red and white chalk on orange-red prepared paper

About 1505–1510

The Royal Collection, Windsor, RL 12419, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 096 *Botany: Star of Bethlehem; Wood Anemone; Sun Spurge*

Pen and brown ink, red chalk  
About 1505–1510

The *ornithogalum umbellatum* (or Star of Bethlehem) on this sheet from the *Codex Windsor* appears in certain copies of *Leda*.

The Royal Collection, Windsor, RL 12424, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 097 *Fluid mechanics* Left-hand page: *The Phenomena of Whirlpools* Right-hand page: *The Interference of Circular Waves*

Pen and brown ink  
About 1490–1492

On these two pages from Manuscript A, Leonardo attempts to analyse the spirals of whirlpools and the interference of two circular waves on the surface of still water.

Institut de France, Paris, Manuscript A, fol. 60v–61r.

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 098 *Fluid Mechanics*

Left-hand page: *Water Gushing from a Duct; Turbulence inside a Pipe*

Right-hand page: *Turbulence Caused by Different Obstacles on Fluid Flow*

Pen and brown ink

About 1508

These two famous pages from *Manuscript F* show the forms water takes as it gushes from a duct and the turbulence created when its flow is blocked by an obstacle. In the text, Leonardo attempts to define the observed phenomenon by giving it a name; with the term *panniculata*, he compares the configuration of the fluid to the structure of a draped fabric.

Institut de France, Paris, Manuscript F, fol. 47–48 r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **099** *Anatomy: the Cranium Sectioned*

Pen, brown ink and brown wash on paper

Verso: *The skull sectioned; Teeth*

Pen, brown ink and brown wash on paper

1489

The famous studies of a sectioned skull in the *Codex Windsor* date from the beginning of Leonardo's anatomical research. The observation is imperfect and some elements, particularly the teeth, are still represented conventionally. The innovation lies in the use of a drawing style evoking technological or architectural design, with a plan, elevation and cross section.

The Royal Collection, Windsor, RL 19058 r–v, loaned by Her Majesty Queen Elizabeth II

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **100** *Study of the Proportions of the Human Body*

Metalpoint, pen and brown ink on white prepared paper  
About 1489–1490

The two studies of the proportions of the head and eye from the Royal Library of Turin attest to a still very classical approach to the structure of the human body.

Biblioteca Reale, Turin, inv. 15574–76

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## **101** *Anatomy: Studies of the Bones of the Leg and Foot, the Knee Joint, the Muscles of the Leg and the Bending Mechanism of the Leg*

*Verso: Studies of the Muscles of the Neck, Four Studies of the Muscles of the Neck, Shoulder, Arm, the Pectoral Muscles, Geometrical Diagram of the Rotation of the Arm*

Black chalk, pen, brown ink and brown wash on paper  
About 1510–1511

Leonardo's magnificent studies of osteology and myology in the *Codex Windsor* date from his collaboration with the anatomist Marcantonio della Torre. His drawing became more systematic through the representational technique he perfected over a period of twenty years, with logical classification and multiple views positioned around the object.

The Royal Collection, Windsor, RL 19008 r–v, loaned by Her Majesty Queen Elizabeth II

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 102 *Vitruvian Man*

Metalpoint, pen and brown ink, brown wash on white prepared paper  
About 1489–1490

During the course of his research on the mathematical and geometrical principles that govern living beings, Leonardo studied the third book of the Roman architectural theorist Vitruvius, in which the author describes how the human body could fit inside a circle and a square. Following after many others, Leonardo drew a version of the man Vitruvius had described in this famous passage. Unlike Vitruvius, he described the figure's relationship to the circle and the square, and went on to correct the architect's abstract values in the light of his own anthropological findings. According to Vitruvius, the length of the foot was one sixth of the height of the body; for Leonardo, it was one seventh.

Gallerie dell'Accademia, Venice, inv.228

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# Leonardo da Vinci

Vinci, 1452–Amboise, 1519

## 103 *Zoology: Bear*

Metalpoint on pale pink prepared paper  
About 1482–1485

The Metropolitan Museum of Art, New York, Lehman Collection, inv. 1975.1.369

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **104** *Zoology: Study of a Dog's Paw*

Metalpoint on pale pink prepared paper  
About 1490–1495

The National Gallery of Scotland, Edinburgh, inv. D 5189

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **105** *Study of a Goat*

Pen and brown ink  
About 1490

Musée du Louvre, Paris, inv. 2638

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **106** Left-hand page: *Ornamental Motifs* Right-hand page: *Head of a Dog,* *Study of Proportions*

Red chalk, partially reworked with pen and brown ink  
About 1497–1499

Institut de France, Paris, Manuscript I, fol. 47v–48r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **107** *Ornithology and Fluid Mechanics; the Flight* *of Birds with and against the Wind*

Pen and brown ink  
About 1513–1514

Leonardo's ornithological studies are remarkably modern in that they explore the kinematics (motion) of bird flight in relation to the physical parameters of the wind – in this case, the upward currents caused by the presence of cliffs at the sea's edge.

Institut de France, Paris, Manuscript E, fol. 42v–43r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **108** *Ornithology and Fluid Mechanics; the Flight of Birds with and against the Wind*

Black chalk, pen and brown ink  
About 1505

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 845r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **109** *The Division of Fractions by Fractions*

Pen and brown ink  
About 1497–1502/1504

Leonardo's calculation errors are well known, but he also had conceptual difficulties with mathematics. On this page from *Manuscript M*, he contests the rule for dividing a fraction by a fraction ( $2/3 \div 3/4 = 8/9$ ) on the grounds that, as it is divided, the result should be smaller. But  $8/9$  is larger than  $2/3$  ...

Institut de France, Paris, Ms L, folio 10v and folio 11r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **110** *Doubling the Cube; an Empirical Solution*

Pen and brown ink

About 1505

Doubling the cube was one of the classical problems of geometry. Given a cube  $A$  with an edge length  $a$ , the edge length  $b$  of cube  $B$  needs to be determined so that the volume of  $B$  is double the volume of  $A$  – which amounts to determining the *cubic root of 2*. Leonardo found a close solution. Cube  $A$ : edge length 4, volume 64, double volume 128. Cube  $B$ : edge length very slightly greater than 5, volume slightly greater than 125.

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 161R

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **111** *Doubling the Cube; the Theorems of Hippocrates of Chios and Apollonius of Perga*

Pen and brown ink

About 1505

The Greek mathematician Hippocrates of Chios demonstrated that the equation for doubling the cube amounted to finding two values,  $b$  and  $c$ , between  $a$  and  $2a$ , so that  $a/b = b/c = c/2a$ . Great Greek mathematicians such as Apollonius, the author of *Conics* (which Leonardo reused – and contested! – here), proposed various geometrical (rather than canonical) methods for finding these values, using only a straightedge and compass.

Biblioteca Ambrosiana, Milan, Codex Atlanticus

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **112** *Squaring the Lune; Various Attempts at Squaring*

Pen and brown ink  
About 1505

The term *squaring* refers to the construction, with a straightedge and compass, of a square with the same surface area as a given figure. Squaring is the very basis of the calculation of surfaces, as any polygon can be reduced to a square; but the squaring of curvilinear figures poses infinitely complex problems. The Greek mathematician Hippocrates of Chios succeeded in squaring the *lune* (a figure bounded by two circular arcs of different radii).

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 389r.

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **113** *Various Attempts at Doubling the Cube. The Extension of the Pythagorean Theorem to the Power of 3. Attempt at the Geometrical Construction of Square Roots from 1 to 9*

Pen and brown ink  
About 1505

Here again, Leonardo endeavours to double the cube by various means – including applying the Pythagorean theorem to volumes rather than surface areas.

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 428R

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **114** *Squaring the Annulus of a Circle; Various Attempts at Squaring*

Pen and brown ink  
About 1505

His whole life long, Leonardo dreamed of squaring the circle. In the late 19th century, Ferdinand von Lindemann proved that the 'true squaring' of the circle was impossible using the Greek geometrical tools (straightedge and compass), due to the nature of  $\pi$ . Here, Leonardo attempts to square the *annulus* – the area between two concentric circles.

Biblioteca Ambrosiana, Milan, Codex Atlanticus, folio 640 recto

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **115** *Compasses, Squaring and Other Operations*

Pen and brown ink  
About 1513–1516

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 696R

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **116** *Compasses, Various Devices and Considerations*

Red chalk

About 1493–1494

Institut de France, Paris, Manuscript H, fol.108v–109r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **117** *The Euclidean Proof of the Pythagorean Theorem*

Pen and brown ink

About 1503–1507

This figure from *Manuscript K* corresponds to Euclid's demonstration, in Proposition 47 of his first book of the *Elements*, of the most famous theorem of all – that of Pythagoras – according to which, in a right-angled triangle, the square on the side opposite the right angle is equal to the sum of the squares on the other two sides:  $BC^2 = AB^2 + AC^2$ .

Institut de France, Paris, Manuscript K, fol. 14v–15r

## Luca PACIOLI

Sansepolcro, 1447–Sansepolcro, 1517

### 118 *The Construction of an Icosahedron from Twenty Equilateral triangles*

Pen and brown ink on vellum  
Completed in 1498

In 1498, in Milan, Leonardo's close friend and collaborator Luca Pacioli wrote the *Divine Proportion*, in which he deals with the Euclidean 'division of a line in mean and extreme ratio'; this principle, known as the 'golden section' since the 19th century, consists of dividing a given line into two parts ( $a$  and  $b$ ), in such a way that,  $a$  being greater than  $b$ ,  $a/b = (a + b)/a$ .

This proportion is used to construct the icosahedron and the dodecahedron – two of the regular polyhedrons considered by Plato, in the *Timaeus*, to be structural components of the universe

University of Geneva Library, Geneva, Manuscript I. e. 210, fol. 33v–34r

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## Luca PACIOLI

Sansepolcro, 1447–Sansepolcro, 1517

### 119 *The Construction of a Dodecahedron from Twelve Regular Pentagons*

Pen and brown ink on vellum  
1498

In 1498, in Milan, Leonardo's close friend and collaborator Luca Pacioli wrote the *Divine Proportion*, in which he deals with the Euclidean 'division of a line in mean and extreme ratio'; this principle, known as the 'golden section' since the 19th century, consists of dividing a given line into two parts ( $a$  and  $b$ ), in such a way that,  $a$  being greater than  $b$ ,  $a/b = (a + b)/a$ . This proportion is used to construct the icosahedron and the dodecahedron – two of the regular polyhedrons considered by Plato, in the *Timaeus*, to be structural components of the universe

University of Geneva Library, Geneva, Manuscript I. e. 210, fol. 37v–38r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **120** *Plans and Elevations of Domed Churches*

Pen and brown ink  
1487–1489

As far as we know, Leonardo never built anything himself, but architecture was a prodigious aspect of his constant drawing. *Manuscripts B* and *B bis* (now in the Institut de France) feature a magnificent series of plans, cross sections and elevations of central-plan domed churches.

Institut de France, Paris, Manuscript B bis, fol. 3v–4r

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **121** *Architectural Study: Fortifications; Multi-Spiral Staircase*

Pen and brown ink  
1483–1499

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2282

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **122** *Archaeological Reconstruction of the Etruscan Tomb of Montecalvario at Castellina in Chianti, near Siena*

Black chalk, pen, brown ink and brown wash on paper  
About 1507

In 1507, the remains of an Etruscan tomb were discovered by chance at the Montecalvario site near Castellina in Chianti. The drawing in the Louvre is traditionally associated with this discovery, as it seems to show the archaeological reconstruction.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2386

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **123** *Technology* Left-hand page: *Tank; Helicopter* Left-hand page: *Ornithopter*

Pen and brown ink  
About 1487–1489

These sheets (once separated by a number of missing pages) are among the most famous in Leonardo's corpus of technological drawings. The design for the 'ornithopter' on the right is based on biomimicry (the imitation of nature's designs) – in this case, on the flight of birds. The ornithopter requires a human being to make its wings flap, but the 'helicopter' on the left has a starched linen screw, stretched over an iron spiral, which is supposed to *rise in the air if turned quickly...*

Institut de France, Paris, Manuscript B, fol. 83v and 88r



# 4.

# LIFE

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Leonardo's rigorous scientific approach encompassed every field of knowledge, engendering an endless, multifaceted labyrinth in which the painter seems to have ultimately lost his way. This disappearance is illusory, however, as it was science itself that gave the artist the freedom to master shade, light, space and movement. In his painting, the turbulence of *componimento inculto* gave way to the *sfumato* technique – a merging of forms and eradication of boundaries made possible by the revolutionary medium of oil. The freedom acquired through knowledge of the natural sciences elevated painting to the status of a divine science able to recreate the world and, most importantly, convey movement – the essence of life and the defining characteristic of every living creature.

These years of scientific inquiry, when Leonardo painted the *Last Supper*, *Saint Anne*, the *Mona Lisa*, *The Battle of Anghiari*, and *Saint John the Baptist*, saw the dawn of the modern style.

Ludovico il Moro commissioned Leonardo to paint *The Last Supper* for the refectory in the Dominican convent of Santa Maria delle Grazie in Milan. The artist is known to have been working on this painting in 1497. The twelve Apostles' reactions to Christ's words – *Truly, I say to you, one of you will betray me* – are depicted in a wave-like formation spreading out from the radiating central figure of Christ. *The Last Supper* – the first true manifesto for a modern art capable of imitating the inner movement of life – earned Leonardo worldwide renown.

Leonardo chose a technique based on thin, transparent oil glazes; incompatible with the dampness of the walls, this resulted in the immediate deterioration of *The Last Supper*.

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## **124** *Study for the Apostle James the Greater in The Last Supper; Architectural Study*

Red chalk, pen and brown ink

About 1494–1496

On 30 June 1497, Leonardo was commissioned to produce a painting for the Milanese convent of Santa Maria delle Grazie. The work was to depict the Last Supper – the final meal shared by Jesus and his disciples before the Crucifixion. One of Leonardo's preparatory sketches was this magnificent red chalk study of Saint James the Greater, showing his stunned expression at Christ's announcement of his coming betrayal by one of his disciples. The architectural sketch has been linked to a project for the Castello Sforzesco in Milan.

The Royal Collection, Windsor, RL 12552, loaned by Her Majesty Queen Elizabeth II

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## **125** *Study for the Apostle Bartholomew in The Last Supper*

Red chalk on red prepared paper  
About 1494–1496

Leonardo was making increasing use of red chalk in the early 1490s and many of the sketches related to *The Last Supper* were done in this medium. Saint Bartholomew is shown reacting with calm and dignity to Christ's revelation of his coming betrayal. The highly finished nature of the drawing has caused doubt as to whether it really is one of his works.

Windsor, The Royal Collection, RL 12548, loaned by Her Majesty Queen Elizabeth II

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Attributed to  
Giovanni Antonio BOLTRAFFIO,  
after Leonardo da VINCI

## **126** *Heads of the Apostles in The Last Supper*

Black chalk, pastels  
About 1499–1505

The painting of *The Last Supper* deteriorated during Leonardo's lifetime because his chosen technique was unsuited to the damp refectory wall. The Apostles' expressions at Christ's announcement of his betrayal are only known from old copies. The six heads in the museum of Strasbourg are attributed to Boltraffio, Leonardo's most brilliant pupil in Milan and one of the first Italian painters to use pastel. The other heads in the series are lost.

Musée des Beaux-Arts, Strasbourg, inv. 295

# Marco d'OGGIONO, after Leonardo da VINCI

Oggiono (?), about 1470–Milan, 1524

## **127** *The Last Supper*

Oil on canvas  
1506–1509

The most valued record of the original painting is the copy made by Marco d'Oggiono between 1506 and 1509, while Leonardo was living in Milan.

Department of Paintings, Musée du Louvre, Paris, INV. 781  
(on long-term loan to the Musée National de la Renaissance, Ecouen)

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# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## **128** *Portrait of Isabella d'Este*

Metalpoint, charcoal, red chalk, yellow ochre  
About 1499–1500

The army of Louis XII of France conquered the duchy of Milan in September 1499. Leonardo left Lombardy in December; during his stay in Mantua, he drew a cartoon (full-scale preliminary sketch) for the portrait of the Marchioness Isabella d'Este. As so often, he broke with tradition – this time by conveying a sense that the profile portrait was the result of the sitter's movement rather than a chosen pose. He captured Isabella as if she had just turned around in mid-conversation. Due to water damage, the side and lower edges of the sketch are missing.

Department of Prints and Drawings, Musée du Louvre, Paris, MI 753

## Gian Cristoforo ROMANO

Rome, 1456–Lorette, 1512

### **129** *Portrait Medal of Isabella d'Este*

Bronze

1498

Isabella d'Este (1474–1539), Marchioness of Mantua through her marriage to Francesco II Gonzaga, commissioned a portrait medal in 1495 from the sculptor Gian Cristoforo Romano. Several copies (with variations) were made. The back of the medal shows a winged Victory under the sign of Sagittarius and a star, symbolising Isabella's birth under favourable auspices.

Department of Coins, Medals and Antiquities,  
Bibliothèque Nationale de France, Paris, AV.1749

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## Attributed to Gian Cristoforo ROMANO

Rome, 1456–Lorette, 1512

### **130** *Presumed Portrait of Isabella d'Este, Marchioness of Mantua*

Terracotta, traces of colour

About 1500

This remarkable terracotta bust was originally painted. Although its attribution and the sitter's identity have been called into question, the bust is generally associated with the sketch in the Louvre, due to the striking resemblance between the drawn and sculpted profiles.

Kimbell Art Museum, Fort Worth, inv. AP 2004.01

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 131 *Study of a Man's Head, Presumed Portrait of Cesare Borgia*

Red chalk  
About 1502 (?)

This study of a head is said to depict Cesare Borgia, the son of Pope Alexander VI. Having entered the service of Louis XII of France, he was granted the title of Duc de Valentinois. In the summer of 1502, Leonardo became Cesare's 'architect and general engineer' and followed him for several months on military campaigns in Italy intended to establish a principality in the regions of Romagna and the Marches. The death of Alexander VI in 1503 and the election of Pope Julius II in November of the same year put an end to the power of the Borgias.

Biblioteca Reale, Turin, inv. 15573

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## 132 **Infrared reflectogram** of the *Portrait of Lisa del Giocondo*, known as the *Mona Lisa*, by Leonardo da Vinci

Oil on poplar panel  
About 1503–1519  
Musée du Louvre, Paris

Leonardo began to work on the portrait of Lisa Gherardini, wife of the silk merchant Francesco del Giocondo, in 1503. The infrared reflectogram allows us to see the preparatory underdrawing of the figure, which – in keeping with his later works – is less detailed. It reveals the alterations (*pentimenti*) made to the hands and seat balusters, and offers a clearer image of the painting's arrangement, now obscured by oxidised conservation varnish.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 133 *Grotesque Head*

Black chalk or charcoal, pricked outlines  
About 1500–1506

Leonardo drew a large number of caricatured heads that reflect his study of human physiognomy and facial expressions. This large sheet, pricked for transfer, was used as a cartoon (full-scale preliminary sketch). The dynamic figure – face in profile, bust in three-quarter view and upward-looking gaze – suggests a preparatory study for a narrative painting, perhaps a large-scale composition such as *Christ among the Doctors* or *Christ Carrying His Cross*.

Christ Church, Oxford, inv. 0033

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 134 *Study for the Virgin of the Yarnwinder*

Metalpoint reworked with red chalk  
on red prepared paper  
About 1500

This is a study for the bust of the Virgin in the painting known as the *Virgin of the Yarnwinder*. Leonardo aims to show the mother's instinctive reaction as she turns to remove the dangerous object from her son's hands, but he also conveys the impression that she has just interrupted her movement, having realised the meaning of Jesus's thoughtful observation of the cross-shaped object.

The Royal Collection, Windsor, RL 12514, loaned by Her Majesty Queen Elizabeth II

In 1499, in Milan, Leonardo met Florimond Robertet, secretary to Louis XII of France. Robertet commissioned the artist for a painting of the Madonna. We know that Leonardo was working on this painting in April 1501, and that it featured the infant Jesus grasping a cross-shaped yarnwinder (foreshadowing his future death) and the Virgin making a gesture of surprise.

There are two versions of this composition, both painted in Leonardo's workshop and brought together for this exhibition. The landscape in the *Bucclench Madonna* was painted over an initial underdrawing identical to that of the *Lansdowne Madonna*. Differences between the two paintings in terms of the pictorial technique and the extent of Leonardo's contribution have generated controversy among art historians with regard to their attribution.

## Leonardo da VINCI and workshop

Vinci, 1452–Amboise, 1519

### **135** *The Virgin and Child*, known as the *Virgin of the Yarnwinder* or the *Lansdowne Madonna*

Oil on panel transferred to canvas  
About 1501–1510 (?)

Leonardo spent several years perfecting the composition; the changes he made are visible in infrared reflectography.

Private collection

# Leonardo da VINCI and workshop

Vinci, 1452–Amboise, 1519

## **136** *The Virgin and Child*, known as the *Virgin of the Yarnwinder* or the *Buccleuch Madonna*

Oil on panel

About 1501–1510? (?)

Collection of the Duke of Buccleuch, Drumlanrig, on long-term loan  
to the National Galleries of Scotland, Edinburgh

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## **137** **Infrared reflectogram** of *The Virgin and Child*, known as the *Virgin of the Yarnwinder* or the *Lansdowne Madonna*

Oil on panel transferred to canvas

About 1501–1510 (?)

Private collection

The infrared reflectograms of the two Madonnas show the same compositional changes. Leonardo initially drew a donkey in the right background – an allusion to the Holy Family's flight into Egypt. On the left was a house with a balcony, in front of which Mary was placing Jesus in a baby walker made by Joseph, and the yarnwinder was placed in a basket of spindles in the foreground. The positions of the Virgin and Child were significantly changed.

## 138 Infrared reflectogram

of *The Virgin and Child*, known as the *Virgin of the Yarnwinder* or the *Lansdowne Madonna*, by Leonardo da Vinci and his workshop

Oil on panel. About 1501–1510 (?)  
National Galleries of Scotland,  
Edinburgh

The reflectograms show the evolution of the composition's form and imagery. Leonardo began by drawing a narrative scene from the life of the Holy Family, who found refuge in Egypt after their flight from the Holy Land. But as the work progressed, he gradually eliminated the non-essential details to focus on the figures' inner states as they confront the Christ Child's destiny as Saviour of the world.

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# RETURN TO FLORENCE

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On 2 September 1494, Charles VIII of France crossed the Alpine pass of Mont Genève, sparking the period known as the Italian Wars. The Medici, rulers of the Florentine republic since 1434, were driven from Florence on 9 November. The republican constitution was then restored around a Great Council with 3,000 members, entailing the construction of a new assembly hall on the eastern side of the Palazzo della Signoria (or Palazzo Vecchio). In 1502, it was decided that the leading figure of the Council – the ‘gonfalonier of justice’ – should have lifetime tenure; Piero Soderini was elected to this new position. This was the political situation in Florence when Leonardo, who had returned to the city in 1500, produced his paintings of *Saint Anne*, *Salvator Mundi* and possibly *Saint John the Baptist* – guardian figures of the liberty of Florence. In the autumn of 1503, he also started work on the portrait of Lisa del Giocondo. Soderini commissioned Leonardo in 1503 – and Michelangelo in 1504 – to decorate the walls of the Council’s assembly hall with two huge paintings, each commemorating a famous Florentine victory: for Leonardo, *The Battle of Anghiari* against the Milanese and for Michelangelo, *The Battle of Cascina* against the Pisans. Leonardo never completed the project, but painted a remarkable scene known as the *Battle of the Standard*; this work, and the cartoon (preliminary sketch) produced by his rival Michelangelo left a lasting artistic impact before finally disappearing.

## After Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### 139 *The Battle of Anghiari*

Oil on panel  
16th century

On 29 June 1440, the Battle of Anghiari was fought between the Milanese army of Duke Filippo Maria Visconti and the combined forces of Florence, Venice and Pope Eugenius IV. Commissioned to produce a wall painting of the battle for the Great Council Chamber of the Palazzo della Signoria, Leonardo began to work on the central section which came to be known as the *Battle of the Standard*; this scene, depicting the animal savagery of war, has come down to us through copies. With its silvery light and strong contrasts of light and shade, it is almost a nocturne (painting of a night scene) – and in effect, the battle is known to have continued into the night.

Uffizi Gallery, Florence, inv. 1890 n. 5376.  
On long-term loan to the Palazzo Vecchio

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## Aristotile da SANGALLO, after Michelangelo

Florence, 1481–Florence, 1551

### 140 *The Battle of Cascina*

Oil on panel  
About 1542

On 28 July 1364, a battle was fought near the town of Cascina, near Pisa. As the Florentine soldiers were cooling off in the river Arno, they were called to arms by their vigilant leaders Galeotto Malatesta and Manno Donatio, who thereby thwarted the tactics of John Hawkwood, the English mercenary captain of the Pisan army. Pisa had rebelled against Florentine rule in 1494, so the *Battle of Cascina* stood as a symbol of contemporary political and military events. Michelangelo was commissioned to paint the battle in 1504 but only completed the cartoon (full-scale preliminary sketch).

Earl of Leicester and Trustees, Holkham Estate

## Anonymous Italian artist, 16th century, reworked by Peter Paul RUBENS

### **141** *The Battle of Anghiari*

Black chalk, pen and brown ink, brush and brown and grey ink, grey wash, heightened with white and blue-grey  
16th–17th century

This drawing in black chalk and brown ink is a copy of the huge preparatory cartoon for the *Battle of Anghiari*, designed and made by Leonardo between 1503 and 1505 to the same scale as the planned mural – i.e. around 18 metres wide by 7 metres high. This drawing was purchased, then enhanced with pen and watercolour, by Peter Paul Rubens.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 20271

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **142** *Study for the Battle of Anghiari*

Pen and brown ink  
About 1503–1504

Leonardo's first ideas for *The Battle of Anghiari* include a magnificent series of sketches in pen and brown ink, some outlined in black chalk. Taking his free and intuitive approach to composition (*componimento inculto*), the artist strove to convey the confusion of the battle between horsemen and foot soldiers amid clouds of dust.

Gallerie dell'Accademia, Venice, inv. 215

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **143** *Study for the Battle of Anghiari*

Black chalk, pen and brown ink  
About 1503–1504

In the upper part of the sheet, Leonardo explored the main dynamics he would incorporate into the *Battle of the Standard*.

Gallerie dell'Accademia, Venice, inv. 215

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **144** *Studies for the Battle of Anghiari*

Pen and brown ink  
About 1503–1504

Several elements of the scene on the left are reminiscent of the *Battle of the Standard*. The bridge visible on the right is the one around which the battle was fought; it led from Borgo San Sepolcro across the river that flowed below the promontory of Anghiari.

Gallerie dell'Accademia, Venice, inv. 216

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **145** *Studies of Horsemen for the Battle of Anghiari*

Pen and brown ink

About 1503–1504

The British Museum, London, inv. 1854,0513.17

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **146** *Study for the Battle of Anghiari*

Black chalk reworked with pen and brown ink

About 1503–1504

Elements such as the charging horseman and the foot soldier delivering a blow were evidently sketches for the *Battle of Anghiari*. The others were probably ideas for an equestrian monument. The figure on the left has been associated with the project for a painting of Leda.

Biblioteca Reale, Turin, inv. 15577

## Leonardo da VINCI and his workshop

Vinci, 1452–Amboise, 1519

### **147** Studies of Mechanics; *Sketch for the Battle of Anghiari and the Angel of the Annunciation*

Black chalk, pen and brown ink  
About 1503–1504

Leonardo's design for the figure of an *Angel of the Annunciation* prefigured that of his *Saint John the Baptist*. The angel on this sheet was copied by a pupil and corrected by the master, who reworked the fore-shortening of the arm. Leonardo used the same ink to make calculations, draw geometrical figures and sketch gear mechanisms, horses and foot soldiers in preparation for *the Battle of Anghiari*.

The Royal Collection, Windsor, RL 12328, loaned by Her Majesty Queen Elizabeth II

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **148** *Study for the Battle of Anghiari; System for Attacking Fortifications*

Stylus, black chalk, pen and brown ink  
About 1503–1504

The black chalk horse was a preparatory sketch for the *Battle of the Standard*. On the right, Leonardo imagined a shower of projectiles passing over a fortress wall. This second study, unrelated to the *Battle of Anghiari*, reflects Leonardo's constant interest in military engineering.

Biblioteca Ambrosiana, Milan, Codex Atlanticus, fol. 72 r

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **149** *Study for the Head of a Soldier in the Battle of the Standard*

Red chalk on pale pink prepared paper  
About 1504

While Michelangelo's *Battle of Cascina* glorified the soldiers' heroic nudity, Leonardo's battle painting conveyed its frenzy and confusion. Two superb preparatory drawings of the screaming protagonists in the *Battle of the Standard* have survived. In these works, the 'science of painting' proves its ability to depict bodily movements and their relationship with emotions – the movements of the soul.

Szépművészeti Múzeum, Budapest, inv. 1774

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **150** *150 Study for the Head of a Soldier in the Battle of the Standard*

Black chalk and traces of red chalk  
About 1504

After *the Battle of Anghiari*, the red banner of the Visconti with its radiating sun and the leopard banner of Milanese captain Niccolò Piccinino were publicly displayed in the cathedral of Santa Maria del Fiore in Florence, before being held in the Palazzo della Signoria. The warrior sketched in black chalk has been identified by some art historians as Piccinino, the defender of the standard, but there is no consensus on this. Leonardo showed a preference for black and red chalk in his later career.

Szépművészeti Múzeum, Budapest, inv. 1775

# Giovanni Francesco RUSTICI

Florence, 1474–Tours, 1554

## 151 *Battle Scene: Horseman Fighting Four Foot Soldiers*

Terracotta, traces of bronze-coloured patina  
About 1503–1520

The sculptor Giovanni Francesco Rustici, a close friend of Leonardo, was inspired by *the Battle of Anghiari* – and the many preparatory drawings for the composition – to create a new type of terracotta group sculpture featuring a violent struggle between a horseman and foot soldiers, combining many different views and perspectives.

Department of Sculptures, Musée du Louvre, Paris, RF 1535

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# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 152 *Studies for the Battle of Anghiari and Leda*

Black chalk, pen and brown ink  
About 1503–1504

This sheet featuring a preparatory study of a rearing horse for one of the horsemen in *the Battle of Anghiari* also shows Leonardo's first ideas for a new composition: *Leda and the Swan*. He used his *componimento inculto* ('intuitive composition') technique to explore the possibilities of the theme in black chalk, then clarified the resulting ideas in pen.

The Royal Collection, Windsor, RL 12337, loaned by Her Majesty Queen Elizabeth II

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 153 *Study for Leda Kneeling*

Black chalk, pen and brown ink  
About 1504–1505

According to legend, Leda, daughter of Thestius, King of Aetolia, was impregnated on the same night by her husband (the Spartan king Tyndareus) and by Zeus (who had seduced her in the form of a swan). She later gave birth to two eggs containing two sets of twins: Castor and Clytemnestra, the children of the mortal Tyndareus, and Pollux and Helen, the offspring of the god. Leonardo designed a first composition on this mythological theme in which the heroine is depicted on one knee as if about to stand, surrounded by the swan and the newly hatched twins.

Museum Boijmans Van Beuningen, Rotterdam, inv. I 466

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## 154 *Crouching Aphrodite*, known as the *Venus of Vienna*

Marble  
2nd century AD, after a Greek original from the 3rd or 2nd century BC

This fragmentary marble sculpture is an archetypal image of the goddess Aphrodite crouching at her bath, with her head turned to the right and her right arm across her breast. Her son, Eros, once stood beside her, but all that remains is his hand on her back. Leonardo's drawing of Leda kneeling in a landscape was probably inspired by a similar classical sculpture.

Department of Greek, Etruscan and Roman Antiquities,  
Musée du Louvre, Paris, MA 2240 (MNB 1292)

# Workshop of Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 155 *Leda*

Oil on panel  
About 1505–1510

This painting, probably executed by one of Leonardo's close collaborators, reproduces the master's final composition on the mythological story of Leda.

The young woman is now standing with her arms around the swan and admiring her newly-hatched offspring. The royal painting collection in the Château de Fontainebleau included a *Leda* that was lost in the late 17th century, and that may have been painted by Leonardo.

Uffizi Gallery, Florence, inv. 1890 n. 9953

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## After an original by Praxiteles

## 156 *Torso of the Aphrodite of Knidos Type*

Thasian marble  
2nd century AD

This torso is of the 'Aphrodite of Knidos' type, based on a sculpture of the goddess created in about 350 BC by the Athenian sculptor Praxiteles and placed in the temple of Aphrodite on the island of Knidos. It depicted Aphrodite standing with her right hand hiding (or indicating) her pubis, while her other hand places a garment on a *hydria* (water jar) evoking her ritual bath. Leonardo probably drew inspiration from a similar fragment for his painting of *Leda* standing in a landscape.

Department of Greek, Etruscan and Roman Antiquities,  
Musée du Louvre, Paris, MA 2184

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **157** *Studies for the Head of Leda*

Black chalk, pen and brown ink  
About 1505–1506

In his preparatory sketches for Leda's head, Leonardo drew a whole series of elaborately braided hairstyles; he even made careful studies of the back view, which would not be seen in the painting! These drawings attest to his keen interest in the complex interlacing of geometrical forms.

The Royal Collection, Windsor, RL 12516, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **158** *Studies for the Head of Leda*

Black chalk, pen and brown ink  
About 1505–1506

The hairstyles in some versions of *Leda* painted by Leonardo's assistants resemble the ones in these ink sketches. But a note written by Leonardo next to one of these studies – 'this one can be removed and refitted without damage' – suggests a design for a theatre or party accessory.

The Royal Collection, Windsor, RL 12515 and 12517, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **159** *Head of a Woman*, known as *La Scapigliata* ('the woman with uncombed hair')

Umber heightened with white on panel  
About 1500–1510

This female head is often said to be a preparatory study for *Leda* or a Virgin Mary. However, the fact that it was painted on wood might suggest that it was a work in its own right – possibly inspired by ancient paintings – in which the artist experimented with a limited palette and a certain incompleteness. *La Scapigliata* recalls the work of the great ancient Greek artist Apelles, who painted a Venus whose head and bust were of extraordinary perfection, while the rest of the body was merely sketched.

Galleria Nazionale, Parma, inv. 362

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **160** *Compositional Study for Saint Anne*

Black chalk reworked in pen and brown ink  
About 1500–1501

After returning to Florence in 1500, Leonardo began to work on the composition of a large panel painting of Saint Anne (the Virgin Mary's mother and a patron saint of the Florentine Republic). The first phase of his research resulted in a cartoon (full-scale preliminary sketch) that is now in London, but he then changed that composition by removing John the Baptist and seating the Virgin Mary on her mother's lap. Leonardo was at the height of his powers and, here again, his creativity was deeply influenced by the freedom he found in *componimento inculto* ('intuitive' composition).

Department of Prints and Drawings, Musée du Louvre, Paris, RF 460

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **161** *Compositional Study for Saint Anne*

Black chalk reworked in pen and brown ink

About 1500–1501

The protagonists in this sketch are the same as those in the Louvre's drawing, but Leonardo has reversed their positions and placed the Lamb on the ground, thereby heightening the dynamics of the action. Mary is holding Jesus tightly to prevent him from playing with the lamb – a symbol of his future Passion. Leonardo hesitated as to the position of Anne's head; unlike Mary, she seems to be trying to bring the lamb and the Christ Child closer together.

Galleria dell'Accademia, Venice, inv. 230

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **162** *The Virgin and Child with Saint Anne and the Infant Saint John the Baptist, known as The Burlington House Cartoon*

Black chalk heightened with white

About 1500

This large cartoon (full-scale preliminary sketch) was Leonardo's first idea for a composition depicting Saint Anne with her daughter Mary and grandson Jesus (Saint Anne trinity). The Christ Child is blessing the infant Saint John the Baptist, sent to prepare the world for the coming of the Saviour. Anne gazes at her daughter, pointing to heaven as if to remind her of God's plan for her son; although Mary's smile suggests that she consents to his future sacrifice, she holds him back nonetheless. A flowing spring in the lower right corner of the landscape is probably an allusion to the water of baptism.

The National Gallery, London, NG 6337

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **163** *Saint Anne, the Virgin Mary, and the Infant Jesus Playing with a Lamb*, known as *Saint Anne*

Oil on poplar panel  
About 1503–1519

Leonardo began to work on his painting of *Saint Anne* in October 1503 and continued until his death. He was constantly adjusting the poses of the figures and the details of their hairstyles and costumes. The meaning of the composition also evolved, with the final version suggesting the elusive moment when the sadly smiling Mary acquiesces to the future death of her son.

Department of Paintings, Musée du Louvre, Paris, INV. 776

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### **164 Infrared reflectogram** of *Saint Anne, the Virgin Mary, and the Infant Jesus Playing with a Lamb*, known as *Saint Anne*, by Leonardo da Vinci

Oil on poplar panel. About 1503–1519  
Musée du Louvre, Paris

The infrared reflectogram of the painting shows traces of the transfer of the large cartoon (full-scale preliminary sketch). Saint Anne's arm is visible behind Mary, attempting to prevent her from keeping Jesus and the lamb apart. Leonardo eventually abandoned this idea, preferring to focus on the mother's conscious acceptance of her son's fate.

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **165** *Studies for Saint Anne: the Infant Jesus*

Red chalk, traces of white heightening on red prepared paper

About 1502–1503

Leonardo's sketches of the Christ Child on this sheet attest to his close observation of both the overall figure and the details. The child in the top right corner is depicted with a piece of cloth around him that was to be held by the Virgin. This detail appears in several workshop versions but is missing from the cartoon for *Saint Anne*.

Gallerie dell'Accademia, Venice, inv. 257

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **166** *Study for Saint Anne: Head of Saint Anne*

Black chalk

About 1502–1503

This head of Saint Anne was a preparatory drawing for the cartoon (full-scale preliminary sketch) that served for the Louvre's painting of *Saint Anne*. It shows her wearing an opaque headdress – unlike her daughter Mary, whose hair is visible. The idealised, smiling face is drawn in black chalk, delicately smudged to create imperceptible transitions between light and shade, comparable to the *sfumato* (smoky) effect in the painting itself.

The Royal Collection, Windsor, RL 12533, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **167** *Study for Saint Anne: Head of the Virgin*

Black chalk, red chalk and traces of pen and brown ink  
About 1507–1510

Leonardo began to work on *Saint Anne* between 1501 and 1503. Over the long course of its creation he experimented with many different ideas, including a head of the Virgin with braids enveloped in an elaborate headdress composed of transparent veils gathered into a pleated turban; this idea appeared in the copies, but was eventually abandoned. The Virgin's face in this drawing is brought to life by the softly smudged black chalk and delicate strokes of red chalk.

The Metropolitan Museum of Art, New York, inv. 1951.51.90

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **168** *Study for Saint Anne: Arm of the Virgin*

Red and black chalk, grey wash, white heightening,  
pen and brown ink on red prepared paper  
About 1507–1510

The drapery over the Virgin's right arm plays a structural role in the painting's composition, influencing its diagonal movement. Leonardo decided to replace the simple fabric in the preparatory cartoon with a transparent material arranged in a series of skilfully rendered circular folds. His experimentation with mixed media gave this drawing a distinctly painterly style.

The Royal Collection, Windsor, RL 12532, loaned by Her Majesty Queen Elizabeth II

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **169** *Study for Saint Anne: Drapery of the Virgin*

Black chalk and grey wash heightened with white  
About 1507–1510

This drawing by Leonardo shows the Virgin's drapery arranged to create a large curve, with billowing folds around her waist and back that heighten the impression of movement and convey a sense of her emotion. The infrared reflectogram shows that Leonardo began by transferring this new design to the painting before finally opting for another solution. This drapery study represents a peak in Leonardo's technical mastery of painting.

Department of Prints and Drawings, Musée du Louvre, Paris,  
Inv. 2257

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **170** *Study for Saint Anne: Drapery of Saint Anne*

Black chalk heightened with white on buff paper  
About 1516–1519

This final sketch, drawn on paper bearing a French watermark, dates from the period when Leonardo was living in Amboise. It attests to the fact that he continued to work on *Saint Anne* until his dying day – in this case, by studying the fall of the folds of the saint's dress. He died before this new idea could be transferred to the painting, which remained unfinished, with only a few lines painted in lapis lazuli in this section.

The Royal Collection, Windsor, RL 12527, loaned by Her Majesty Queen Elizabeth II

Leonardo probably designed an image of Christ as the Saviour of the world between 1500 and 1506, while he was in Florence. In the context of the Florentine Republic, the theme symbolised the fall of tyranny and the restoration of liberty, the Medici having been driven out of the city on 9 November 1494 (the feast day of the Holy Saviour).

## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **171** *Study for the Salvator Mundi*

Red chalk, touches of black and white chalk  
on red prepared paper  
About 1500–1506

Leonardo sketched this initial design for the right sleeve of Christ's garment, but did not use it in the painting.

The Royal Collection, Windsor, RL 12524, loaned by Her Majesty Queen Elizabeth II

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## Leonardo da VINCI

Vinci, 1452–Amboise, 1519

### **172** *Study for the Salvator Mundi*

Red chalk, touches of black and white chalk, heightened  
with white on red prepared paper  
About 1500–1506

The lower right sketch shows the sleeve on Christ's right arm as he makes a gesture of blessing; the central drawing is a study for the folds of his robe. Leonardo did not use the former design in his final painting, but the latter closely resembles the robe in the finished work.

The Royal Collection, Windsor, RL 12525, loaned by Her Majesty Queen Elizabeth II

# Workshop of Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 173 *Salvator Mundi* (Ganay version)

Oil on walnut panel  
About 1505–1515

This version of the *Salvator Mundi* was probably painted by a pupil of Leonardo under the master's guidance. It faithfully reproduces the prototype, but the *sfumato* (blending) effects are less subtle. Nonetheless, the technique is extremely meticulous and the pigments (including lapis lazuli) are as precious as those used in the original.

Private collection, former collection of the Marquis de Ganay

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## 174 Infrared reflectogram of the *Salvator Mundi* by Leonardo da Vinci's workshop

Oil on walnut panel. About 1505–1515  
Private collection

This reflectogram shows an underdrawing that was evidently transferred mechanically from a cartoon (full-scale preliminary sketch). The discontinuous lines and the corrections made to them are characteristic of several paintings from Leonardo's workshop, including the copy of the *Mona Lisa* now in the Museo del Prado in Madrid. A cross was added to the orb, but then removed.

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# RELOCATION TO FRANCE

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Michelangelo and Raphael were Rome's favourite artists during the reign of Pope Leo X, and in the autumn of 1516 Leonardo left for France. On 10 October 1517, Cardinal Luigi of Aragon, the grandson of King Ferdinand of Naples, was passing through Amboise and visited the ageing Leonardo at the Château de Cloux (known today as the Château du Clos Lucé), the residence provided for him by the French king François I. Leonardo showed the cardinal and his suite three paintings he had been working on for over ten years (and whose final owner would be the king of France): *Saint Anne*, the *Mona Lisa* and *Saint John the Baptist*.

Leonardo produced only about fifteen paintings in all. This was not, as has often been suggested, because he was only interested in the original idea or conception, but on the contrary because, in his view, the science of painting found its truest expression in the infinitely extended process of execution. His contemporaries saw Leonardo as the forerunner of the 'modern style' because he was the first (and probably only) artist capable of endowing his work with an awe-inspiring realism. Such creative power was as overwhelming as the world inhabited by Leonardo – a world of impermanence, universal destruction, tempests and darkness.

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## 175 *Saint John the Baptist*

Oil on walnut panel  
About 1508–1519

John the Baptist, the Precursor of Christ, is depicted as a man of ideal beauty who still has something of the purity of youth. He is portrayed against a background of darkness, his upward-pointing finger denoting the coming of Christ in accordance with the Prologue to the Gospel of John: *There was a man sent from God, whose name was John. He came as a witness to testify to the light, so that all might believe through him. He himself was not the light, but he came to testify to the light.*

Department of Paintings, Musée du Louvre, Paris, inv 775

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## 176 **Infrared reflectogram** of *Saint John the Baptist* by Leonardo da Vinci

Oil on walnut panel. About 1508–1519  
Musée du Louvre, Paris

The reflectogram of *Saint John the Baptist* shows the extraordinary finesse of the preparatory drawing. Some pentimenti (alterations) are visible, including a change to the left arm and a lock of hair added to the forehead. The left arm and raised right arm feature rather harsh transitions between shadow and light, suggesting that those parts of the painting were never finished.

## Antonio de BEATIS

Milan or Vaprio d'Adda, about 1491/93–Canonica, 1567

### **177** *Account of the Visit of Cardinal Luigi of Aragon to Leonardo da Vinci at the Château de Cloux on 10 October 1517*

On 10 October 1517, Cardinal Luigi of Aragon, the grandson of King Ferdinand of Naples, visited Leonardo at the Château de Cloux (known today as the Château du Clos Lucé). The artist showed the cardinal his manuscripts, anatomical studies and three paintings: the portrait of a Florentine lady (Lisa del Giocondo), *Saint John the Baptist* and *Saint Anne*. Antonio de Beatis, who kept the Cardinal's travel journal, noted that Leonardo was paralysed in his right hand and that he was accompanied by his pupil Francesco Melzi.

Biblioteca Nazionale Vittorio Emanuele III, Naples, MS. X. F. 28

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## Attributed to Francesco MELZI

### **178** *Portrait of Leonardo da Vinci*

Red chalk  
About 1515–1518

Francesco Melzi joined Leonardo's workshop in 1508 and became his most loyal pupil. He followed the master to France, was present at his death and inherited his drawings and manuscripts. In this beautiful red chalk portrait attributed to Melzi, Leonardo has the flowing hair and beard of an ancient Greek philosopher such as Pythagoras or Plato.

Veneranda Biblioteca Ambrosiana, Milan, inv. f 263 inf. n. 1 bis

# Leonardo da VINCI

Vinci, 1452–Amboise, 1519

## **179** *A Deluge*

Black chalk

About 1517–1518

Leonardo's last drawings included costume studies, a mysterious female figure pointing to something in a river landscape, and a series of deluges in black chalk – images of the world's impermanence.

The Royal Collection, Windsor, RL 12378, loaned by Her Majesty Queen Elizabeth II

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# AROUND THE LEONARDO DA VINCI EXHIBITION

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## IN THE AUDITORIUM

### PRESENTATION OF THE EXHIBITION

by the exhibition curators.

Wednesday 30 October, 12:30–6:30 p.m.

### LECTURE SERIES

#### **Leonardo da Vinci**

Thursdays 31 October, 14 and 21 November,  
9 January at 6:30 p.m.

### STUDY DAY

#### **Léonard de Vinci : l'expérience de l'art**

(**'Leonardo da Vinci: the experience of art'**)

In collaboration with the C2RMF, the CNRS, IPERION-CH, I  
CP-Paris.

Friday 25 October at 10 a.m.

### DOCUMENTARIES

#### **La Vie cachée des œuvres : Léonard de Vinci**

(**'The Hidden Life of Artworks: Leonardo da Vinci'**)

by J. Garcias and S. Neumann, 2011, 52 min.

Coprod. Camera Lucida, Musée du Louvre, ARTE France.

Thursday 14 November at 12:30 p.m.

***Léonard de Vinci, la restauration du siècle***

**(‘Leonardo da Vinci, the Conservation Project of the Century’)**

by S. Neumann, 2012, 55 min.

Coprod. Nord-Ouest documentaires,  
Musée du Louvre, ARTE France, CRTF.

Friday 6 December at 12:30 p.m.

***Léonard de Vinci, la Manière moderne***

**(‘Leonardo da Vinci, the Modern Style’)**

by S. Paugam. Author F. Kosinetz, 2019, 52 min.

Coprod. Zed, Musée du Louvre, ARTE France.

Friday 13 December at 8 p.m.

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**CONCERTS**

**La musique secrète de Léonard (‘Leonardo’s secret music’)**

Doulce Mémoire ensemble

Friday 15 November at 8 p.m.

**Dans l’atelier de Léonard (‘In Leonardo’s workshop’)**

Sollazzo ensemble

Thursday 21 November at 12:30 p.m.

View the programme on [www.louvre.fr](http://www.louvre.fr)

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**PUBLICATIONS**

**Exhibition catalogue**

Under the direction of Vincent Delieuvin and Louis Frank.

Co-published by Musée du Louvre éditions / Hazan

***Vie de Léonard de Vinci*** de Giorgio Vasari,

Edited, translated and annotated by Louis Frank

and Stefana Tullio Cataldo.

Co-published by Musée du Louvre éditions / Hazan

***Léonard2Vinci***

Graphic novel by Stéphane Levallois.

Co-published by Musée du Louvre éditions / Futuropolis

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**GUIDED TOURS**

For adults from 7 November onwards, daily at 3:30 p.m.;

on Wednesdays and Fridays at 7 p.m. For families from

13 November onwards, every Wednesday at 3:30 p.m.

Reservations: [ticketlouvre.fr](http://ticketlouvre.fr)

## SPECIAL THEME TOURS

### **Léonard de Vinci et la peinture italienne de la Renaissance** (**'Leonardo da Vinci and Italian Renaissance Painting'**)

On sale at the Fnac store and on [fnac.fr](http://fnac.fr)

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## WEEKEND WORKSHOPS IN THE CABINET OF PRINTS AND DRAWINGS

### ***Léonard et l'art du dessin*** ('**Leonardo and the Art of Drawing**')

Introduction to the techniques used by Leonardo da Vinci.

14 and 15 December 2019, 18 and 19 January 2020,

and 15 and 16 February 2020,

from 2 to 5 p.m. in the Rotonde Sully (no reservation required)

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## AUDIO GUIDE

Selection of works with commentaries by the exhibition curators

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## VIRTUAL REALITY

### ***Mona Lisa: Beyond the Glass***

Immersive experience, 6 min.

Virtual reality experience developed in partnership with HTC Vive.

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## TUILERIES GARDEN

The Louvre and Tuileries garden designers have created flower beds inspired by Leonardo's masterpieces.

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## REOPENING

### **The Salle des États**

After several months of renovations, the Salle des États has reopened to the public to showcase its Venetian masterpieces and present the Mona Lisa in a brand new setting.

Bank of America is the lead sponsor of the Leonardo da Vinci exhibition.

Additional support is provided by Kinoshita Group, Bouygues Bâtiment Ile-de-France, AXA, Deloitte, and Lusion.

In collaboration with media partners *Le Monde*, *Le Journal du Dimanche*, **Télérama**, *The New York Times*, ARTE, France Télévisions and RTL.

In partnership with Fnac and RATP.



