

MAKING MARVELS

A PICTURE ALBUM



Making Marvels

A PICTURE ALBUM

Innovation, technology, and spectacle come together in wondrous works of art and science. Embodying the creative achievements of the royal courts of Europe, the objects featured in *Making Marvels* demonstrate how European royalty, from the Renaissance to the Enlightenment, expressed status through ingeniously crafted inventions. These works, beautifully illustrated and engagingly discussed, inspired technical advances that had a vast influence on astronomy, engineering, craftsmanship, and even international politics.

48 PAGES; 31 ILLUSTRATIONS

MAKING MARVELS

A PICTURE ALBUM



THE
MET

THE METROPOLITAN MUSEUM OF ART, NEW YORK





From the Renaissance
to the Enlightenment,
marvels inspired
extraordinary advances in
science, technology,
and the arts.

Today the word *marvel* is applied to anything from films to video games, but, for a certain period in early modern history, it signified a truly spectacular invention. In the Renaissance, Baroque, and early Enlightenment periods—a transformative era



in Europe, between the outdated medieval order and the tumult wrought by the French Revolution—the pursuit of the marvelous was closely associated with the quest for innovation. Often, objects intended to express majesty and opulence also signaled major advances in science, technology, and the arts.

The definition of what was marvelous depended in part on scholars, clergymen, and, especially, princes, for whom natural wonders represented both their material possessions and their power over the natural and human world. For the early modern ruler, authority was conferred by not only the *possession* of wealth and

titles, but their *expression*. By building *Kunstkammern*, or “cabinets of curiosity”—thoughtfully selected collections of objects and instruments, each more handsome, inventive, or astounding than the next—and embracing practices that showcased their skill and erudition, princes of the era proclaimed their right to rule.

Marvels came in many forms and were usually ostentatious, standing out among the objects in a collection to captivate visitors with their superior craftsmanship, ingenious functionality, and sparkling materials. Chief among the last was silver, which was itself a form of currency and thereby an expression of wealth. The sheer value of this treasured material, combined with its sheen, resistance to corrosion, and malleability, inspired artisans to fashion silver items for their affluent clients.



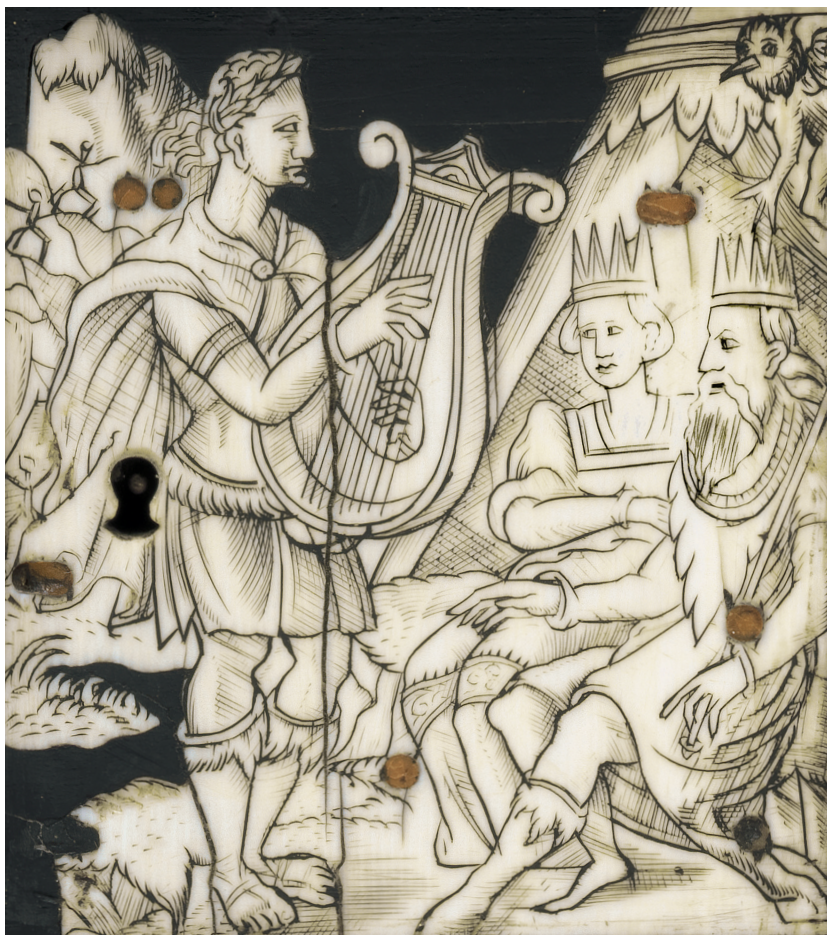
PAGE 04:
Centerpiece, 16th century

PAGE 05:
Writing Box, ca. 1560/70

THIS PAGE:
Automaton Clock, 17th century







ABOVE:

Miniature Collector's Cabinet, ca. 1600

OPPOSITE:

The Cittern Player Automaton, 17th century







A ruler's possession
of a wide-ranging
and all-encompassing
collection became
a symbol of his mastery
over the world.

Silver showpieces were but one facet of the princely treasure. Nearly every ruling dynasty in Europe between 1550 and 1750 amassed vast collections of precious and amusing objects. The attractiveness and value of these *Kunstkammern* evinced the power of the rulers who assembled them, for they presented a rich display of natural, scientific, and artistic wonders, and they were considered expressions of their owners' virtue, status, and erudition.

Beginning in the early sixteenth century, discoveries from the New World together with a flowering of the arts, a radically altered cosmology, and improved technologies sparked wonder and curiosity for which the *Kunstskammer* provided an ideal setting. Collectors favored astounding examples of virtuosic skill and





human creativity as well as extremely rare, beautiful, or unusual products of nature, and they sought out artifacts from foreign lands, finds from the remote past, and special tokens and portraits of former or contemporary figures, not to mention in-

novative tools, scientific instruments, automata, and clocks. All of these made *Kunstkammern* seem like mirror images of the divine creation—microcosms reflecting the macrocosm created by God.

Since these collections of marvels were intended to evoke awe, they naturally included assemblages of gemstones. These signaled a prince's ownership of valuable natural wonders and when cut into sparkling jewels implied an understanding of proportion, geometry, and refraction. Long invested with talismanic meanings, astral powers, and medicinal properties, gemstones were splendid markers of wealth and scientific possibility.

PAGE 12:

*Hat Ornament with the
"Dresden Green" Diamond,
second half of 18th century*

PAGE 13:

Ostrich Egg Ewer, ca. 1630

THIS PAGE:

Drinking Horn, ca. 1540–50









OPPOSITE:
Grotesque Wild Boar, 1603–9

ABOVE:
Turtle Automaton with Neptune as Vintner, 1626





Collecting practices of
the sixteenth and
seventeenth centuries
gave rise to courtly
marvels that were central
to the growth of a new
experimental philosophy.

Before the early modern period, forms of knowledge had been separated: certain knowledge was the realm of theologians and university-trained practitioners of the exact *sciences*, while sensory engagement with nature was the realm of artisans, who achieved mastery over natural materials through the mechanical *arts*. The joining of these two realms was one of the most consequential results of the centralization of wealth and power that underpinned the flourishing of the noble courts of Europe.

These courts competed to attract and retain highly skilled artisans, who could produce the marvels that represented and sustained princely power. Artisanal skill involved a deep knowledge of materials and the processes used in their manipulation. Artisans passed this knowledge on to princes, whose education in science, craft, and natural philosophy was essential to the foundations of their leadership.

Among the modes of instruction deemed most suitable for a prince was ivory turning. Beginning in the sixteenth century, artisans pioneered a method



of working raw ivory into dazzling forms via the lathe, a machine traditionally used to generate decorative elements of architecture or furniture. Ivo-

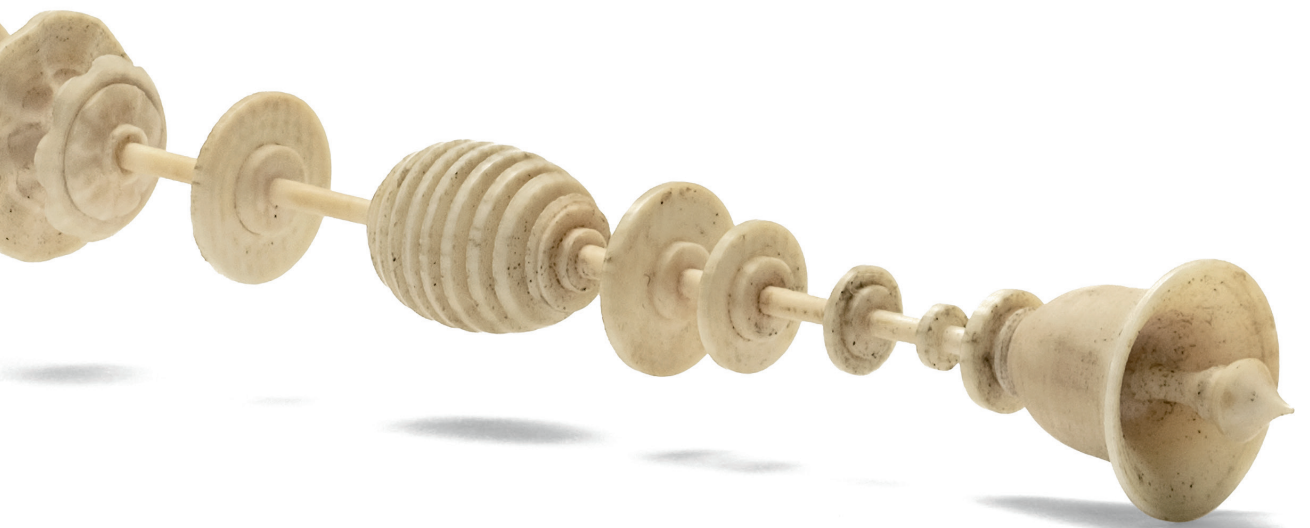
ry turning required a deep understanding of mathematics, which was essential as well for military pursuits (specifically ballistics and fortifications), land surveying, and astronomical calculation—all activities closely associated with power.

Of course, the princely life was not solely occupied with the acquisition of useful technical skills: some marvels served mainly to entertain and amuse. These wondrous objects were richly outfitted with jewels, “exotic” hardwoods, and other precious materials, which rendered them as artful as they were diverting.

PAGE 21:
Drinking Cup, 1630

THIS PAGE:
Turned-Ivory Piece, ca. 1600







ABOVE:

Chess and Tric-Trac Game Board, 16th century or later

OPPOSITE:

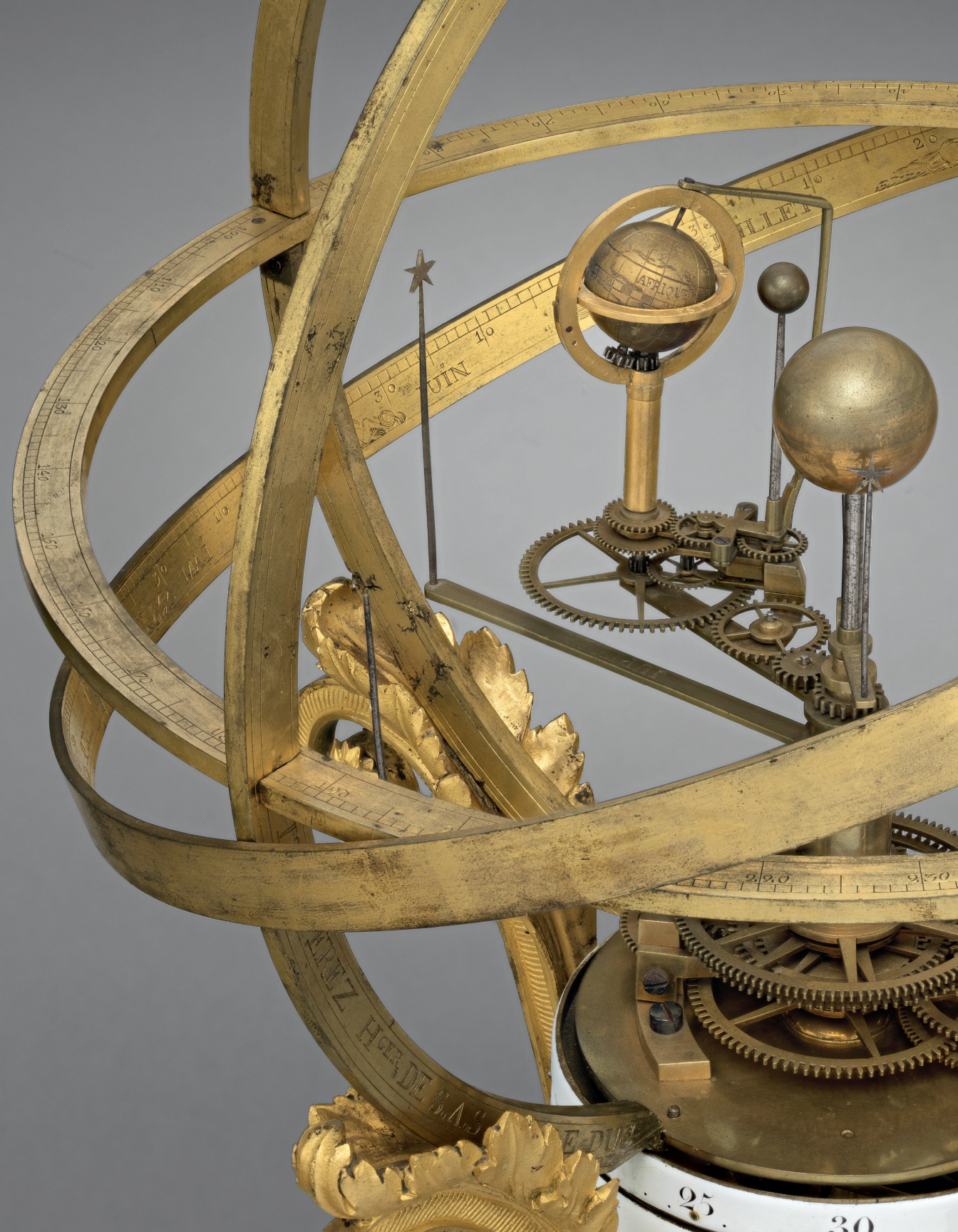
Pietre Dure Night Clock, 1704–5



THIS PAGE:
Casket, ca. 1680









For European rulers,
the exploration of astronomy
and pursuit of alchemy
were part of the effort
to demonstrate mastery over
the natural world.

As a repository of a prince's collection, a *Kunstammer* was a reflection of his worldview. Owning objects that spoke to new developments in science and technology helped further one's reputation as a wise, judicious ruler. Though they took utilitarian form, these objects were often as superbly designed, constructed, and adorned as the most precious decorative arts.



The princely engagement with science was perhaps most evident with astronomy. In fact, most European rulers established centers of astronomical observation at their courts. Understanding the movement of the heavens allowed for more accurate timekeeping, measurement, and astronomical prediction, and instruments that mapped the stars and planets lent their owners certain advantages—such as forecasting the harvest, or even an individual's fate. These objects built on the ancient foundations of the astrolabe and

the sundial, and contributed to the notable scientific developments of the Age of Enlightenment.

In addition to astronomy, rulers across Europe funneled resources toward developing new artisanal, metallurgical, and medicinal products and processes. These efforts were all joined under one field—alchemy—which reached its golden age in Europe in the sixteenth and seventeenth centuries. Alchemy was a complex discipline centered on transforming, purifying, and understanding matter. It was believed that if one could determine what made up valuable materials such as gold, glass, and gemstones, these materials could be recreated in the laboratory for the enrichment of the realm. And since the processes involved



in alchemical experimentation were as important as the end products themselves, the *Kunstkammer* displayed not only beautiful objects but also the remarkable instruments used to manufacture them.

PAGE 30:

Aeolipile (Steam Blower), ca. 1590–1600

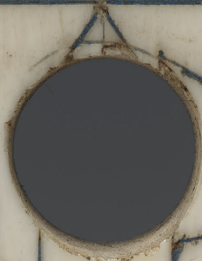
PAGE 31:

Microscope, ca. 1750

THIS PAGE:

Portable Diptych Sundial, 1602





GSPVRG	48	PORTVGAL	42
ORMS	48	CALABRIA	42
RIS	48	GRANATA	39



COPERNICVS

ATRIA



OPPOSITE:
Equation Clock, 1591

ABOVE:
Desk Set with Telescope and Writing Utensils, 17th century





Technical sophistication,
material splendor,
exquisite craftsmanship,
and ingenious invention
converged in clocks
and other mechanically
driven marvels.

Clocks have always been about more than telling time. Following the Bible, medieval and early modern theorists likened the universe to a vast mechanical clock, a comparison that dominated the polemics of the day and rendered clocks symbolic of the wider world. As such, they were greatly sought after for the *Kunstammer*, which was itself conceived as a universe in miniature.

Timepieces of the period were sophisticated instruments with complicated movements, and their exteriors were often equally elaborate, boasting sumptuous materials and ambitious decorations. In many cases, their creation involved cabinetmakers, goldsmiths, enamelists, sculptors, and even makers of musical instruments. Some of the largest examples combined timekeeping with planetary and astrological readings, but even the smallest personal timepieces were extravagantly designed.

The increasingly complex technologies driving clockworks were eventually adapted for use in movable automata. These animated curios, seemingly driven by a divine hand yet wholly the product of their makers' skill and innovation, spoke to the potential of human ingenuity in an era of unparalleled scientific advancement

and discovery. Growing more ambitious, inventors then tried to create machines that could mimic human motion and seem to react intelligently to commands. Their ambition led to astonishing figural automata that could “walk” and gesture as though they were living beings, or even carry out more complicated feats, such as playing chess or writing poetry. Not surprisingly, these moving marvels were among the most coveted items for a princely collection.

Clocks and automata have long reflected humanity’s curiosity and quest for knowledge. In their precise and often mysterious workings, these fascinating machines draw connections between the divinity of the cosmos and the humanist potential to harness or control its power. In the sixteenth, seventeenth, and eighteenth centuries, rulers across Europe used their wealth and status to cultivate an environment where such creativity and ingenuity could blossom. Beauty and innovation thus came together at the courts of early modern Europe, where science and splendor were pursued with equal vigor and together helped form a culture of magnificence.

THIS PAGE:
Musical Automaton Clock,
ca. 1625







Technisches Museum Wien

Inventit et fecit Vienna

1760



OPPOSITE:

Miraculous Writing Machine, 1760

ABOVE:

Caricature of Engravers "à la Grecque," 18th century





OPPOSITE:
Automaton Clock, 1600–1610

ABOVE:
The Moving Monk, ca. 1550

COVER (DETAIL)

Green Turban Shell Cup and Cover
Stand: Johann Joachim Busch (1720–1802)
Cup and cover: German(?), ca. 1600; stand:
German, Mecklenburg, before 1753
Green turban snail shell (*Turbo marmoratus*),
silver (gilded), brass (cast, partially gilded)
H. 14 ³/₁₆ in. (36 cm)
Staatliche Schlösser, Gärten und Kunst-
sammlungen Mecklenburg-Vorpommern,
Schwerin (KH 887)

PAGE 1

Watch
Nicolaus Rugendas the Younger
(1619–1694/95)
German, Augsburg, ca. 1670
Gold, brass (gilded), steel (partly blued),
enamel (painted, raised), rubies
H. 3 ¹/₈ in. (7.9 cm), W. 2 ¹/₈ in. (5.4 cm),
D. ⁷/₈ in. (2.2 cm)
The Metropolitan Museum of Art, New York,
Gift of J. Pierpont Morgan, 1917 (17.190.1520)

PAGE 2 (DETAIL)

Celestial Globe with Clockwork
Gerhard Emmoser (active 1556–84)
Austrian, Vienna, 1579
Silver (partially gilded), brass (gilded), steel
H. 10 ³/₄ in. (27.3 cm), W. 8 in. (20.3 cm),
D. 7 ¹/₂ in. (19.1 cm),
Diam. of globe 5 ¹/₂ in. (14 cm)
The Metropolitan Museum of Art, New York,
Gift of J. Pierpont Morgan, 1917 (17.190.636)

PAGE 4

Centerpiece in the Form of a Galley
Joseph Mayer (d. 1609)
German, Ulm, late 16th century
Silver (partially gilded)
H. 16 ¹/₈ in. (41 cm), W. 12 ⁵/₈ in. (32 cm),
D. 6 ¹/₈ in. (15.7 cm)
Kunstskammer, Kunsthistorisches Museum,
Vienna (KK 6864)

PAGE 5 (DETAIL)

Writing Box
Wenzel Jamnitzer (1507/8–1585)
German, Nuremberg, ca. 1560/70
Silver (gilded), lead
H. 2 ³/₈ in. (6 cm), W. 8 ⁷/₈ in. (22.7 cm),
D. 4 in. (10.2 cm)
Kunstskammer, Kunsthistorisches Museum,
Vienna (KK 1155)

PAGES 6–7 (DETAIL)

Automaton Clock with Pacing Lion
Daniel Lotter (active 1602–1691)
German, Augsburg, ca. 1619; additions ca. 1675–80
Silver (cast, partly gilded), bronze, ebony, enamel
H. 10 ¹/₂ in. (26.7 cm), W. 10 in. (25.4 cm),
D. 7 in. (17.8 cm)
Wadsworth Atheneum Museum of Art, Hart-
ford, Connecticut, Gift of J. Pierpont Morgan
(1917.254)

PAGE 8 (DETAIL)

Miniature Collector's Cabinet
After Bernard Salomon (ca. 1508–ca. 1561)
German, possibly Nuremberg, ca. 1600
Leather (dyed, gold-tooled); pine, poplar,
pear-, and yew woods; veneers of ivory, mother-
of-pearl, and pear-, plum, ebony, rose-, holly,
ash, and green-stained poplar woods; metal
(gilded); glass (painted)
H. 6 ¹/₈ in. (15.6 cm), W. 7 ³/₈ in. (18.7 cm),
D. 5 ¹/₂ in. (14 cm)
The Metropolitan Museum of Art, New York,
Gift of Susan Dwight Bliss, 1948 (48.59.2)

PAGE 9 (DETAIL)

The Cittern Player Automaton
South German(?), first half of 17th century
Bronze (gilded), copper (gilded)
H. 9 ⁷/₈ in. (25 cm)
Musée d'Horlogerie du Locle, Château des
Monts (MHL Inv. 21)

PAGE 10

Bust of Emperor Hadrian
Head: Court workshop of Frederick II
(1194–1250), Holy Roman Emperor
Head: Sicily, 1240; bust: late 16th century;
base: ca. 1850
Chalcedony, green porphyry, silver (gilded),
gold, enamel, pearls
H. 8 ¹/₄ in. (21 cm)
The Al Thani Collection (Belpo23c)

PAGE 12

Hat Ornament with the "Dresden Green"
from the Diamond Garniture
Franz Michael Diespach (before 1725–ca. 1791),
incorporating pieces by Jean Jacques Pallard
(1701–1776)
Dresden and Prague, 1769; older elements
Vienna, 1746
Almond-shaped celadon-green diamond of
160 grains (approx. 41 carats); two round,
brilliant-cut diamonds; 411 medium to small
diamonds; silver; gold
H. 5 ¹/₂ in. (14.1 cm), W. 2 in. (5 cm)
Grünes Gewölbe, Staatliche Kunstsamm-
lungen Dresden (VIII 30)

PAGE 13

Ostrich Egg Ewer
Hans Clauss I (active 1627–71)
German, Nuremberg, ca. 1630
Ostrich egg, silver (gilded)
H. 19 ¹/₄ in. (48.9 cm)
Wadsworth Atheneum Museum of Art,
Hartford, Connecticut, Gift of J. Pierpont
Morgan (1917.272)

PAGES 14–15

Drinking Horn (The Tecklenburg Greifenklau)
German, ca. 1540–50
Buffalo horn, silver (cast, embossed,
engraved, gilded)
H. 12 ⁷/₁₆ in. (31.5 cm), L. 24 ¹⁵/₁₆ in. (63.3 cm)
Sammlung Angewandte Kunst, Museumsland-
schaft Hessen Kassel (KP B II.90)

PAGE 16 (DETAIL)

Grotesque Wild Boar
Caspar Beutmüller the Elder (d. 1618)
German, Nuremberg, 1603–9
Coconut (*Cocos nucifera*), silver (gilded),
residue of cold paint
H. 8 in. (20.3 cm), W. 5 ⁷/₈ in. (15 cm),
D. 5 ¹/₈ in. (13 cm)
Burg Eltz, Wierschem

PAGE 17

Turtle Automaton with Neptune as Vintner
Leodegar Grimaldo (active first half of
17th century)
German, Stuttgart, 1626
Wood (painted), silver (gilded), iron,
tortoiseshell
H. 9 in. (22.8 cm), W. 4 ¹/₈ in. (10.4 cm),
D. 7 ⁷/₈ in. (20 cm)
Museum für Kunst und Gewerbe Hamburg
(2006.57)

PAGE 18 (DETAIL)

"Invention" Mask of Augustus the Strong
Johann Melchior Dinglinger (1664–1731)
German, Dresden, 1709
Copper (chased, gilded)
H. 19 ¹/₄ in. (49 cm)
Rüstkammer, Staatliche Kunstsammlungen
Dresden (N 171)

PAGE 21

Drinking Cup in the Form of a Horse and Rider
Hans Ludwig Kienle (or Kienlin, 1591–1653)
German, Ulm, 1630
Silver (partially gilded)
H. 12 ³/₈ in. (31.5 cm)
The Art Institute of Chicago (2003.114)

PAGES 22–23 (DETAIL)

Turned-Ivory Piece with Star in Polyhedron
German, probably Dresden, ca. 1600
Ivory (turned)
H. approx. 9 in. (23 cm), W. 2 ³/₈ in. (6 cm),
D. 2 ³/₈ in. (6 cm)
Private collection, Germany

PAGE 24

Chess and Tric-Trac Game Board
German, second half of 16th century or later
Wood, ivory, mother-of-pearl
H. 17 ³/₄ in. (45.1 cm), W. 17 ³/₄ in. (45.1 cm),
D. ¹/₄ in. (0.6 cm)
The Metropolitan Museum of Art, New York,
Pfeiffer Fund, 1964 (64.51)

PAGE 25 (DETAIL)

Pietre Dure Night Clock
Italian, Florence, 1704–5
Case and hardstone mosaics: Galleria dei Lavori, Florence, under the supervision of Giovanni Battista Foggini (1652–1725); woodwork: Leonardo van der Vinne (1659–1713); figures: attributed to Massimiliano Soldani-Benzi (1656–1740); movement: Francesco Papillion (active ca. 1700)
Ebony, bronze (gilded), semiprecious stones (chalcedony, jasper, lapis lazuli, *verde d'Arno*)
H. 37 3/8 in. (94.9 cm), W. 24 13/16 in. (62.9 cm), D. 11 in. (27.9 cm)
The J. Paul Getty Museum, Los Angeles (97.DB.37)

PAGES 26–27 (DETAIL)

Casket
Attributed to Michel Redlin (active by 1688)
Polish, Gdansk (Danzig), ca. 1680
Amber, gold foil, brass (gilded), wood, silk satin, paper
H. 11 13/16 in. (30 cm), W. 13 in. (33 cm), D. 8 1/4 in. (21 cm)
The Metropolitan Museum of Art, New York, Walter and Leonore Annenberg Acquisitions Endowment Fund, 2006 (2006.452a–c)

PAGE 28 (DETAIL)

Orrery Clock
Louis Thouverez (master 1788, d. after 1823)
French, Paris, dated 1790
Bronze (gilded), white marble, brass, enamel
H. 19 in. (48.3 cm), Diam. 9 1/2 in. (24.1 cm)
The Metropolitan Museum of Art, New York, Bequest of Mrs. Charles Wrightsman, 2019

PAGE 30

Aeolipile (Steam Blower)
South German (Augsburg) or Bohemian (Prague), ca. 1590–1600
Bronze (dark patina), silver
H. 15 3/4 in. (40 cm)
The Hearn Family Trust, New York

PAGE 31 (DETAIL)

Microscope
Claude Siméon Passemant (1702–1769)
French, Paris, ca. 1750
Bronze (gilded), steel, brass, shagreen, tinted parchment, gold tooling, glass, mirror glass
H. (extended) 24 1/4 in. (61.6 cm)
The Metropolitan Museum of Art, New York, Purchase, Mr. and Mrs. Charles Wrightsman Gift and Gift of Mr. and Mrs. Charles Wrightsman, by exchange, 1986 (1986.1a–d)

PAGES 32–33 (DETAIL)

Portable Diptych Sundial
Paulus Reinman (active 1575–1609)
German, Nuremberg, 1602
Ivory, brass
H. 4 1/2 in. (11.4 cm), W. 3 1/2 in. (8.9 cm)
The Metropolitan Museum of Art, New York, Gift of Mrs. Stephen D. Tucker, 1903 (03.21.24)

PAGE 34 (DETAIL)

Equation Clock
Jost Bürgi (1552–1632) and Hans Jacob Emck (d. after 1616)
German, Kassel, 1591
Brass (gilded), silver (engraved), iron
H. 4 3/8 in. (11 cm), W. 6 1/8 in. (15.5 cm), D. 6 1/8 in. (15.5 cm)
Astronomisch-Physikalisches Kabinett, Museumslandschaft Hessen Kassel (APK U 24)

PAGE 35

Desk Set with Telescope and Writing Utensils
German, first half of 17th century
Ivory (turned), ebony
H. 16 3/8 in. (41.7 cm)
Kunstskammer, Kunsthistorisches Museum, Vienna (KK 4804)

PAGE 36 (DETAIL)

Astronomical Table Clock
Movement: probably Jeremias Metzger (ca. 1525–ca. 1597); signed by Caspar Behaim (Chasparus Bohemus, active 1568–84)
German, Augsburg, 1568
Brass (gilded), iron
H. 14 1/4 in. (36.2 cm), W. 8 1/2 in. (21.6 cm), D. 5 3/4 in. (14.6 cm)
The Metropolitan Museum of Art, New York, Gift of J. Pierpont Morgan, 1917 (17.190.634a–d)

PAGES 40–41 (DETAIL)

Musical Automaton Clock with Spinnet and Organ
Veit Langenbucher (1587–1631) and Samuel Bidermann and Son (1540–1622)
German, Augsburg, ca. 1625
Silver, brass, iron, gilding, ebony, hardwood, various other woods and metals, parchment, leather, color textile, paint
H. 30 3/4 in. (78.1 cm), W. 19 11/16 in. (50 cm), D. 12 5/8 in. (32 cm)
The Metropolitan Museum of Art, New York, Purchase, Clara Mertens Bequest, in memory of André Mertens, 2002 (2002.323a–f)

PAGE 42 (DETAIL)

Miraculous Writing Machine
Friedrich von Knaus (1724–1789)
Austrian, Vienna, 1760
Iron, brass, bronze (cast, some colored), paper, wood (with marbled stucco, poliment gilding)
H. 70 7/8 in. (180 cm), W. 42 1/8 in. (107 cm), D. 38 9/16 in. (98 cm)
Technisches Museum, Vienna (1406)

PAGE 43

Caricature of Engravers "à la Grecque"
Jean Charles Delafosse (1734–1789)
French, 18th century
Pen and black ink, brush and gray and colored wash, over traces of black chalk
7 5/8 × 4 7/8 in. (19.4 × 12.4 cm)
The Metropolitan Museum of Art, New York, The Elisha Whittelsey Collection, The Elisha Whittelsey Fund, 1960 (60.576.5(5))

PAGE 44 (DETAIL)

Automaton Clock in the Form of an Elephant
German, Augsburg, 1600–1610
Metal (gilded), bronze (silvered), copper, steel, enamel, wood (ebonized), glass, paint
H. 11 in. (27.9 cm), W. 4 in. (10.2 cm), D. 7 1/2 in. (19.1 cm)
Loyola University Museum of Art, Chicago, Gift of Mrs. Thomas Stamm with deep appreciation and affection in recognition of Rev. John J. Piderit, S.J., 22nd President, Loyola University Chicago, Martin D'Arcy, S.J., Collection (1989-03)

PAGE 45

The Moving Monk
Possibly circle of Juanelo Turriano (ca. 1500–1585)
Probably Spanish, ca. 1550
Hardwood (stained beech or poplar), traces of color enamel, leather, metals
H. 16 in. (40.6 cm), W. 5 in. (12.7 cm), D. 6 in. (15.2 cm)
National Museum of American History, Smithsonian Institution, Washington, D.C. (1977.1191)

BACK COVER

The Rhinoceros
Bohemian, possibly Prague, early 17th century
Tortoiseshell, coral, pearls, shells
H. 19 7/8 in. (50.5 cm), W. 23 1/4 in. (59 cm), D. 3 7/8 in. (10 cm)
Kunstsammlungen Graf von Schönborn, Wiesenthed

The text for this book was adapted from *Making Marvels: Science and Splendor at the Courts of Europe*, edited by Wolfram Koeppe, Marina Kellen French Curator in the Department of European Sculpture and Decorative Arts, and published in conjunction with an exhibition on view at The Metropolitan Museum of Art, New York, from November 25, 2019, to March 1, 2020.

The exhibition and accompanying catalogue are made possible by the Anna-Maria and Stephen Kellen Foundation.

Published by
The Metropolitan Museum of Art,
New York
Mark Polizzotti
Publisher and Editor in Chief
Gwen Roginsky
Associate Publisher and General Manager
Peter Antony
Chief Production Manager
Michael Sittenfeld
Senior Managing Editor

Edited by Marcie M. Muscat and
Michael Sittenfeld
Production by Paul Booth
Designed by Michael Dyer/Remake
Image acquisitions and permissions
by Josephine Rodriguez-Massop

Photographs of works in the Met collection are by Joseph Coscia, Jr., Imaging Department, The Metropolitan Museum of Art, New York, unless otherwise noted.

Additional Photography Credits

The Art Institute of Chicago/Art Resource, NY: p. 21; bpk Bildagentur/Rüstkammer, Staatliche Kunstsammlungen/Art Resource, NY: p. 18; bpk Bildagentur/Staatliches Museum/Gabriele Bröcker/Art Resource, NY: front cover; bpk Bildagentur/Rüstkammer, Staatliche Kunstsammlungen/Jürgen Karpinski/Art Resource, NY: p. 12; Courtesy of J. Paul Getty Museum Open Content Program: p. 25; Kunstkammer Georg Laue, Munich/London: pp. 22, 23; Photo by Martin Jermann: p. 16; Kunsthistorisches Museum-Museumsverband: pp. 4, 5, 35; Kunstsammlungen Graf von Schönborn, Pommersfelden, photo by Michael Aust: back cover; Courtesy of Loyola University Museum of Art, Martin D'Arcy, S.J. Collection, Chicago: p. 44; Image © The Metropolitan Museum of Art: frontispiece, pp. 2, 8, 26, 27, 31, 36, 40, 41, 43; Collection of the Musée d'Horlogerie du Locle, Château des Monts, photo by Renaud Sterchi: p. 9; Museum für Kunst und Gewerbe Hamburg, Stiftung für die Hamburger Kunstsammlungen: p. 17; Museumslandschaft Hessen Kassel, Astronomisch-Physikalisches Kabinett: p. 34; Museumslandschaft Hessen Kassel, Sammlung Angewandte Kunst: pp. 14, 15; Photo by Maggie Nimkin: p. 30; Archive Center, National Museum of American History, Smithsonian Institution: p. 45; Courtesy of Technisches Museum Wien: p. 42; © The Al Thani Collection 2018, photo by Todd White Art Photography: p. 10; Wadsworth Atheneum Museum of Art: pp. 6, 7, 13

The Metropolitan Museum of Art endeavors to respect copyright in a manner consistent with its non-profit educational mission. If you believe any material has been included in this publication improperly, please contact the Publications and Editorial Department.

Typeset in Jenson
Printed on 157 gsm Neo matt art
Color separations by Professional Graphics, Inc., Rockford, Illinois
Printed by Midas Printing International Limited, Hong Kong

Copyright © 2019 by
The Metropolitan Museum of Art,
New York

First printing

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publishers.

The Metropolitan Museum of Art
1000 Fifth Avenue
New York, New York 10028
metmuseum.org

Cataloguing-in-Publication Data
is available from the Library
of Congress.

ISBN 978-1-58839-703-4

ALSO AVAILABLE

Making Marvels

Science and Splendor at the Courts of Europe

Edited by Wolfram Koeppe

Featuring 170 exemplary objects, from mechanical toys and scientific instruments to timepieces and silver furniture, this groundbreaking catalogue brings to life a glorious period when remarkable works of art were suffused with luxury, scientific invention, and political power.

308 PAGES; 300 ILLUSTRATIONS

HARDCOVER, \$65

Available for purchase at The Met Store and through
Yale University Press

THE
MET

The Metropolitan Museum of Art
1000 Fifth Avenue
New York, New York 10028
metmuseum.org

PRINTED IN CHINA



ISBN 978-1-58839-703-4



PRINTED IN CHINA

THE
MET