

LEONARDO
DA VINCI

WALTER
ISAACSON

MAIN CHARACTERS

Cesare Borgia (c. 1475–1507). Italian warrior, illegitimate son of Pope Alexander VI, subject of Machiavelli’s *The Prince*, Leonardo employer.

Donato Bramante (1444–1514). Architect, friend of Leonardo in Milan, worked on Milan Cathedral, Pavia Cathedral, and St. Peter’s in the Vatican.

Caterina Lippi (c. 1436–1493). Orphaned peasant girl from near Vinci, mother of Leonardo; later married Antonio di Piero del Vaccha, known as Accattabriga.

Charles d’Amboise (1473–1511). French governor of Milan from 1503 to 1511, Leonardo patron.

Beatrice d’Este (1475–1497). From Italy’s most venerable family, married Ludovico Sforza.

Isabella d’Este (1474–1539). Beatrice’s sister, the Marchesa of Mantua, tried to get Leonardo to paint her portrait.

Francesco di Giorgio (1439–1501). Artist-engineer-architect who worked with Leonardo on Milan’s cathedral tower, traveled with him to Pavia, translated Vitruvius, and drew a version of Vitruvian man.

Francis I (1494–1547). King of France from 1515, last patron of Leonardo.

Pope Leo X, Giovanni de’ Medici (1475–1521). Son of Lorenzo de’ Medici, elected pope in 1513.

Louis XII (1462–1515). King of France from 1498, conquered Milan in 1499.

Niccolò Machiavelli (1469–1527). Florentine diplomat and writer, became envoy to Cesare Borgia and friend of Leonardo in 1502.

Giuliano de' Medici (1479–1516). Son of Lorenzo, brother of Pope Leo X, Leonardo's patron in Rome.

Lorenzo “the Magnificent” de' Medici (1449–1492). Banker, art patron, and de facto ruler of Florence from 1469 until his death.

Francesco Melzi (c. 1493–c. 1568). From a noble Milan family, joined Leonardo's household in 1507 and became a surrogate son and heir.

Michelangelo Buonarroti (1475–1564). Florentine sculptor and rival of Leonardo.

Luca Pacioli (1447–1517). Italian mathematician, friar, and friend of Leonardo.

Piero da Vinci (1427–1504). Florentine notary, father of Leonardo, did not marry Leonardo's mother, subsequently had eleven other children with four wives.

Andrea Salai, born Gian Giacomo Caprotti da Oreno (1480–1524). Entered Leonardo's household at age ten and was dubbed Salai, meaning “Little Devil.”

Ludovico Sforza (1452–1508). De facto ruler of Milan from 1481, Duke of Milan from 1494 until his ouster by the French in 1499, patron of Leonardo.

Andrea del Verrocchio (c. 1435–1488). Florentine sculptor, goldsmith, and artist in whose workshop Leonardo trained and worked from 1466 to 1477.

CURRENCY IN ITALY IN 1500

The ducat was the gold coin of Venice. The florin was the gold coin of Florence. Both contained 3.5 grams (0.12 ounces) of gold, which would make them worth about \$138 in 2017. One ducat or florin was worth approximately 7 lire or 120 soldi, which were silver coins.

PRIMARY PERIODS OF LEONARDO'S LIFE

Vinci

1452–1464

Florence

1464–1482

Milan

1482–1499

Florence

1500–1506

Milan

1506–1513

Rome

1513–1516

France

1516–1519

NOTE REGARDING THE COVER

The cover is a detail of an oil painting in Florence's Uffizi Gallery that was once thought to be a self-portrait painted by Leonardo. Based on recent X-ray analysis, it is now considered to be a portrait of Leonardo by an unknown artist done in the 1600s. It is based on, or is the basis for, a similar portrait rediscovered in Italy in 2008, called the Lucan portrait of Leonardo da Vinci. It has been copied many times. A water-color-on-ivory version painted in the 1770s by Giuseppe Macpherson is in the British Royal Collection and in 2017 was in the show "Portrait of the Artist" in the Queen's Gallery of Buckingham Palace.





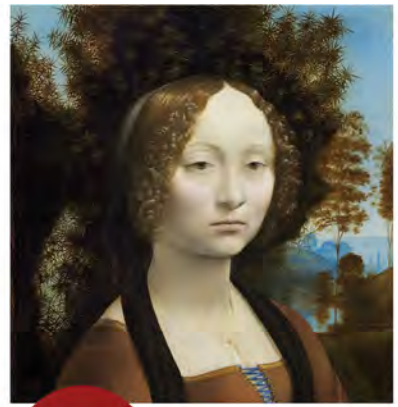
Becomes a member of the painters' guild; first known drawing is a landscape

c.1473

Collaborated with Verrocchio on the *Baptism of Christ*



c.1475



c.1478

Portrait of Ginevra de' Benci, daughter of a wealthy Florentine banker

1452

Born on April 15

End 100 Years' War; fall of Constantinople

Michelangelo is born

Ludovico Sforza becomes ruler of Milan; Magellan is born

Gutenberg prints the Bible

Machiavelli is born; Lorenzo de' Medici takes power

Copernicus is born

Johannes de Spira starts publishing house in Venice

Raphael is born

Becomes an apprentice in Verrocchio's studio in Florence

c.1468



The Adoration of the Magi commissioned



1482

Moves to Milan and begins keeping notebooks

1481

The Annunciation: youthful experiment with perspective is flawed, but heralds brilliance

c.1472



science

life

world

art



Lady with an Ermine; clay model for the horse monument is put on display in Milan



Does the drawings for Pacioli's *De divina proportione*

1496

1493



1498

First attempt at a flying machine

Studies anatomy & architecture

1489

Dias of Portugal rounds the southern tip of Africa

Christopher Columbus sails to the New World; Lorenzo de' Medici dies; Rodrigo Borgia becomes Pope Alexander VI

Vasco da Gama finds a sea route to India; Louis XII becomes King of France; Savonarola's Bonfire of the Vanities; France conquers Milan

Süleyman I, of the Ottoman Empire, is born; Ludovico officially becomes Duke; Savonarola deposes the Medici in Florence; King Charles VIII of France invades Italy

c.1490



Vitruvian Man; *Feast of Paradise* is presented for the wedding feast of the duke's nephew; Salai comes to live with Leonardo

1483



Commissioned, along with the de Predis brothers, to paint *Virgin of the Rocks*

Begins *The Last Supper* in the refectory in the convent of Santa Maria delle Grazie

1495



1499

Leaves Milan

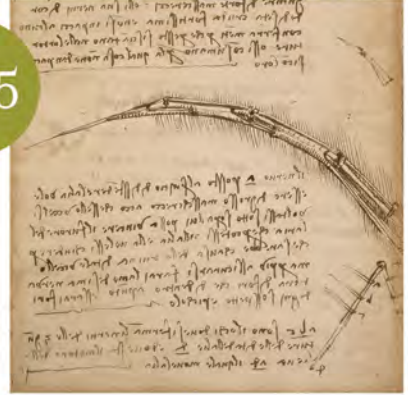


1503

Returns to Florence, begins painting the *Mona Lisa* and works on it for the rest of his life

Studies the flight of birds; second unsuccessful attempt to fly; struggles to paint the *Battle of Anghiari*, a major commission in Florence that is eventually abandoned, unfinished.

1505

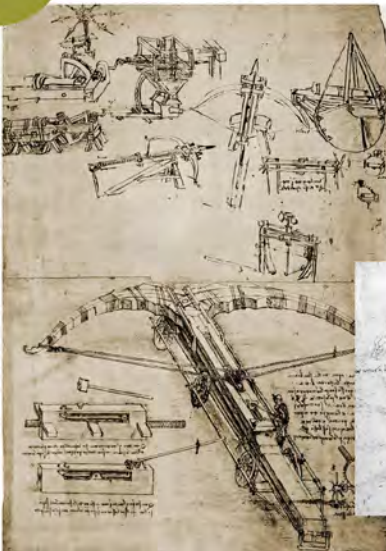


Michelangelo's statue of David; young Raphael comes to Florence to study with Leonardo and Michelangelo

Leonardo's friend, Amerigo Vespucci, publishes his account of sailing to the New World

The architect Donato Bramante is hired by the pope to rebuild St. Peter's church in Rome

1502



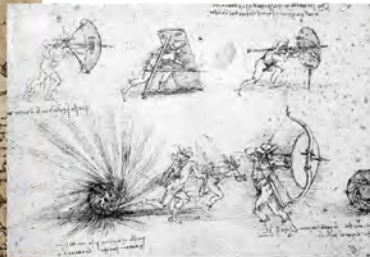
Begins to work for Cesare Borgia as military engineer

Returns to Milan, where he remains, on and off, for seven years

1506

1507

Painter and engineer to Louis XII



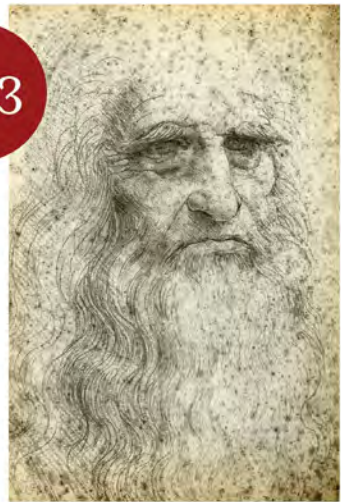


c.1508



Divides his time between Milan and Florence; studies of waterworks; designs the Trivulzio monument; second *Virgin of the Rocks*

1513



Moves to Rome; the iconic Turin drawing, a possible self-portrait done in the preceding years, often defines our image of Leonardo

Michelangelo finishes painting the Sistine Chapel; Gerardus Mercator, who produces the first map of the world, is born; Medici return to power in Florence

Andreas Vesalius, who publishes the first accurate book on human anatomy, is born in Brussels

Martin Luther launches Protestant Reformation

King Henry VIII becomes king of England

Vasari is born

Giovanni de' Medici becomes Pope Leo X

Francis I becomes king of France



1509



Pursues his studies of anatomy and continues with hydraulics

1516

Moves to Amboise as a guest of Francis I

1514



dies on May 2

Visits Parma and Florence; Plans to drain the Pontine Marshes

1519



From Leonardo's notebooks c. 1495: a sketch for *The Last Supper*, geometric studies for squaring a circle, octagonal church designs, and a passage in his mirror-script writing.



The town of Vinci and the church where Leonardo was baptized.



Florence in the 1480s, the cathedral with Brunelleschi's dome in the center and the Palazzo della Signoria, the seat of government, to its right.



Fig. 1. Verrocchio's *David*.



Fig. 3. Drawing possibly of Leonardo modeling for Verrocchio's *David*.



Fig. 2. Presumed self-portrait by Leonardo in the *Adoration of the Magi*.



Fig. 4. Drapery study from Verrocchio's studio, attributed to Leonardo, c. 1470.



Fig. 5. A warrior.

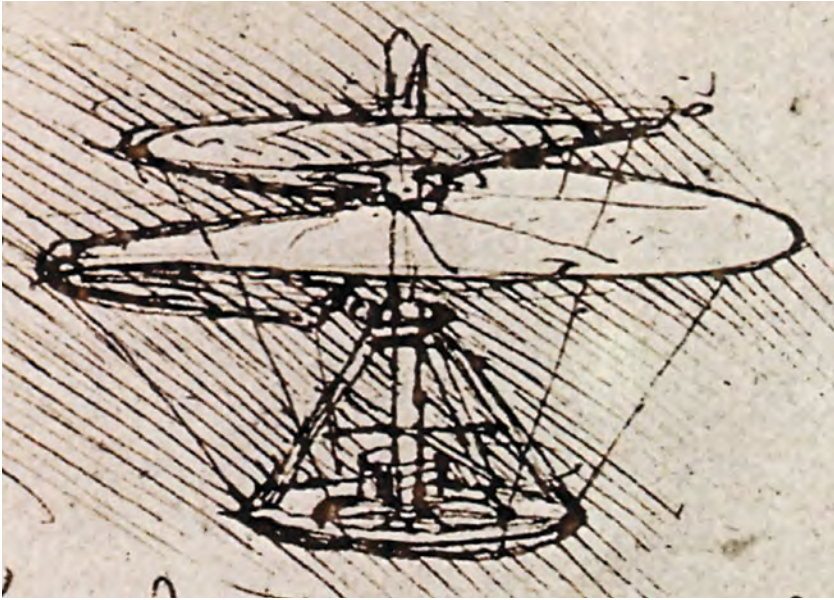


Fig. 6. A flying machine, probably for the theater.



Fig. 7. Leonardo's Arno Valley landscape, 1473.



Fig. 8. *Tobias and the Angel* by Verrocchio with Leonardo.



Fig. 9. Antonio del Pollaiuolo's *Tobias and the Angel*.



Fig. 10. *Baptism of Christ* by Verrocchio with Leonardo.



Fig. 11. Leonardo's *The Annunciation*.



Fig. 12. *Madonna of the Carnation* (Munich Madonna).



Fig. 13. *Madonna and Child with Flowers* (Benois Madonna).



Fig. 14. *Ginevra de' Benci*.



Fig. 15. *Adoration of the Magi.*

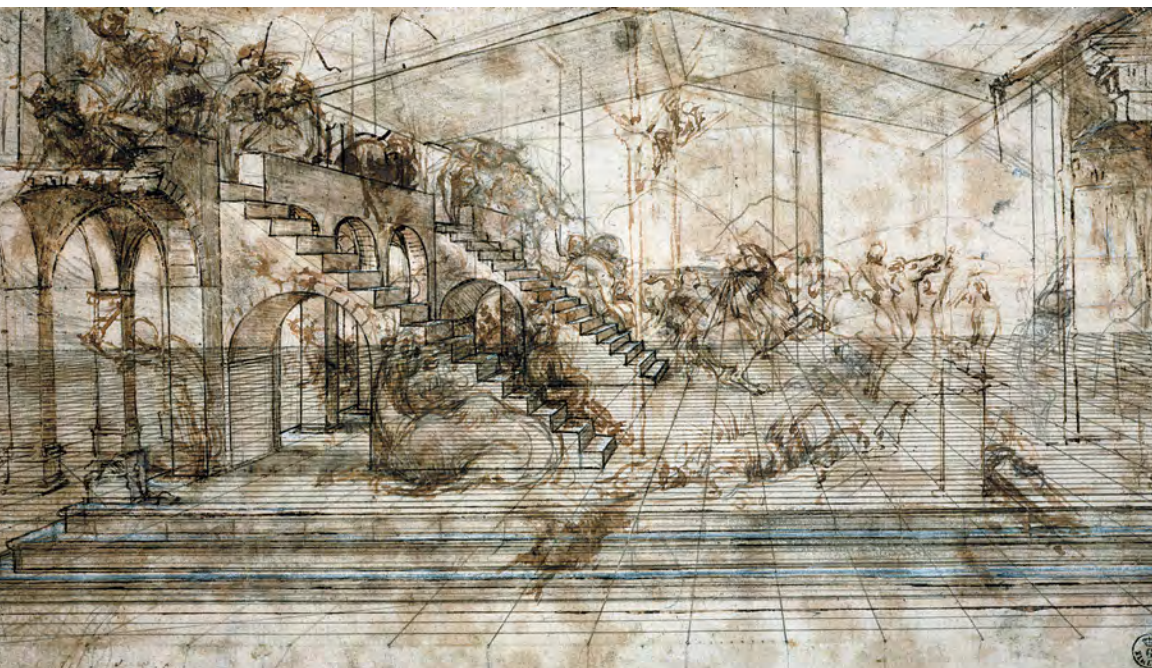


Fig. 16. Preparatory study for the *Adoration of the Magi*.



Fig. 17. *Saint Jerome in the Wilderness.*



Fig. 18. Drawing in 1495 with neck muscle incorrect.



Fig. 19. Anatomy drawing c. 1510 with neck muscle correct.



Fig. 20. The hanging of Bernardo Baroncelli.

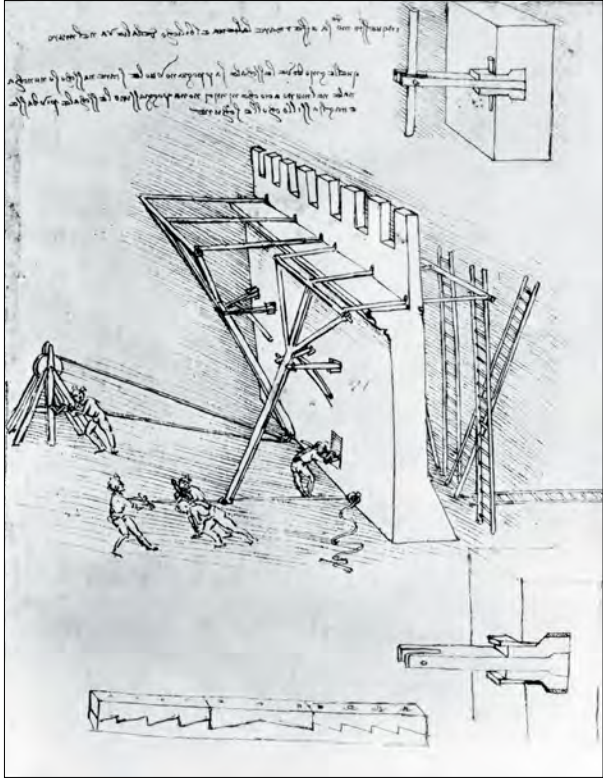


Fig. 21. Machine for pushing away ladders.



Fig. 22. Scythed chariot.

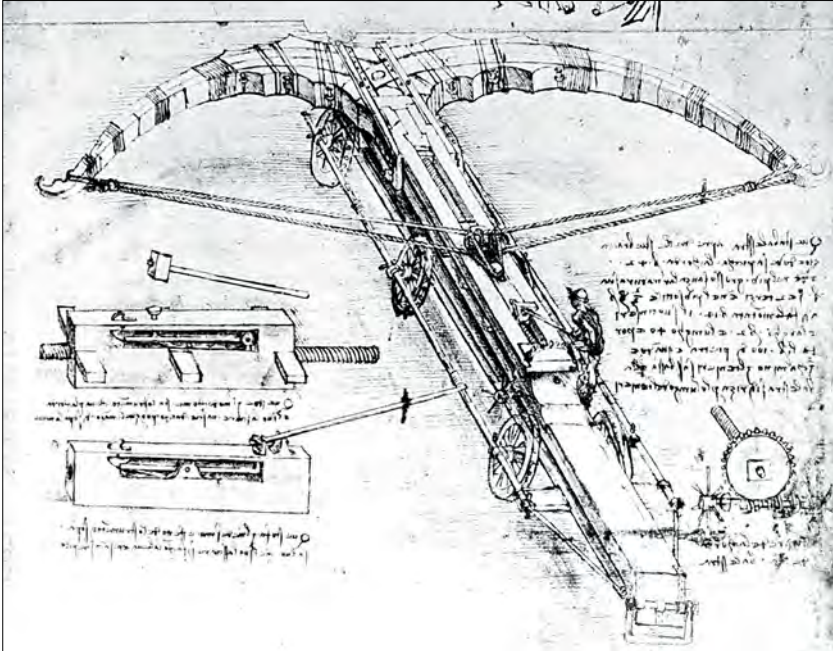


Fig. 23. Giant crossbow.

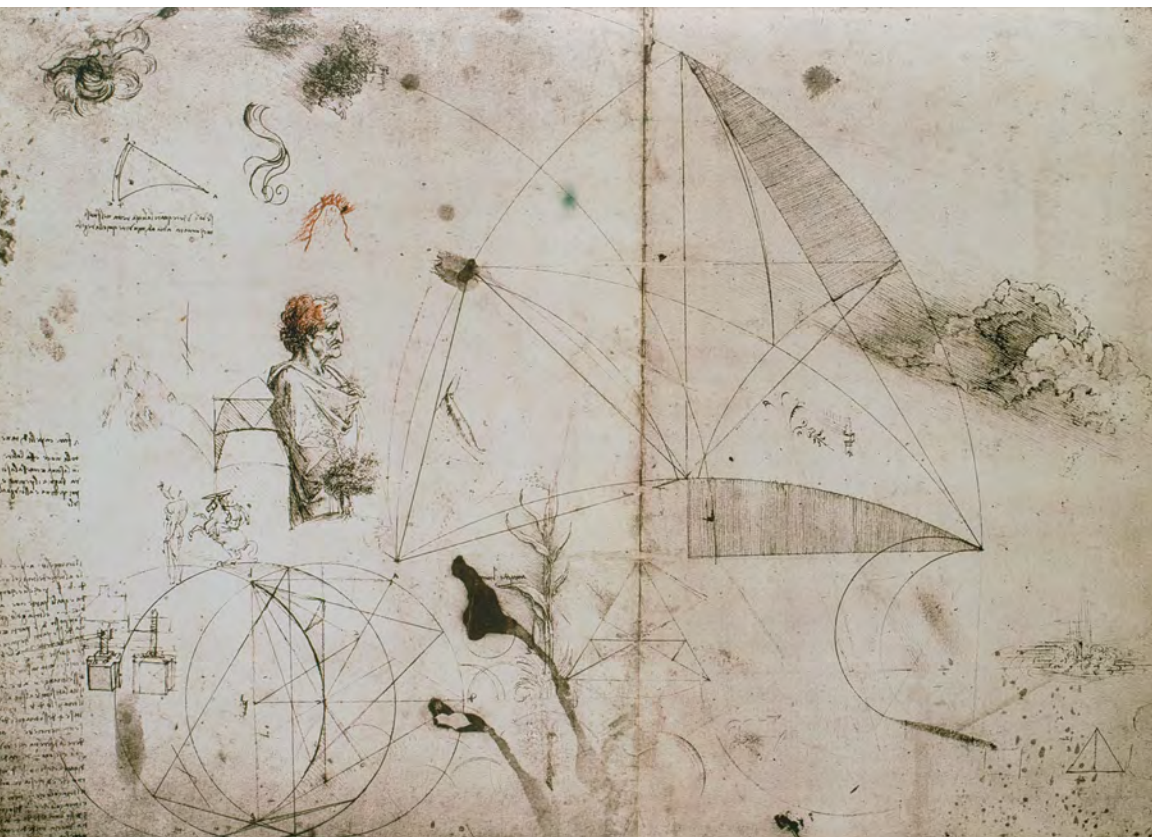


Fig. 24. A notebook sheet c. 1490.



Fig. 25. Keyboard-operated bell.



Fig. 26. Leonardo's craggy warrior and a grotesque.



Fig. 27. Copy of a grotesque from Leonardo's studio.



Fig. 28. Five heads.



Fig. 29. Nutcracker man and young man, 1478.



Fig. 30. Old man and probably Salai, 1490s.

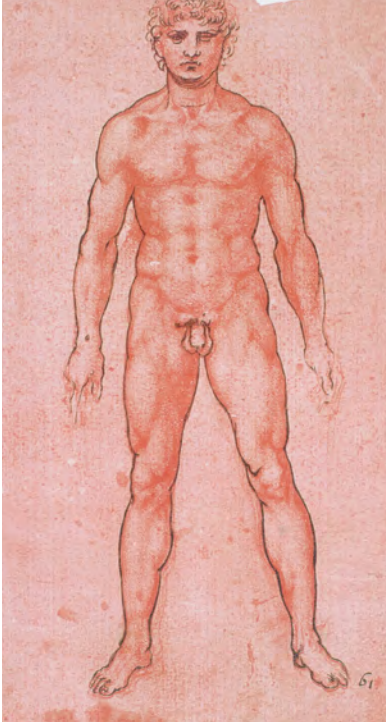


Fig. 31. Salai c. 1504.



Fig. 32. c. 1504.



Fig. 33. c. 1510.



Fig. 34. c. 1517.



Fig. 35. Allegorical drawing of Pleasure and Pain.



Fig. 36. Milan Cathedral, with tiburio.

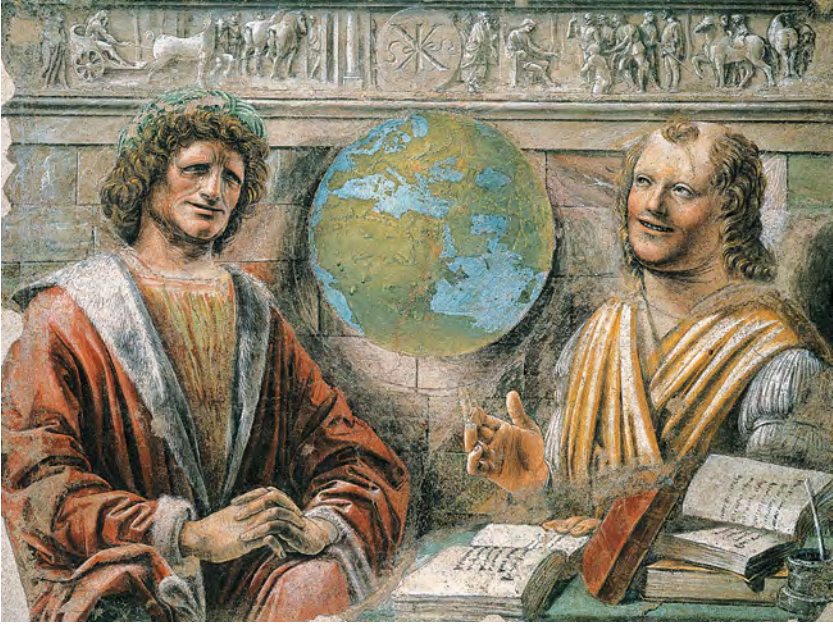


Fig. 37. Bramante's *Heracitus and Democritus*, Leonardo on the left.

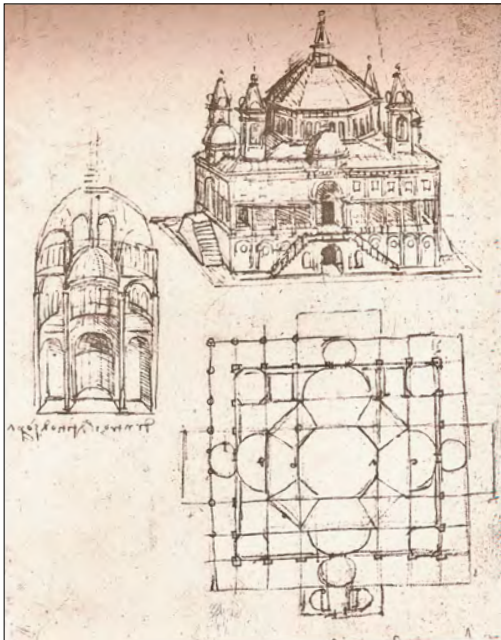


Fig. 38. Church drawings.

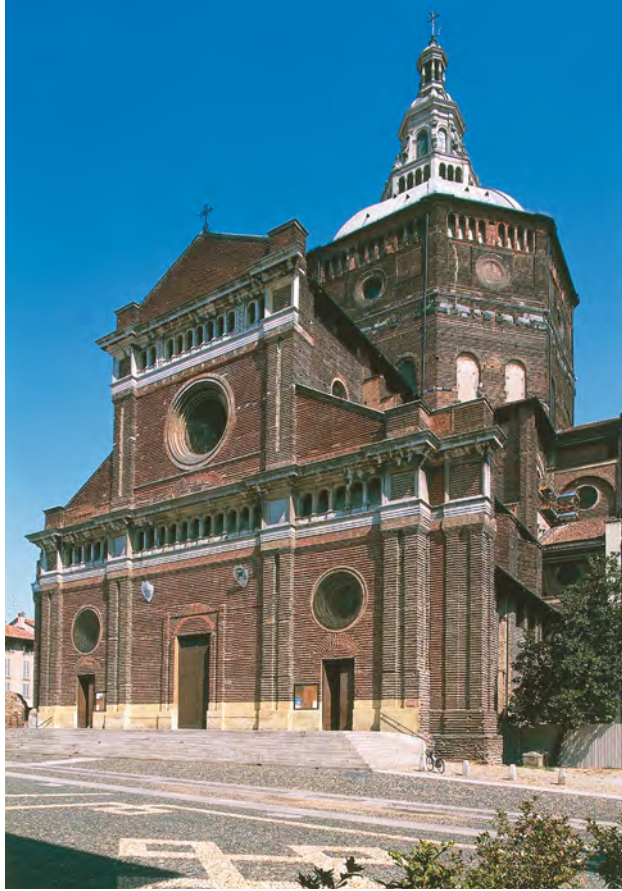


Fig. 39. Pavia Cathedral.



Fig. 40

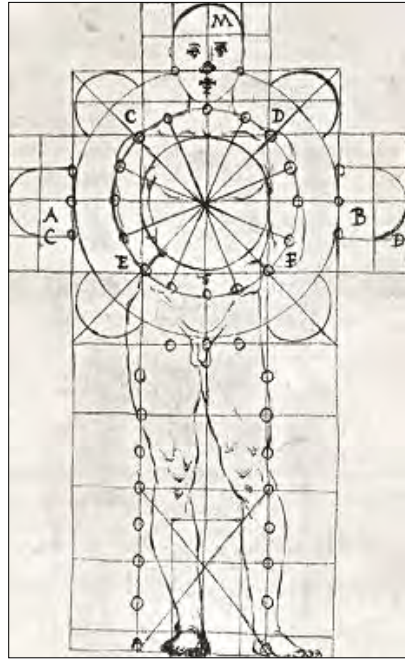


Fig. 41



Fig. 42

Francesco di Giorgio's drawings of Vitruvian Man.



Fig. 43. Giacomo Andrea's drawing of Vitruvian Man.

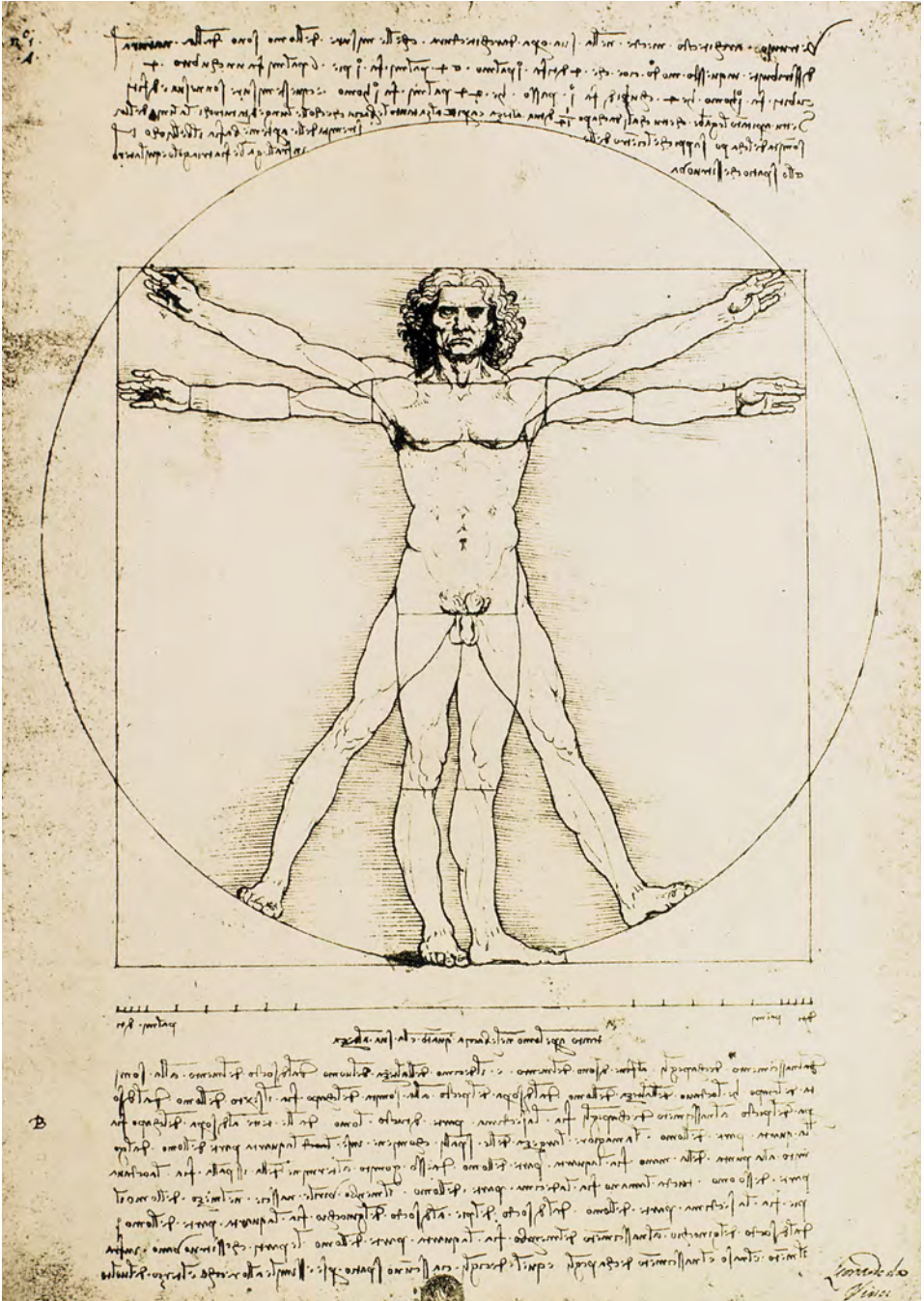


Fig. 44. Leonardo's Vitruvian Man.

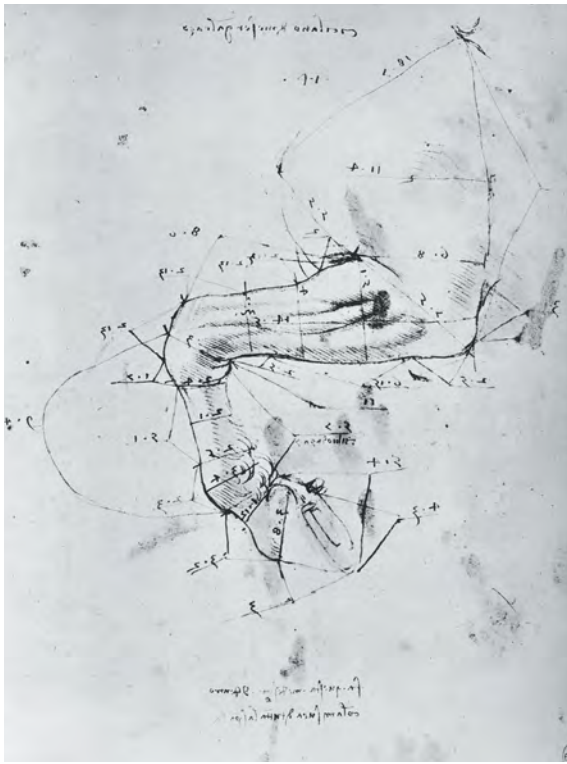


Fig. 45. Leg of horse.



Fig. 46 Study for the Sforza monument.

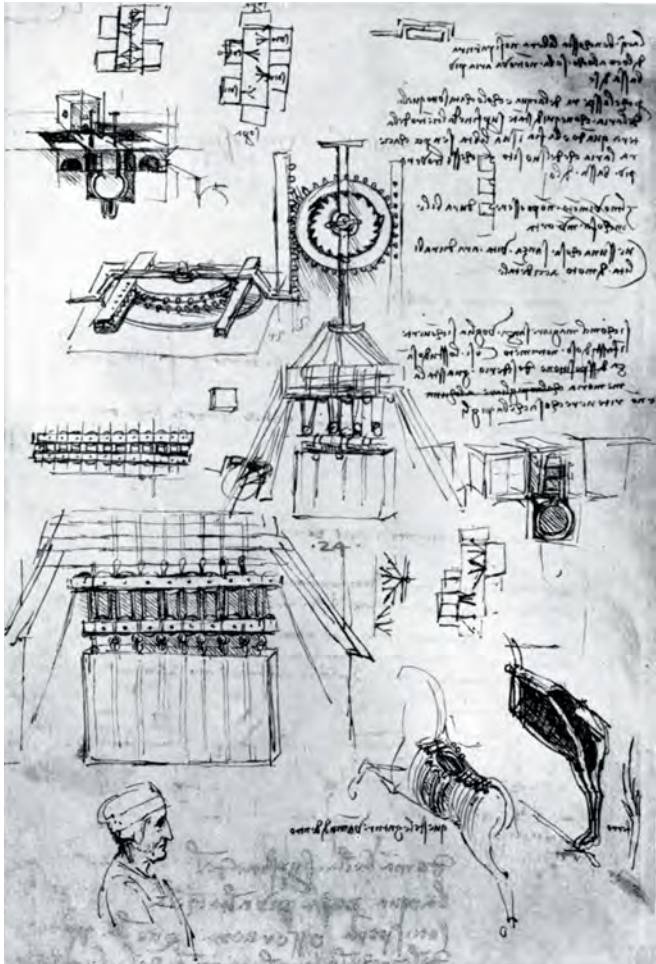


Fig. 47. Plans for casting the monument.

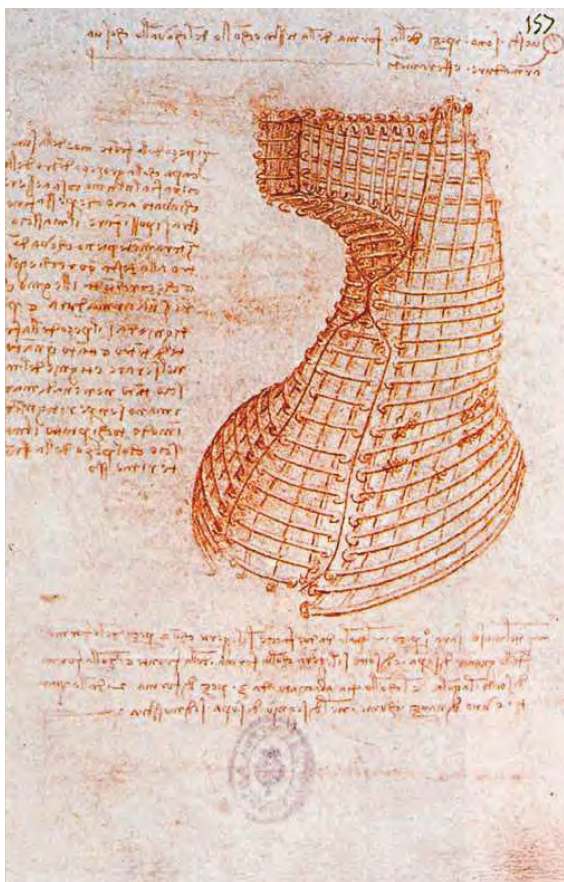


Fig. 48. Casting hood for the monument.

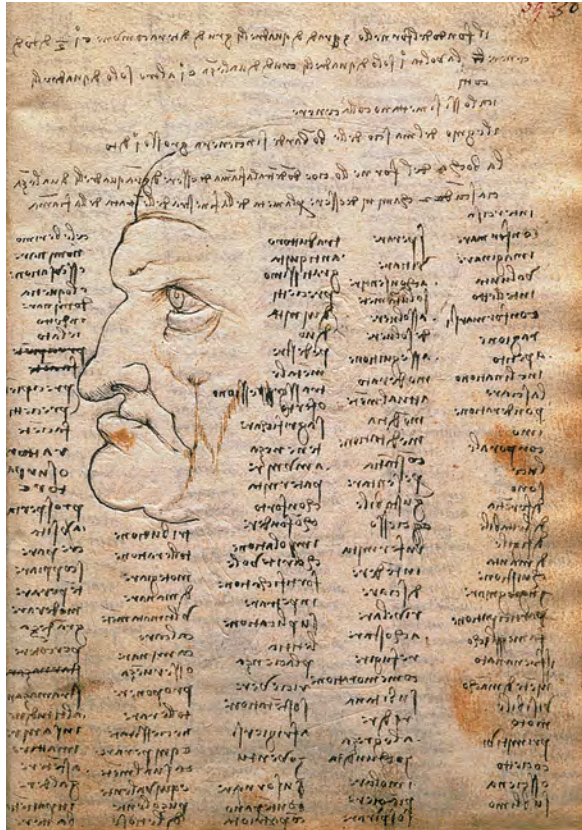


Fig. 49. Trying to learn Latin, with a grimace.

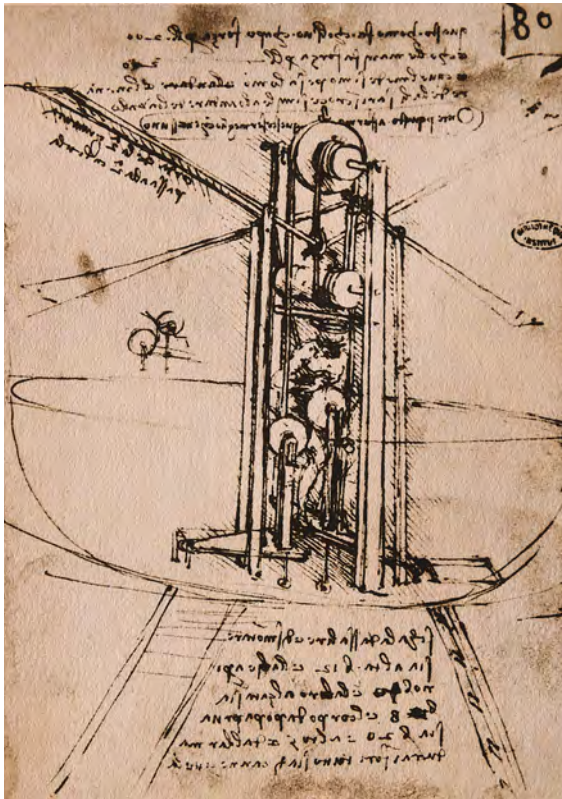


Fig. 50. A human-powered flying machine.

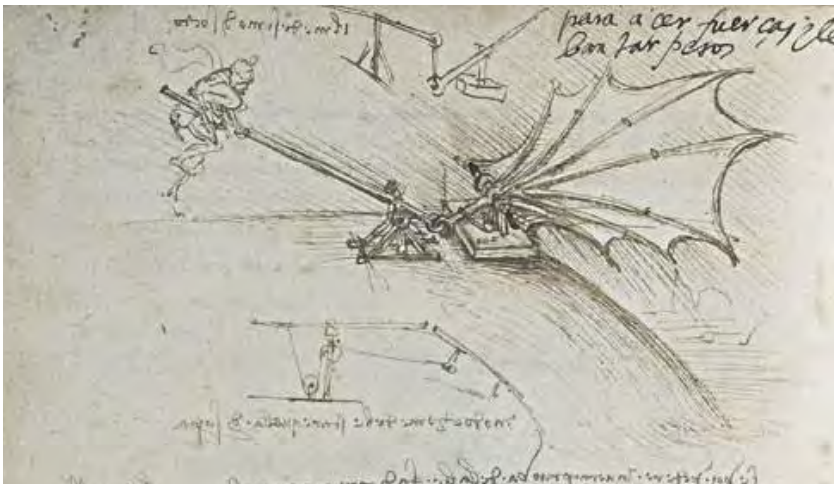


Fig. 51. A wing with hinges.

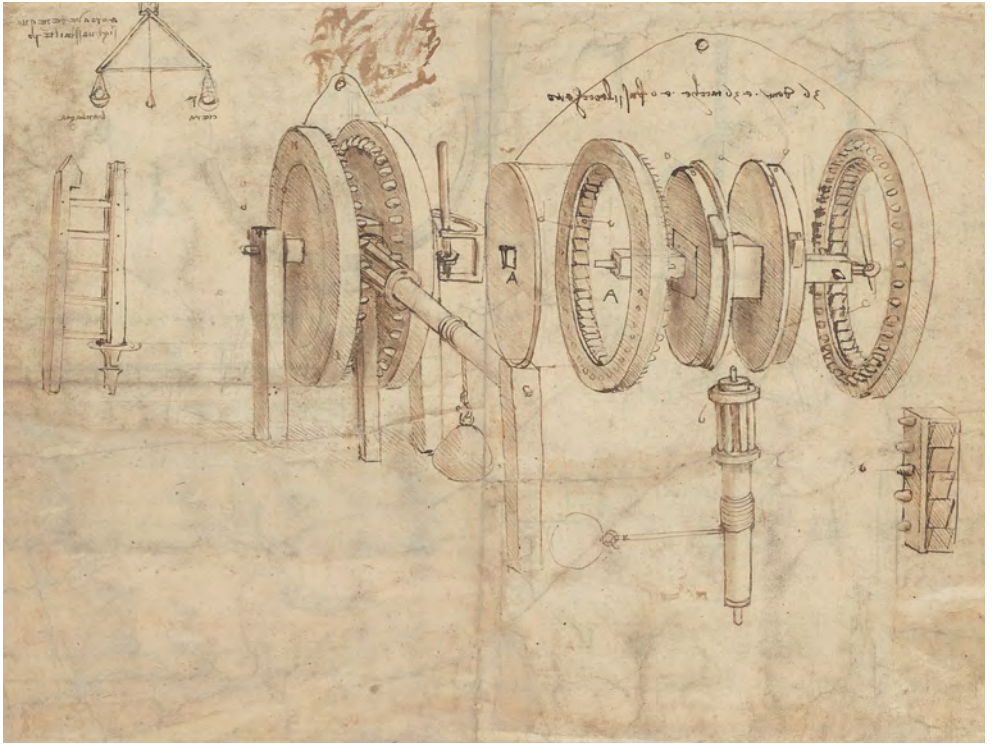


Fig. 52. A hoist with view of components.

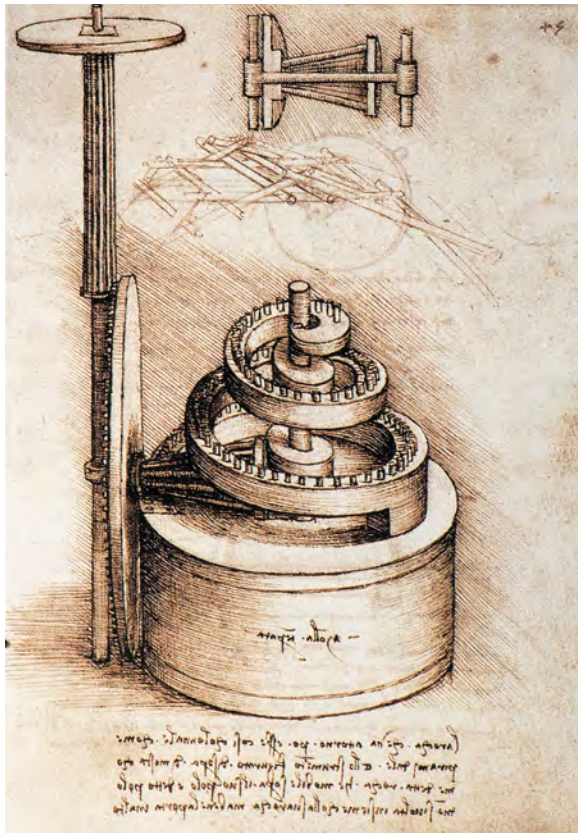


Fig. 53. A spiral gear for equalizing spring power.

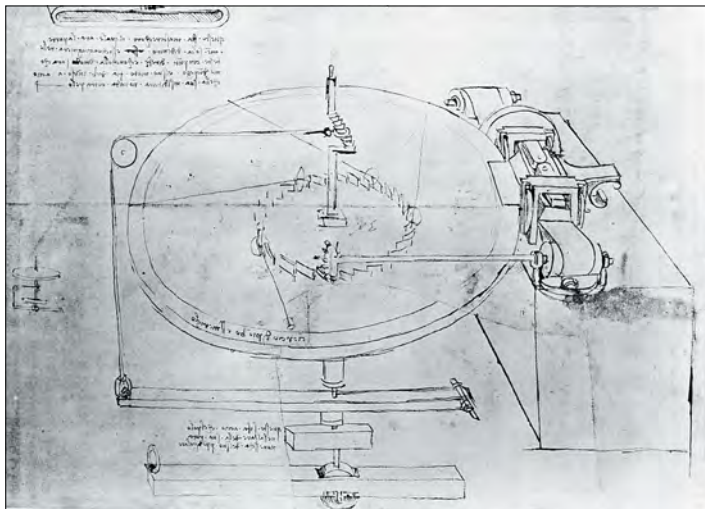


Fig. 54. Needle-grinding machine.



Fig. 55. A perpetual-motion machine using a water screw.



Fig. 56. A screw jack with ball bearings.



Fig. 57. Luca Pacioli.

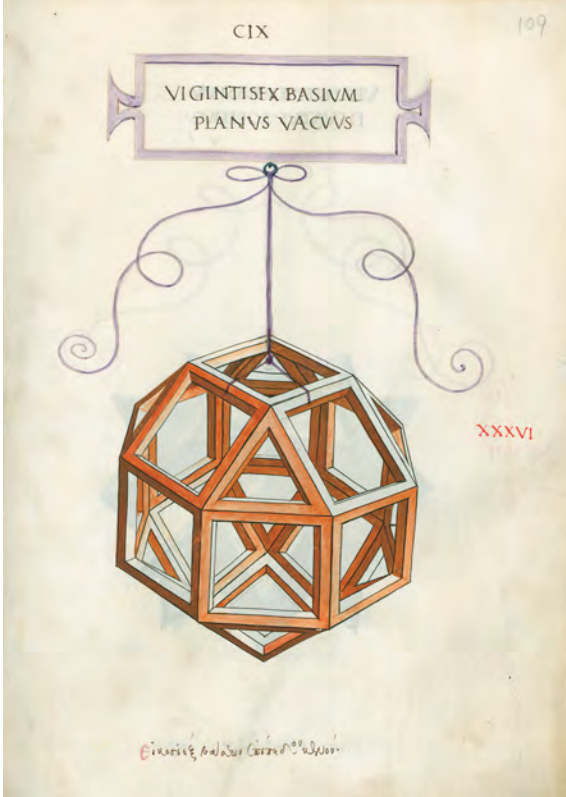


Fig. 58. Leonardo's rhombicuboctahedron for Pacioli's book.

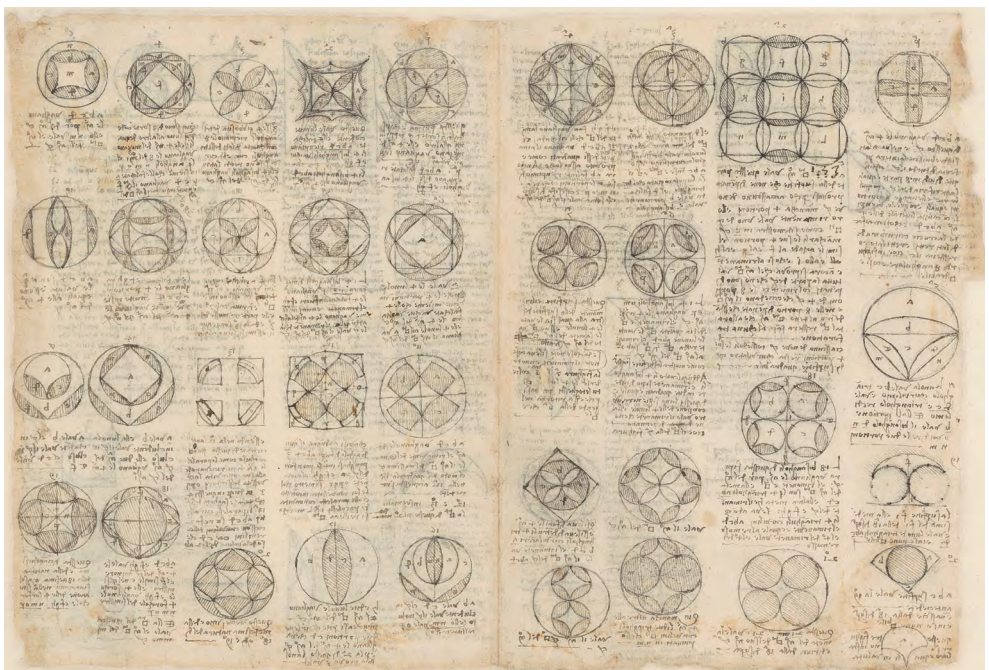


Fig. 59. Finding equivalent geometric areas.



Fig. 60



Fig. 61

Skull drawings, 1489.



Fig. 62



Fig. 63

Proportions of the face.



Fig. 64. *Virgin of the Rocks* (first version, Louvre).



Fig. 65. *Virgin of the Rocks* (second version, London).



Fig. 66. Study for *Virgin of the Rocks*.



Fig. 67. *Portrait of a Musician.*



Fig. 68. *Lady with an Ermine*, Cecilia Gallerani.



Fig. 69. *La Belle Ferronnière.*



Fig. 70. *Portrait of a Young Fiancée*, also known as *La Bella Principessa*.



Fig. 74. *The Last Supper*.

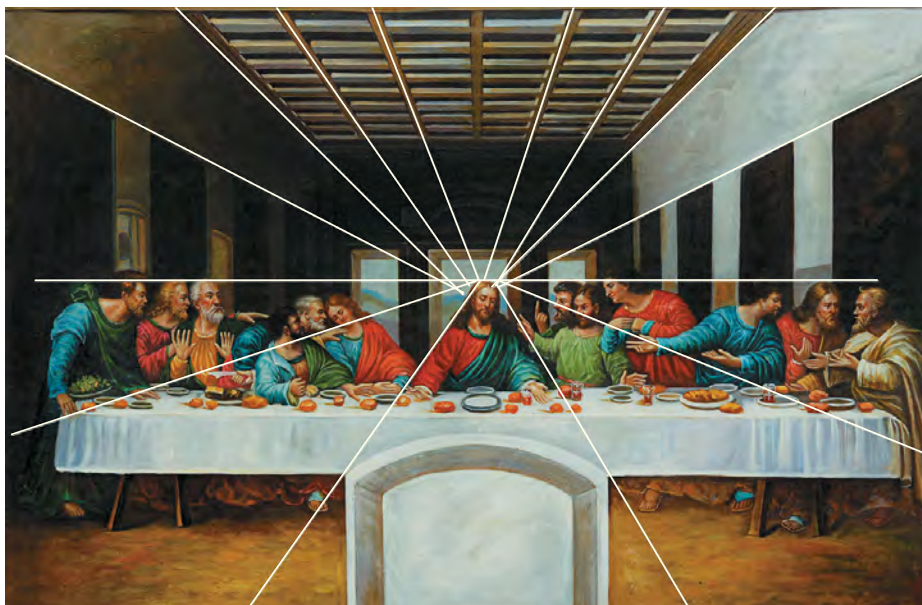


Fig. 75. Perspective lines of *The Last Supper*.



Fig. 76. The refectory with *The Last Supper*.

Expenses for Caterina's death. burial:

For 3 pounds of candle wax	s. 27
For the bier	s. 8
A pall for the bier	s. 12
For bearing and placing a cross	s. 4
For the bearers	s. 8
For 4 priests and 4 clerks	s. 20
Bell, book, sponge,	s. 2
For the gravediggers	s. 16
For the dean	s. 8
For the license	s. 1

s. 106

[Earlier expenses]

Doctor	s. 5
Sugar and candles	s. 12

s. 123



Fig. 77. Drawing of Isabella d'Este.



Fig. 78. *Madonna of the Yarnwinder* (Lansdowne version).



Fig. 79. *Virgin and Child with Saint Anne.*

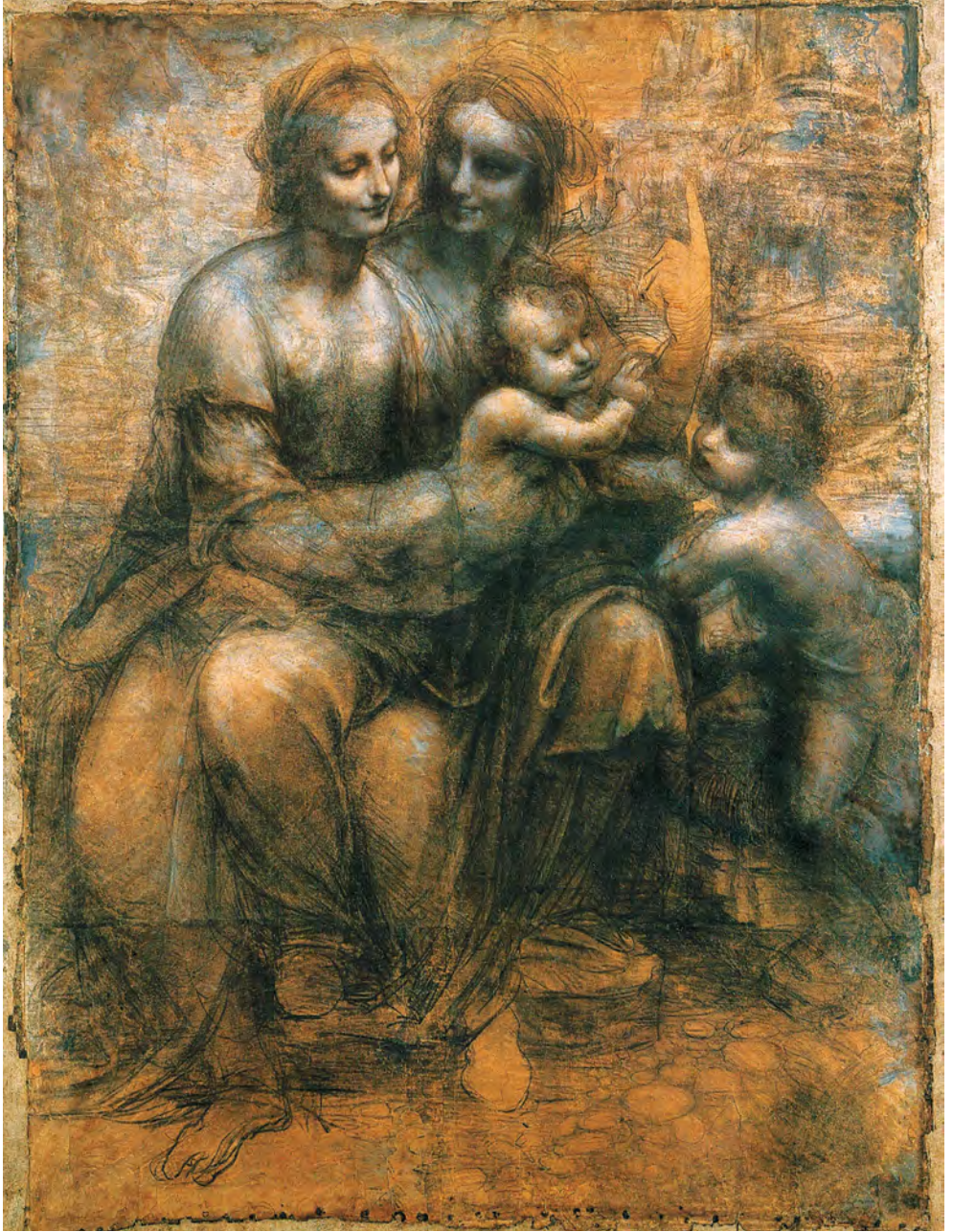


Fig. 80. Burlington House cartoon for *Saint Anne*.



Fig. 81. Francesco Melzi copy of *Leda and the Swan*.



Fig. 82. Leonardo's preparatory drawing for *Leda and the Swan*.



Fig. 83. *Salvator Mundi*.



Fig. 84. Image through a crystal orb.



Fig. 85. Leonardo's sketches probably of Cesare Borgia.

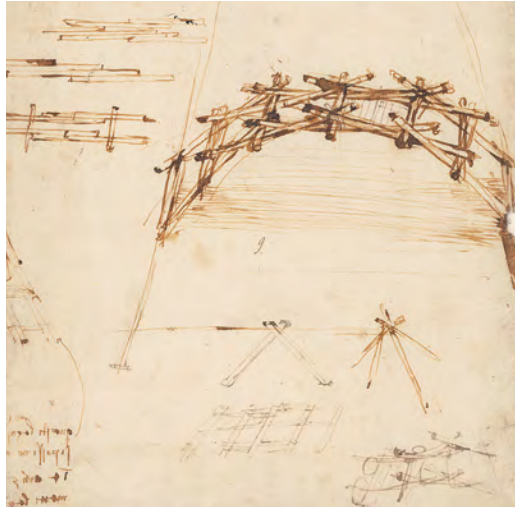


Fig. 86. Self-supporting bridge.



Fig. 87. Leonardo's map of Imola.

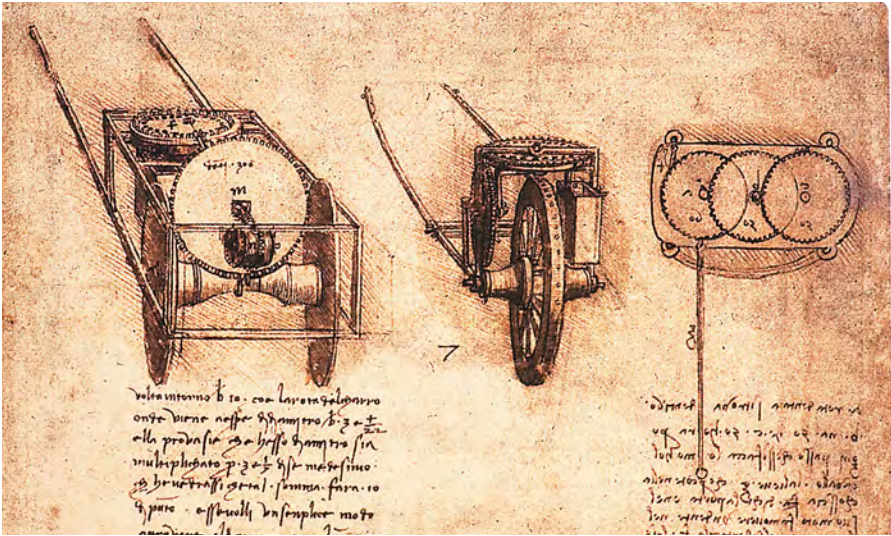


Fig. 88. An odometer.

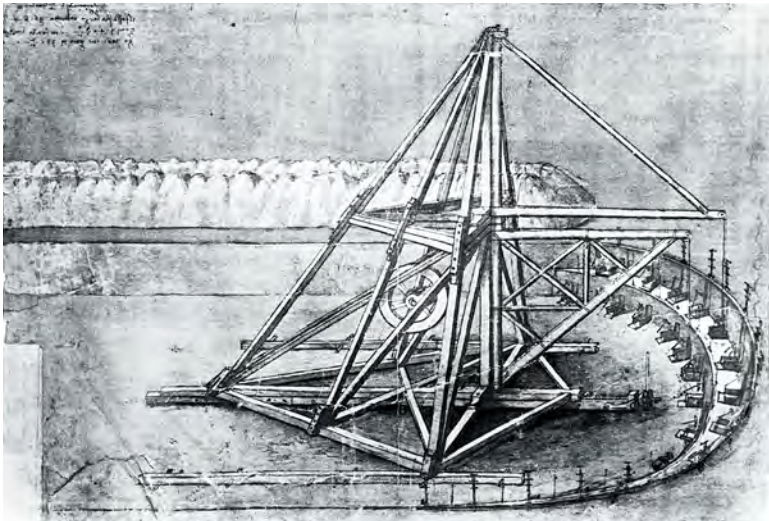


Fig. 89. Machine for digging canals.



Fig. 90. Topographic view of the Chiana Valley.



Fig. 91. Peter Paul Rubens' copy of Leonardo's *Battle of Anghiari*.



Fig. 92. Florence's Palazzo della Signoria, now the Palazzo Vecchio, in 1498 during the burning of Savonarola. The Duomo is on the left.



Fig. 93. Study for the
Battle of Angiari.



Fig. 94. A warrior for the
Battle of Angiari.



Fig. 95. Conveying the motion of horses.



Fig. 96. Horses showing fury, with an angry lion and man in the center.

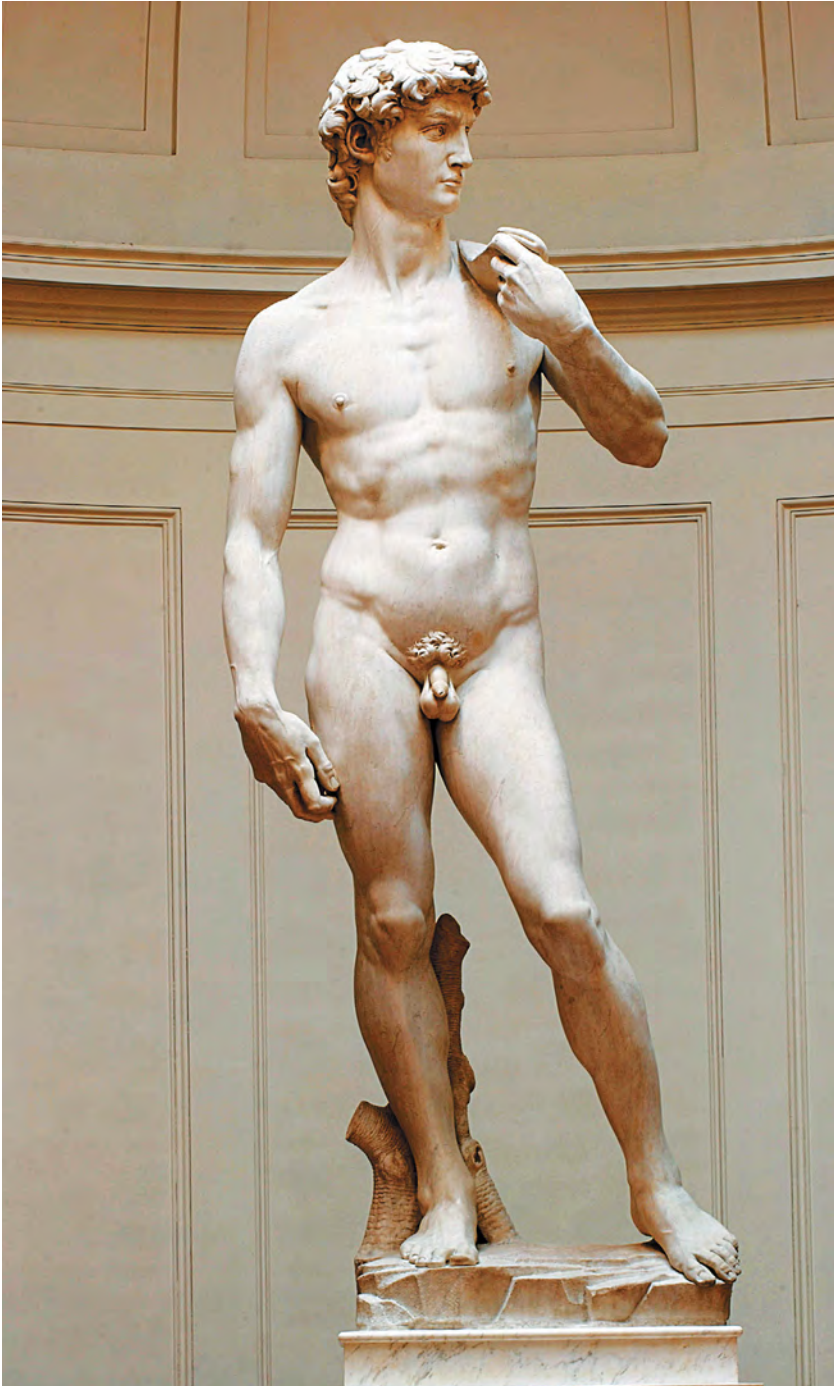


Fig. 97. Michelangelo's *David*.



Fig. 98. Leonardo's notebook sketch of Michelangelo's *David*.



Fig. 99. A copy of Michelangelo's lost *Battle of Cascina*.



Fig. 100. Michelangelo's *Doni Tondo*.



Fig. 101. Francesco Melzi by Boltraffio.

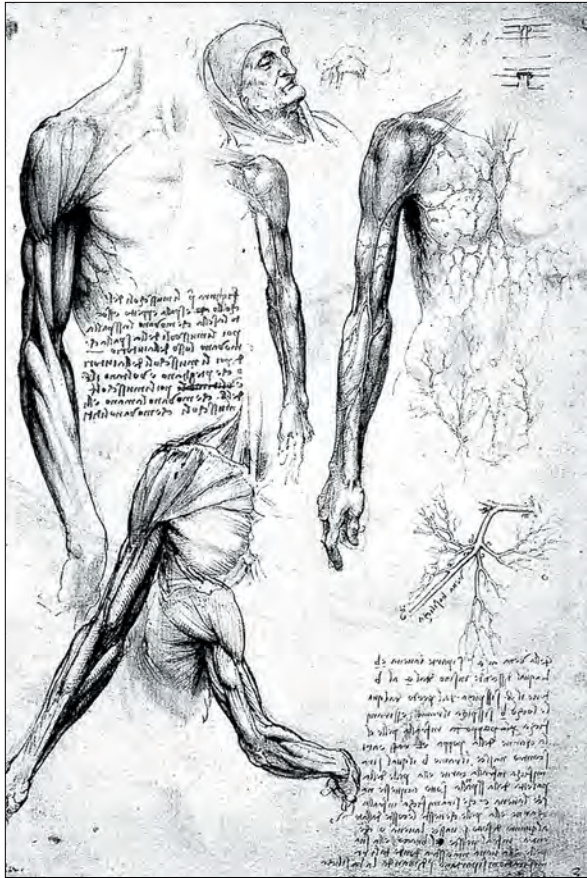


Fig. 102. The centenarian and his muscles.

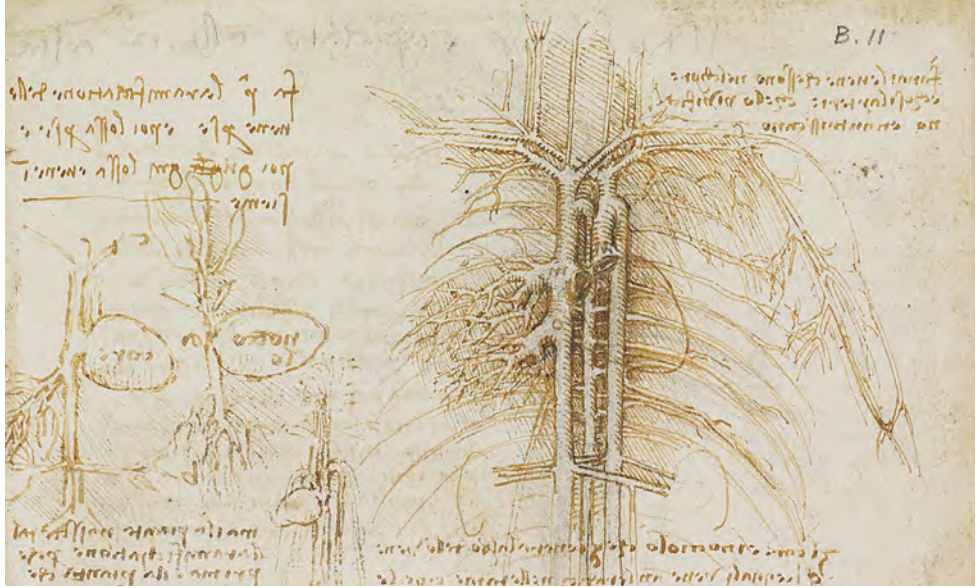


Fig. 103. The heart and arteries juxtaposed with a sprouting seed.

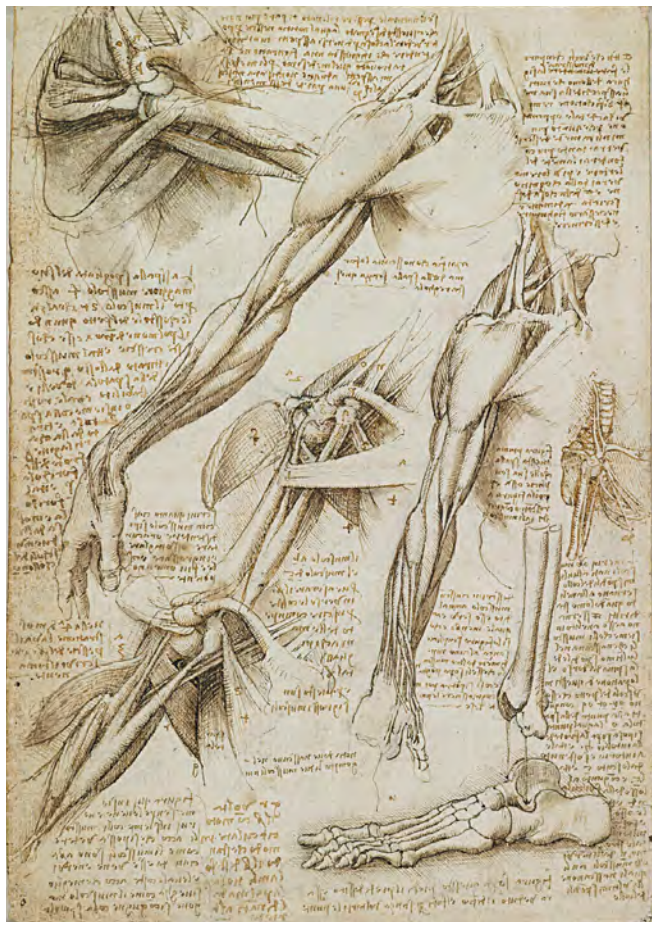


Fig. 104. Multiple layers of bone and muscle.

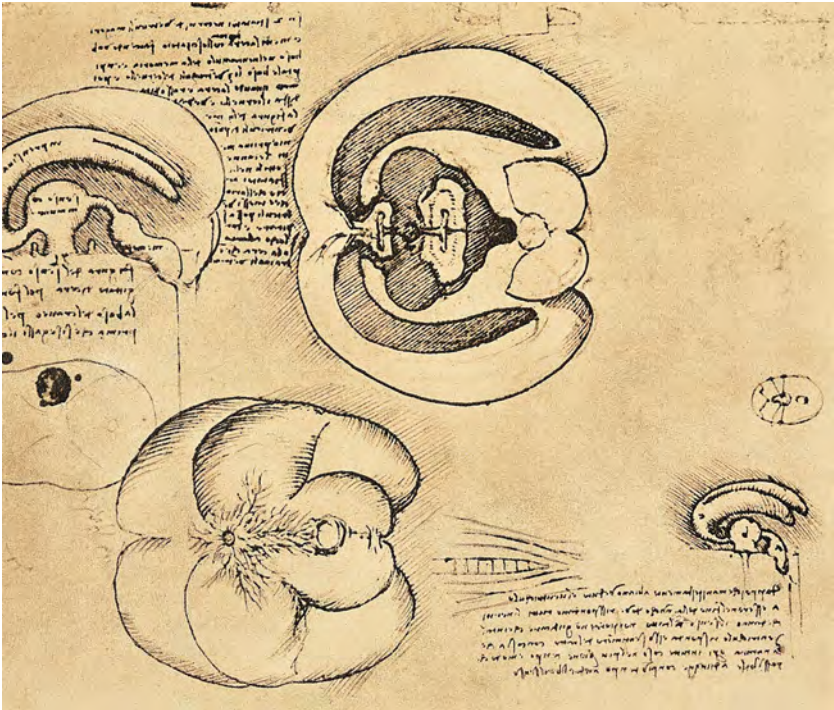


Fig. 105. Method for making a wax cast of the brain.



Fig. 106. Nerves and ventricles of the brain.



Fig. 107. Muscles of the shoulder.



Fig. 108. Muscles of the leg.

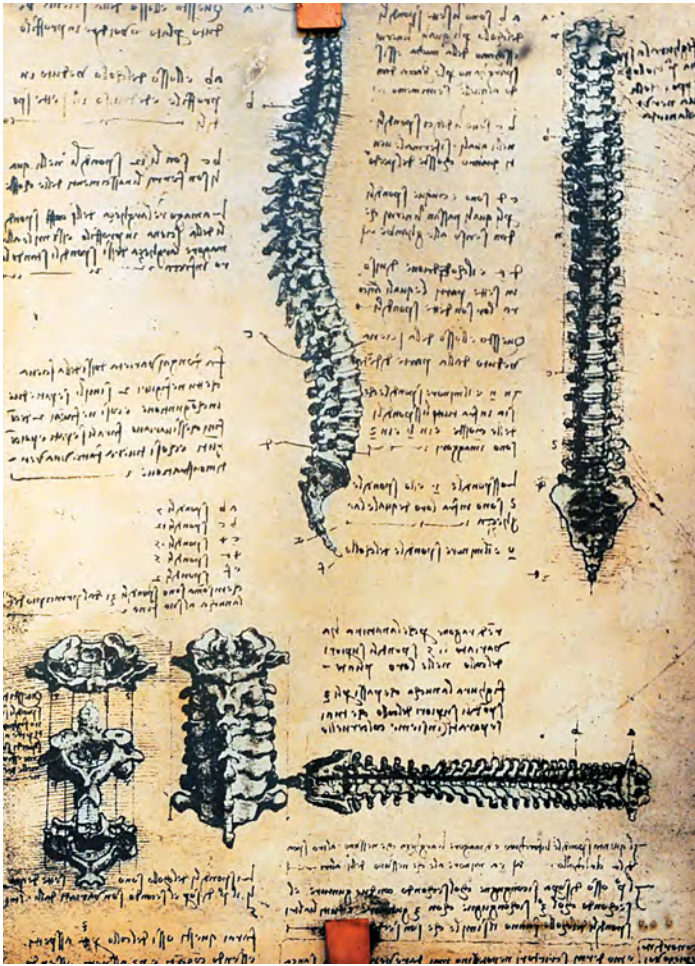


Fig. 109. The spine, with exploded view.



Fig. 110. Dissections of arms and face.

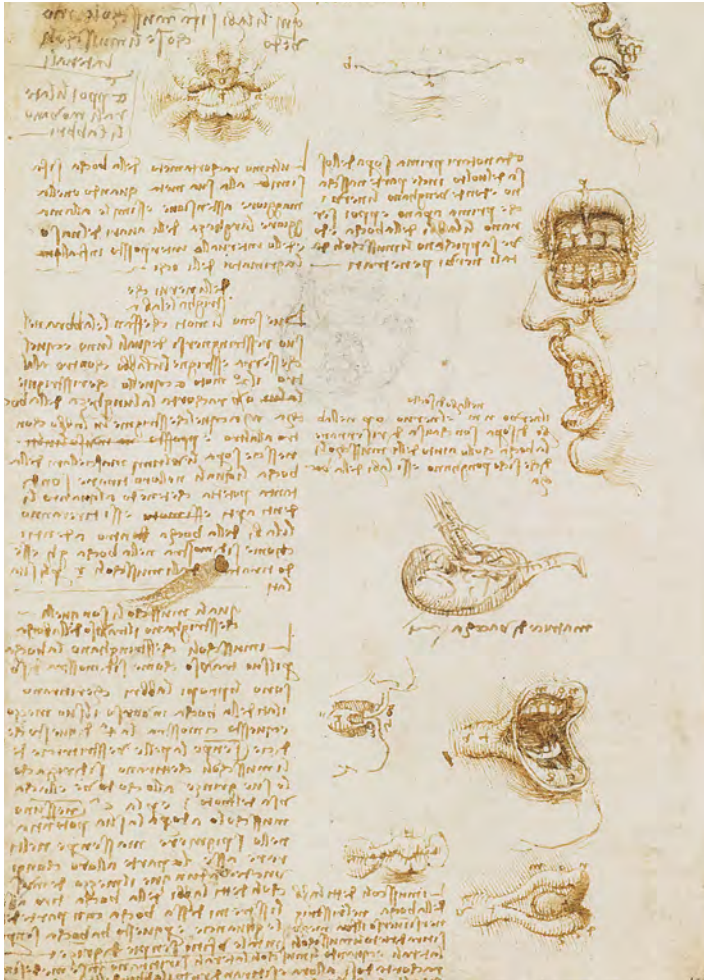


Fig. 111. Nerves and muscles of the mouth.

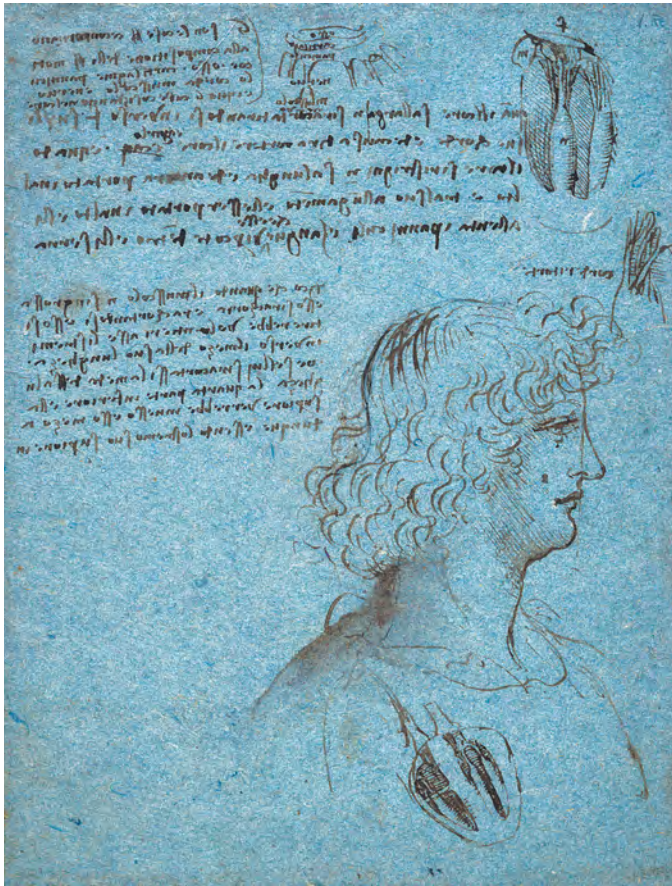


Fig. 112. The heart with Salai.

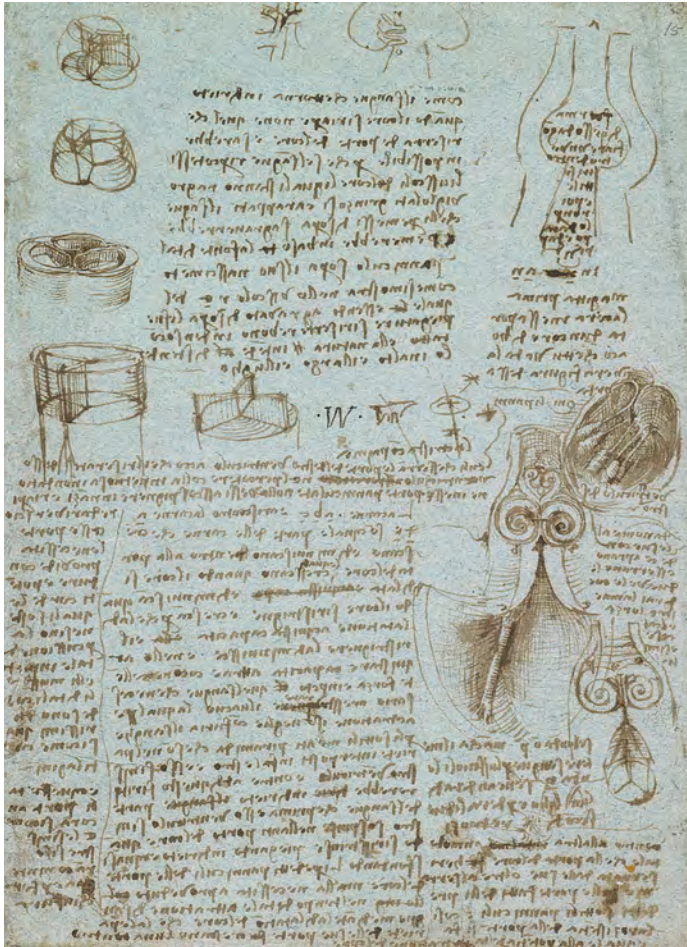


Fig. 113. The aortic valve.



Fig. 114. Fetus in the womb.



Fig. 115. Water passing obstacles and falling into a pool.



Fig. 116. Star of Bethlehem flower.

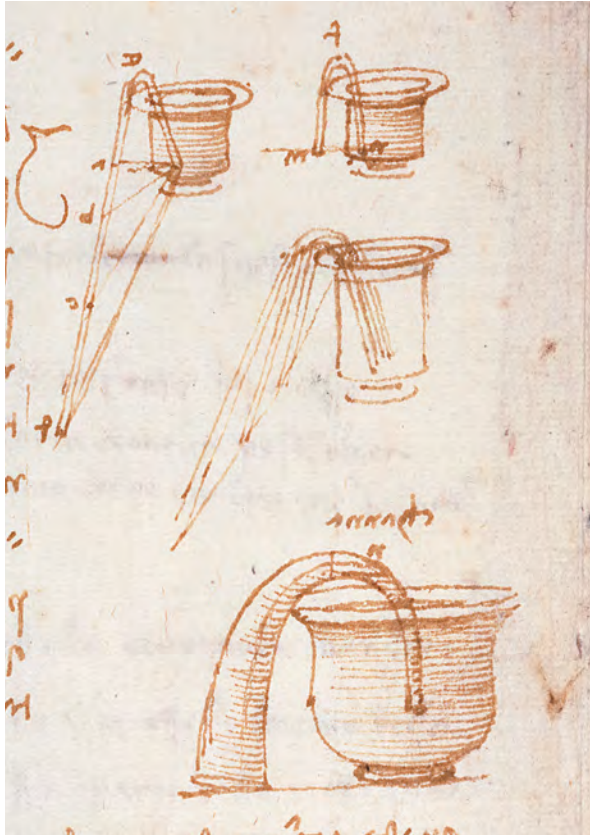


Fig. 117. Thought experiment using siphons.



Fig. 118. Old man and studies of moving water.



Fig. 119. Melzi's drawing of Leonardo.



Fig. 120. Raphael's pointing Plato, possibly based on Leonardo.



Fig. 121. A student sketch possibly of Leonardo.



Fig. 122. Portrait of Leonardo in Vasari's book.



Fig. 123. The Lucan portrait.



Fig. 124. Portrait in the Uffizi.



Fig. 125. The Turin portrait.



Fig. 126. Possible self-portrait in notebook.

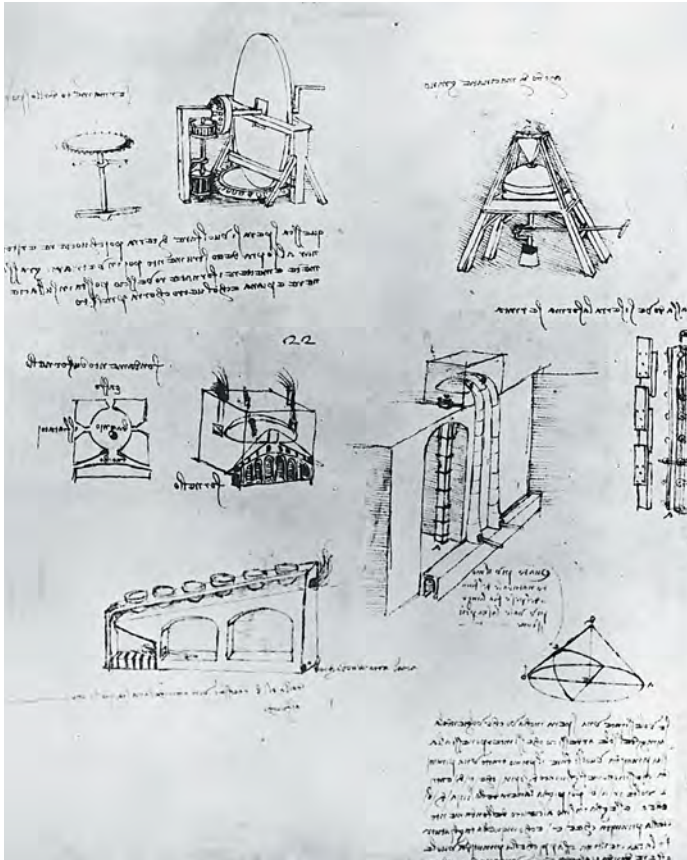


Fig. 127. Machine for making mirrors.

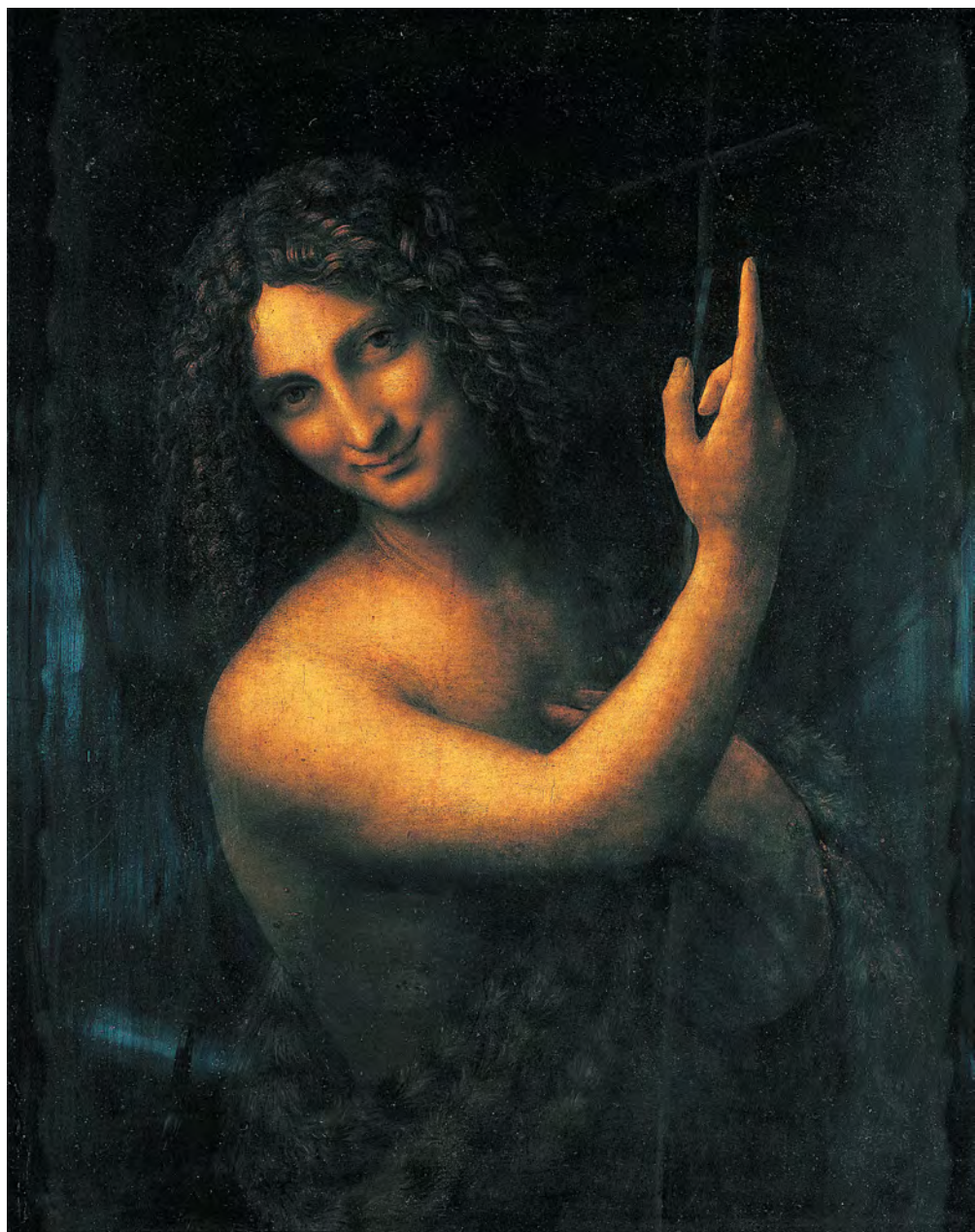


Fig. 128. *Saint John the Baptist.*



Fig. 129. Saint John converted to a Bacchus.



Fig. 130. Copy of the lost *Angel of the Annunciation*.



Fig. 131. Student sketch of *Angel of the Annunciation*, corrected by Leonardo.

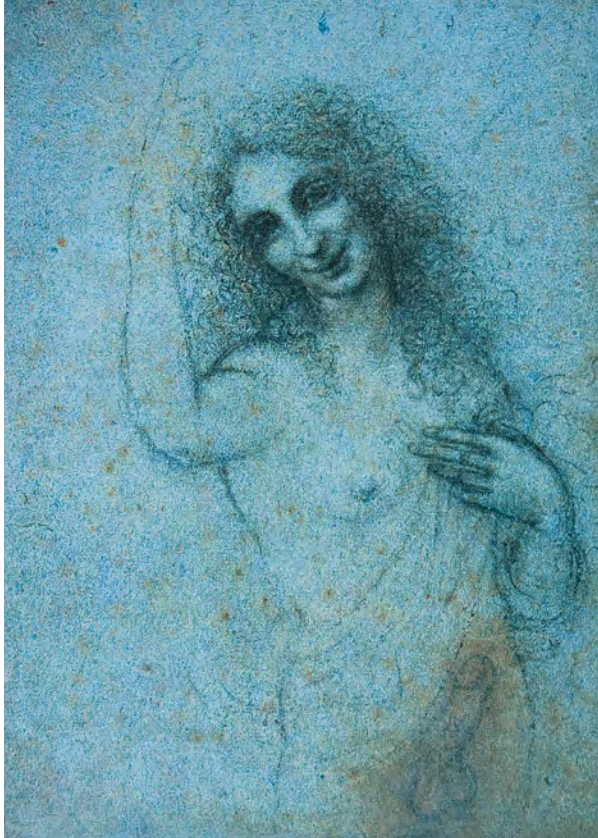


Fig. 132. *Angel Incarnate*, with breasts and erection.



Fig. 133. *Pointing Lady*.

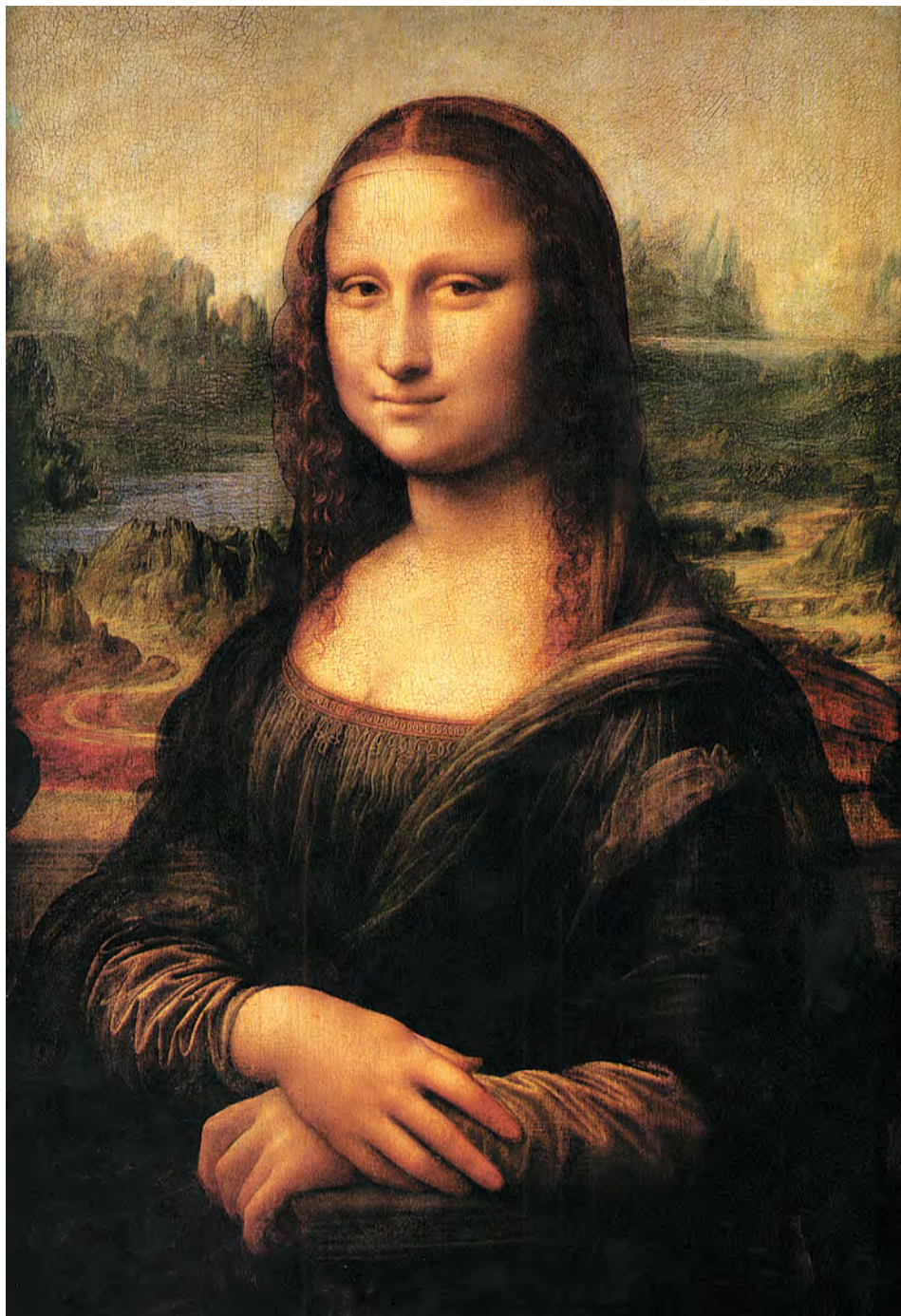


Fig. 134. The *Mona Lisa*.



Fig. 135. The Prado copy.



Fig. 136. The *Monna Vanna*.



Fig. 137. King Francis I of France,
Leonardo's final patron.



Fig. 138. Château de Cloux, now called Clos Lucé.



Fig. 139. Leonardo's last bedroom.



Fig. 140. Drawing for a masquerade.



Fig. 141.

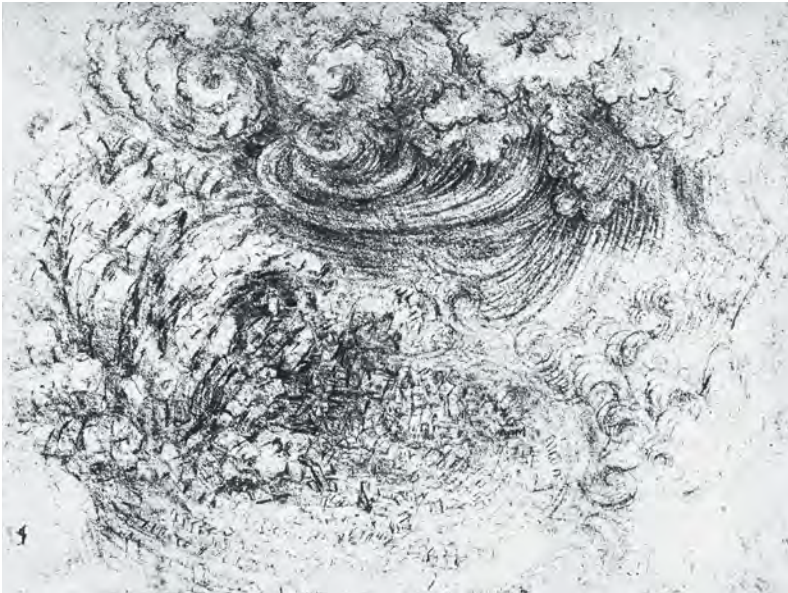


Fig. 142.

Deluge drawings.



Fig. 143. Studies of right triangle areas, ending with “the soup is getting cold.”



Fig. 144. Jean-Auguste-Dominique Ingres, *The Death of Leonardo*.