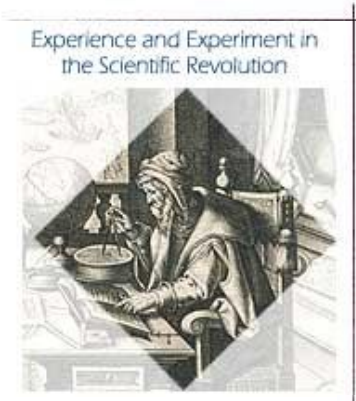

Plate 2 from *Nova Reperta*
by Johannes Stradanus

Overview

In Stradanus's plate, the scholar in his study is surrounded by the new instruments of navigation, drafting, and surveying. An armillary sphere, a compass, an octant, several books, and other measuring tools sit on the table at left. In the left foreground, a lodestone floats on a raft of wood in a wine cooler. The model galleon suspended from the ceiling contrasts to the single-masted, oared Mediterranean vessel that can be seen through the window. The juxtaposition of instruments and books on the scholar's desk indicates the coming together of the hitherto generally separate traditions of practice and theory. Out of their union, the new experimental philosophy emerged.

In the seventeenth century, practitioners of this new experimental philosophy came to view themselves as purveyors of a new kind of knowledge. In the wake of their claims, broad epistemological conflicts developed over the concepts of experience and experiment. These conflicts are examined by Peter Dear and Adrian Johns, among others. The conflicts threatened the dominant Aristotelian sense of common experience as that which was acknowledged by all and therefore required no demonstration (e.g., if you drop a brick, it will fall downwards). The new experimental philosophers posited instead that truth claims were to be subject to particular experiments. Often such experiments required complex apparatus, such as the air pump, that could be constructed and manipulated only by experts. Thus the status of the experimental philosophy as philosophical knowledge was problematic; how could it be universally accepted if it relied on particular experiences and events available only to a few individual experts?

Although, in many cases, experimental philosophers exaggerated their complete break with the natural philosophy of the past, several points of difference can be identified between the new experimental philosophy and the natural philosophy of the ancient and medieval periods. The experimental philosophers sought explanations in terms of mechanisms more often than causes. Although they did not always acknowledge their debt, the methods of the experimental philosophers drew from the ways in which craftspeople manipulated natural materials. Individuals who called themselves "new philosophers" were a more diverse group than natural philosophers in the past, and they were sometimes newly arrived in the republic of letters. In addition, venues for natural philosophical practice shifted from the universities to other sites-royal courts, the new academies such as the Royal Society that emphasized experimentation, craft workshops, and even private residences. Investigators proclaimed themselves active experimenters rather than bookish contemplators, interested not in system building, but in the active collection of experience.

Their standards of proof and their modes of legitimating their knowledge also differed markedly from the kinds of investigations that had come before. They couched their proofs in the terms of individual narratives of experimental practice rather than general logical demonstration. Thomas Sprat (1635-1713) in *The History of the Royal Society* (1667) laid out the correct comportment of the natural philosopher and the ideal natural philosophical community. Although very different as individuals, Galileo Galilei (1564-1624), Robert Boyle (1627-91), and, eventually, Isaac Newton (1643-1727), became model natural philosophers for their contemporaries. All three viewed instruments as part of nature, and all used mathematical arguments to make truth claims in natural philosophical and physical knowledge. Not all seventeenth-century philosophers accepted the epistemological claims of these natural philosophers as unproblematic, however. Thomas Hobbes (1588-1679) disputed them outright, while individuals such as Blaise Pascal (1623-1662) conducted natural philosophical investigation that combined older modes of legitimating knowledge with the use of philosophical instruments and mechanical theorizing.

The Scientific Revolution is often rightly viewed as a period of great theoretical change in natural philosophy. But it would be a mistake to view it solely in this way; it can also be seen as a period of transformation in attitudes to experience and to practice. In the sixteenth and seventeenth centuries, practices involving the investigation of nature changed, and the kinds of people who pursued such

investigations expanded. Natural knowledge became a resource by which a great variety of individuals made claims to authority and intellectual legitimacy. As "experiment" came to replace "experience," knowledge of nature, based upon the new experimental philosophy, came to occupy a central place in early modern culture.

Plate 2 from *Nova Reperta*
by Johannes Stradanus

- Overview
- Syllabus
- The Magnetic Earth
- Partisan Almanacs
- Boyle's Air Pump
- Astronomical Observations

Astronomical Observations

In the *Sidereus Nuncius* (or *Starry Messenger*), first published in 1610, Galileo Galilei (1564-1642) reported his observations made with a new astronomical instrument, the telescope. Galileo did not invent the telescope, but hearing that such an instrument was being sold in France and the Netherlands, he tried to obtain one. When he failed, he undertook to make it himself. Spyglasses, as they were called, were made by placing a convex and a concave lens in a tube. The earliest instruments magnified three or four times. Galileo figured out that the magnification was determined by the ratio of the focal lengths of the two lenses. He set about to improve the instrument and in the process, learned to grind and polish lens. He first made an instrument that magnified eight or nine times, and eventually fabricated one that magnified twenty times.

His first astronomical observations with the new instrument were of the moon. Galileo's observations of the moon and other heavenly bodies such as the moons of Jupiter and the stars of the Milky Way revolutionized astronomy because they provided evidence that the heavens were not perfect and unchanging, as the Aristotelian geocentric model assumed. For example, Galileo showed that the moon was not smooth, but rough and uneven, similar to the earth. He argued that the surface of the moon contained structures such as mountains and valleys. He observed that the line on the moon that separated light and darkness (the terminator) was not a smooth curved line that would be found on a uniform surface, but jagged and irregular as was expected for a rough, uneven surface. Rather than a sharp division between the sublunary and supralunary spheres, Galileo's observations supported the view that the moon was like the earth. It followed that the earth was similar to the other heavenly bodies (and perhaps orbited the sun as the moon orbited the earth and the moons of Jupiter revolved around that planet). Galileo's observations provided powerful support for the Copernican heliocentric model of the cosmos.

Galileo described the moon's earth-like surface but he also provided drawings that served as strikingly persuasive images. This is the second of a series of four moon drawings that appeared in the *Sidereus Nuncius*. Galileo's drawings are not accurate maps of the moon; it is difficult to correlate his structures with modern moon maps. Rather, his drawings were meant to persuade his readers of the earth-like nature of the moon. Perhaps in his use of images he was influenced by William Gilbert's drawings of the *terrella* or "little earth," that appear throughout the *De magnete* (1600) and help to convince the reader of Gilbert's argument that the earth is a magnet.

Pamela O. Long
Washington, DC

Suggested Reading

Drake, Stillman. "Galileo's First Telescopic Observations." *Journal for the History of Astronomy* 7 (1976): 153-168.

Van Helden, Albert. *The Invention of the Telescope*. American Philosophical Society, *Transactions* 67.4 (1977): 1-67.

---. *Introduction to Sidereus Nuncius or The Sidereal Messenger, by Galileo Galilei*, trans. by Albert Van Helden. Chicago: University of Chicago Press, 1989.

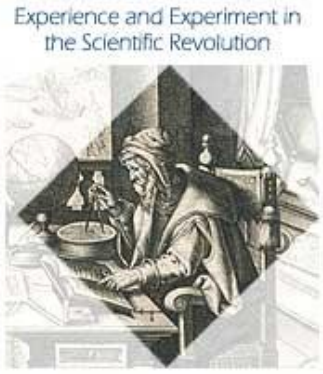

Plate 2 from *Nova Reperta*
by Johannes Stradanus

Boyle's Air Pump

Robert Boyle was a central figure in the investigations of the natural world by means of experimentation that were carried out by the members of the Royal Society and other experimental philosophers in England and elsewhere in the seventeenth century. Boyle already had a long-standing interest in pneumatics when he read of the experiments (carried out in 1644) by Evangelista Torricelli (1608-1647) and Vincenzo Viviani (1622-1703) that effectively created a barometer. They had filled a tube with mercury, closed it at the end, and inverted it into a dish of mercury, whereupon the column sank to about 760 millimeters above the dish, leaving an empty space in the tube above the mercury. Torricelli concluded that his instrument might be used to measure atmospheric pressure. The experiment was of great philosophical interest because it seemed to disprove the Aristotelian dictum that "nature abhors a vacuum."

Click Here for a Larger View

Boyle heard of these experiments by the early 1650s and repeated them. He then attempted to create a variation of the apparatus that would allow the introduction of larger objects into the empty space, and thus allow further investigation of the nature of air. He was aided again by hearing of experiments carried out in 1647 by the mayor of Magdeburg, Otto Guericke. Guericke built an air suction pump with a cylinder, a piston, and two flap valves. Boyle set for his assistant Robert Hooke (1635-1703) the problem of creating an air pump that was suitable for carrying out experiments concerning the nature of air. The image that appears in Boyle's treatise, *New Experiments Physico-Mechanical Touching the Spring of the Air*, displays the apparatus that Hooke devised and that was used for the numerous experiments described in the treatise.

Boyle provides a complete description of the apparatus, which included two main parts: the glass vessel and a pump to draw the air out. He labels and describes each part, including an account of the way in which it was constructed and the materials with which it was made. These details contribute to the immediacy of the descriptions of the experiments. They suggest that Boyle is not referring to Aristotelian common experience (agreed upon by everyone) but rather to particular experiments, carried out at a particular time by specific experimenters, watched by reliable witnesses, and using a specific, complex apparatus.

Boyle's phrase, the "spring of the air," points to a major focus of the experiments, the capacity of the air to exert pressure and to expand. Boyle was cautious about overdrawing his conclusions. For example, he did not claim that the air pump created a true vacuum, that is, that the space became truly empty. Rather, he referred to the removal of "ordinary air," leaving open whether or not the operational vacuum was a true one. This refusal was part of his methodology in which he claimed to be dealing only in "facts" rather than hypothesis and theory.

By the end of the seventeenth century, the principle that the atmosphere was a fluid possessing weight and that its pressure could be excluded from the interior of a closed vessel so as to obtain a vacuum was incorporated into the construction of the first steam engines, the technology that came eventually to define the course of the Industrial Revolution.

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Washington, DC

Harry Kitsikopoulos
New York University

Suggested Reading

Boyle, Robert. *The Works of Robert Boyle*. Vol. 1, *Experiments Physico-Mechanical touching the Spring and Weight of Air*. Edited by Michael Hunter and Edward Davis. Brookfield, Vermont: Pickering and Chatto, 1999-2000.

Dear, Peter. *Discipline and Experience: The Mathematical Way in the Scientific Revolution*. Chicago: University of Chicago Press, 1995.

Dear, Peter. *Revolutionizing the Sciences: European Knowledge and Its Ambitions, 1500-1700.* Princeton: Princeton University Press, 2001.

Frank, Robert G. *Harvey and the Oxford Physiologists: Scientific Ideas and Social Interaction*. Berkeley: University of California Press, 1980.

Shapin, Steven, and Simon Schaffer. *Leviathan and the Air-pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press, 1985.

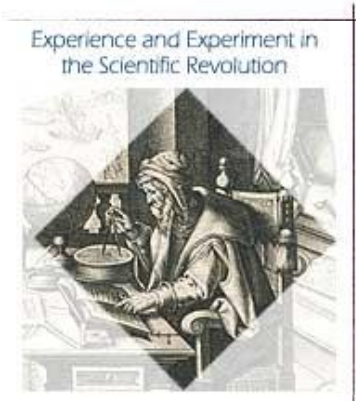


Plate 2 from *Nova Reperta*
by Johannes Stradanus

Partisan Almanacs

The invention of the telescope, the new models of the cosmos, and the increasing authority of personal observation did not diminish the popular zeal for astrology. In England, the publication of almanacs rose steadily from the end of the sixteenth century and they remained extremely popular throughout the following century. After bibles and printed sermons, almanacs were the most commonly published books in seventeenth-century England. They were also heavily used. Never far from hand, they were consulted frequently for personal guidance, planting schedules, and daily information of every sort.

There is little variation in the astrological information found in seventeenth-century almanacs. Most of the charts laying out the position of stars and planets in these books are uniform, drawn from standard compendia of astrological data known as *ephemeredes*. What distinguished particular publications were the various essays and prognostications that accompanied the charts. Gradually, these readings of the past, present, and future became far more significant than the data, and they remain fascinating reflections of social and political positions. Writers of almanacs became particularly strident during the English Civil War. The celebrated protestant astrologer William Lilly (1602-1681) scored some notable successes—and prominence—in foretelling Parliamentarian victories.

John Booker secured his own reputation with his predictions of the deaths of Gustavus Adolphus and the elector palatine. Parliament appointed him licenser of mathematical (or astrological) books. His *Bloody Irish Almanack*, 1646, is less an actual almanac than a prognostication written in response to the 1641 rebellion in Ireland against the new English planters and in contestation of an earlier polemical reading of the stars that had been published in Ireland. Invoking the

authority of the stars, Booker foretells the doom of the rebellious and Royalist Irish. He dismisses the Irish almanac's celebration of the rule of "glorious King Charles" over Britain and Ireland and its denigration of the treasonous Roundheads. Booker offers his own chronology of the world, beginning at the creation, which reveals the eventual triumph of the Protestant cause. He associates England with the sign of Mars, Ireland with Taurus, and shows that the imminent movement of Saturn and Mars into the house of Taurus naturally indicates that God will pour out his "overflowing cuppe of wrath and vengeance" upon the Irish "insurrection."

Eric Leonidas
Central Connecticut State University

Suggested Reading

Bernal, J. D. *The Extension of Man: A History of Physics before the Quantum.* Cambridge: MIT Press, 1972.

Geneva, Ann. *Astrology and the Seventeenth Century Mind.* Manchester, NY: Manchester University Press, 1995.

Kelly, John T. *Practical Astronomy during the Seventeenth-Century: Almanac-Makers in American and England.* New York: Garland, 1991.

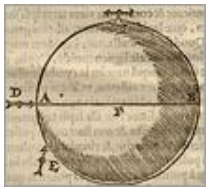
Lilly, William. *An Introduction to Astrology.* Hollywood: New Castle Publishing Company, 1972.

Plate 2 from *Nova Reperta*
by Johannes Stradanus

The Magnetic Earth

In *De magnete*, William Gilbert describes numerous experiments with the magnet or lodestone. Gilbert's treatise is a key text in the development of the experiment as a means of discovering truths about the natural world. In twentieth-century scholarship, *De magnete* is the focal point of a discussion about the origins of the methodology that became central to the experimental philosophy in the seventeenth century. One issue involves the extent to which Gilbert derived his methods and views from earlier treatises such as the thirteenth-century "Letter on the Magnet" by Pierre de Maricourt, first published in 1558, and *The Newe Attractive* by the retired mariner and compass maker, Robert Norman, first published in 1581.

For most of his experiments Gilbert chose a natural lodestone, which he shaped into a sphere by turning the stone on a lathe. He called this round stone a *terrella*, or little earth. The many images of this "little earth" (of which the image shown here is the first) thoroughly prepare the reader to accept Gilbert's conclusion that the earth itself is a magnet. The illustration shows *how* to find the poles of the *terrella* similar to the earth's poles. Gilbert explains how to do this using an instrument called a *versorium*. The *versorium* is a small compass needle made with a piece of magnetized iron that can freely turn on its base. The *versorium* is placed on various spots on the *terrella* and the point to which it turns is marked. Gilbert explains that after marking a number of points, you can discover the point at which all the points converge (A and B) which are the poles. A *versorium* placed near but not on the *terrella* (as D) will point directly at the pole.



Nine years later, Galileo created strikingly earth-like images of the moon which he claimed to have viewed through his new instrument, the telescope. Galileo was acquainted with Gilbert's *De magnete* and may have noticed how effectively Gilbert used visual images of magnets that looked like small earths to help persuade his readers that the earth itself was actually a magnet.

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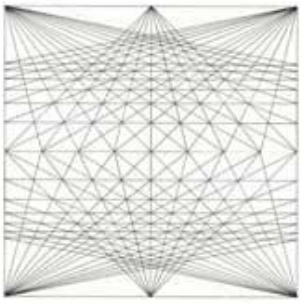
Suggested Reading

Freudenthal, Gad. "Theory of Matter and Cosmology in William Gilbert's *De Magnete*." Isis 74 (1983): 22-37.

Henry, John. "Animism and Empiricism: Copernican Physics and the Origins of William Gilbert's Experimental Method." *Journal of the History of Ideas* 62 (January 2001): 99-119.

Pumfrey, Steven. "William Gilbert's Magnetical Philosophy, 1580-1674: The Creation and Dissolution of a Discipline." Ph.D. diss., University of London, Warburg Institute, 1987.

Zilsel, Edgar. "The Origins of William Gilbert's Scientific Method." *Journal of the History of Ideas* 2 (January 1941): 1-32.



Syllabus

The Textures of Experience

Visiting Faculty: John Sutton, Senior Lecturer in Philosophy, Macquarie University, Australia

Monday:
Aristotle. *Selected works from Parva Naturalia. The Complete Works of Aristotle: the Revised Oxford Translation.* Edited by Jonathan Barnes. 2 vols. Princeton: Princeton University Press, 1984.
Essential reading: Vol. 1: *On Memory*, pp. 714-720; *On Sleep*, pp. 721-8; *On Dreams*, pp. 729-735; *On Divination in Sleep*, pp. 736-9.
Recommended reading: Vol. 1: *Sense and Sensibilia*, pp. 693-713.

Tuesday:
Aristotle. *De Anima. The Complete Works of Aristotle: the Revised Oxford Translation*. Edited by Jonathan Barnes. 2 vols. Princeton: Princeton University Press, 1984.
Vol. 1: pp. 641-92. Read especially Book One, chapters 1 and 5; Book Two, chapters 1-5 and 12; and Book Three, chapters 3-5.

Descartes, René. *Treatise of Man (L'homme)*. Translation and commentary by Thomas Steele Hall. Cambridge: Harvard University Press, 1972.
Read especially pp. 1-5, 17-22, 33-40, 71-91, 96, and 108-113.

Reiss, Timothy. "Denying the Body? Memory and the Dilemmas of History in Descartes," *Journal of the History of Ideas* 57 (1996): 587-607.

Sutton, John. *Philosophy and Memory Traces: Descartes to Connectionism*. New York: Cambridge University Press, 1998.
See especially pp. 31-49.

Sutton, John. "The Body and the Brain." *Descartes' Natural Philosophy*. Edited by Stephen Gaukroger, John Schuster, and John Sutton. London: Routledge, 2000, pp. 697-722.

Wednesday:
Ficino, Marsilio. *Three Books on Life*. Edited and translated by Carol V. Kaske and John R. Clark. Binghamton, NY: Medieval & Renaissance Texts & Studies, 1989.
Read Book I, chapters 1-6; Book III, especially chapters 1-6, 13, 20-21, 25-26.

Pomponazzi, Pietro. *De Immortalitate Animae*. Trans. W. Hay, in E. Cassirer, P. Kristeller, and J. Randall (eds.), The Renaissance Philosophy of Man. Chicago: Chicago University Press, 1948.
Read pp. 280-284.

Agrippa, H. C. *Three Books of Occult Philosophy or Magic, by the famous mystic Henry Cornelius Agrippa - Book One - Natural Magic*. Willis F. Whitehead (ed.), Chicago: Hahn and Whitehead, 1898. Read Chapters 9-14, pp. 58-73.

Digby, Kenelm. *Two Treatises . . .* New York and London: Garland reprints, 1977.
Read Book I, chapters 18, 32-33, 35-38.

Sutton, John. "Body, Mind, and Order: local memory and the control of mental representations in medieval and Renaissance sciences of self." *1543 And All That: Word and Image in the Proto-Scientific Revolution*. Edited by Guy Freeland and Anthony Corones. Dordrecht: Kluwer, 2000, pp. 117-150.

Sutton, John. *Philosophy and Memory Traces: Descartes to Connectionism*. New York: Cambridge University Press, 1998.

Read especially pp. 117-148.

Thursday:
Paracelsus. "Seven Defensiones" and "On the Miners' Sickness." *Four Treatises of Theophrastus von Hohnenheim, called Paracelsus*. Translated by C. Lilian Temkin et al. Baltimore: Johns Hopkins University Press, 1941, 1996.
Read pp. 1-41 and pp. 43-126; see especially "The Fourth Defense," pp. 24-29; and pp. 124-26.

Paracelsus. "The *Herbarius* of Paracelsus." Translated with introduction by Bruce T. Moran. *Pharmacy in History* 35.3 (1993): 99-127.
Read especially pp. 113-118 and pp. 123-24.

Pliny the Elder. *Historia naturalis*. Translated by H. Rackham. 10 Vols. Cambridge: Harvard University Press; London: W. Heinemann, 1938-1963.
Read Vol. 1: pp. 24-25 and pp. 37-41; Vol. 2: pp. 506-537 (*Historia naturalis* 1 [contents and list of authorities]; and 7.1-10).

Porta, Giambattista della. *Natural Magick*. Edited by Derek J. de Solla Price. A reproduction of the anonymous English translation of 1658. New York: Basic Books, 1957.
Read pp. 1-25.

Daston, Lorraine, and Katharine Park. *Wonders and the Order of Nature, 1150-1750*. New York: Zone Books, 1998.
Read chapter 4.

Scribner, Bob. "Cosmic Order and Daily Life: Sacred and Secular in Pre-Industrial German Society." *Religion and Society in Early Modern Europe 1500-1800*. Edited by Kaspar von Greyerz. Boston: Allen & Unwin, 1984, pp. 17-32.

Supplementary Reading:
Paracelsus. "Volumen medicinae paramirum." Translated by Kurt F. Leidecker. *Bulletin of the History of Medicine*. Supplement No. 11. Baltimore: Johns Hopkins University Press, 1949.

Piccolomini, Aeneus Sylvius. *The Commentaries of Pius II*. Translated by Florence Alden Gragg. Introduction and notes by Leona C. Gabel. Northampton, MA: Smith College, 1915-1957.

Des Chene, Dennis. *Life's Form: Late Aristotelian Conceptions of the Soul*. Ithaca: Cornell University Press, 2001

Des Chene, Dennis. *Spirits and Clocks: Machine and Organism in Descartes*. Ithaca: Cornell University Press, 2000,
Read especially the introduction and the conclusion.

The Renaissance Computer: Knowledge Technology in the First Age of Print. Edited by Neil Rhodes and Jonathan Sawday. London: Routledge, 2000.
Read the papers by Rhodes and Sawday; Marcus; Sawday; Corns; and Rhodes.

Scarry, Elaine. "Donne: 'but yet the body is his booke.' " *Literature and the Body*. Edited by Elaine Scarry. Baltimore: Johns Hopkins University Press, 1988.

Walker, D. P. *Music, Spirit, and Language in the Renaissance*. London: Variorum Reprints, 1985.
Read especially "Medical Spirits in Philosophy and Theology from Ficino to Newton" and "The Astral Body in Renaissance Medicine."

Walker, D. P. *Spiritual and Demonic Magic from Ficino to Campanella*. London: Warburg Institute, 1958, reprinted University of Notre Dame Press, 1975.
Read especially chapters 1, 2, and 4.

Webster, Charles. *From Paracelsus to Newton: Magic and the Making of Modern Science*. Cambridge: Cambridge University Press, 1982.

Vernacular Epistemologies

Visiting Faculty: Mary Fissell, Associate Professor of the History of Science, Medicine, and Technology, Johns Hopkins University; and Gail Kern Paster, Professor of English, George Washington University

Monday: Vernacular Knowledge and Print Culture
Bacon, Francis. *Sylva Sylvarum. Works of Francis Bacon*. Edited by James Spedding et al. London, 1876.
Read Vol. II: Century I, Experiments 45-59 (358-65), Experiment 63 (367), Experiments 65-66 (368-69), Experiment 98 (380-82); Century III, Experiment 293 (437-38); Century VII, Experiments 601-607 (528-30); and Century X, Experiment 928 (649), Experiment 960 (660-1).

Lupton, Thomas. *A thousand notable things*. London: 1601, p. A2r-B3r.

Eamon, William. *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture*. Princeton: Princeton University Press, 1994.
Read pp. 3-12 and pp. 234-66.

Fissell, Mary. "Imagining Vermin in Early Modern England," *History Workshop Journal* 47 (1999): 1-29.

Tuesday: The Body and/in The World
Moffett, Thomas. *Health's Improvement*. London, 1655, pp. 1-11and pp. 29-49.

Paster, Gail Kern. "The Body and Its Passions."

Paster, Gail Kern. "The Clear Spirit Puddled: Physiological Tropes of Passion in *Othello*"

Schoenfeldt, Michael. *Bodies and Selves: Physiology and Inwardness in Spenser, Shakespeare, Herbert, and Milton*. Cambridge: Cambridge University Press, 2000.
Read especially pp. 1-39.

Thursday: Book Exercise
Chartier, Roger. "Culture as Appropriation." *Understanding Popular Culture: Europe from the Middle Ages to the Nineteenth Century*. Berlin: Mouton, 1984, pp. 230-53.

Friday: Female Bodies
Heywood, Thomas. *Wise Woman of Hogsdon* (1604?). Edited by Michael Leonard. Garland, 1980.

Fissell, Mary. "Making Bodies Speak: Prophets and Midwives." *Making Books into Bodies: Women and Popular Medicine in Early-Modern England*, forthcoming.

Women's Worlds in Seventeenth-Century England. Edited by Patricia Crawford and Laura Gowing. London: Routledge, 2000, Items 1.7, 1.15, 1.16, 1.20.

Supplementary Reading:
Aristotle's Masterpiece: or The Secrets of Generation. London, 1694.

Bennett, Jim and Scott Mandelbrote. *The Garden, the Ark, the Tower, and the Temple: Biblical Metaphors of Knowledge in Early Modern Europe*. Oxford: Museum of the History of Science in association with the Bodleian Library, 1998.

Fissell, Mary. "Gender and Generation: Representing Reproduction in Early Modern England," *Gender and History* 7 (1995): 433-56.

Henry, John. "Doctors and Healers: Popular Culture and the Medical Profession." *Science, Culture, and Popular Belief in Renaissance Europe*. Edited by Stephen Pumfrey, Paolo L. Rossi, and Maurice Slawinksi. Manchester: Manchester University Press, 1991.

Vaughan, William. *Naturall and Artificial Directions for Health, deriued from the best philosophers, as well moderne, as auncient*. London, 1600.

Carlino, Andrea. *Books of the Body: Anatomical Ritual and Renaissance Learning*. Translated by John Tedeschi and Anne C. Tedeschi. Chicago: University of Chicago Press, 1999.

Ginzburg, Carlo. *The Cheese and the Worms: The Cosmos of a Sixteenth-Century Miller*. Translated by John Tedeschi and Anne C. Tedeschi. Reprint edition. Baltimore: Johns Hopkins University Press, 1992.

Mechanical Arts, Natural Philosophy, and Visual Representation

Visiting Faculty: David Summers, William R. Kenan, Jr. Professor of the History of Art, University of Virginia; and Beth L. Holman, Associate Professor, Studies in the Decorative Arts, Design, and Culture, The Bard Graduate Center

Monday:
Manetti, Antonio di Tuccio. *The Life of Brunelleschi*. Edited by Howard Saalman. University Park, PA: Pennsylvania State University, 1970.

Summers, David. "Pandora's Crown: On Wonder, Imitation and Mechanism in Western Art." *Wonders, Marvels and Monsters in Early Modern Culture*. Edited by Peter G. Platt. Newark: University of Delaware Press, 1999, pp. 45-75.

Tuesday:
The Didascalicon of Hugh of St. Victor: A Medieval Guide to the Arts. Translated by Jerome Taylor. New York: Columbia University Press, 1991.

Summers, David. "Quello che non è sia." Michelangelo and the Language of Art. Princeton: Princeton University Press, 1981, pp. 41-55.

Wednesday:
Holman, Beth L. "A 'subtle artifice': Giulio Romano's *Salt Cellar with Satyrs* for Federico II Gonzaga," *Quaderni de Palazzo Te* (December 2000): 57-67.

Cellini, Benvenuto. *The Autobiography of Benvenuto Cellini*. Translated by George Bull. London; New York: Penguin, 1998.
Read the story of the saltcellar: Chapter II, section ii; story of chalice for Clement VII: Chapter I, sections lxi-lxii.

Alberti, Leon Battista. "On Painting." *On Painting and On Sculpture*. Edited with translations, introduction, and notes by Cecil Grayson. London: Phaidon, 1972. Reprint is also available with introduction by Martin Kemp. London: Penguin, 1991.

Homer. *Iliad*. Translated by A. T. Murray. The Loeb Classical Library. Cambridge, Massachusetts: Harvard University Press, 1999.
Read section on Achilles shield: Book XVIII, lines 540-709.

Ovid. *Metamorphoses*. Translated by A. D. Melville. Oxford; New York: Oxford University Press, 1986.
Read opening of Book II.

Thursday:
Da Vinci, Leonardo. *The Madrid Codices*. Edited by Ladislao Reti. 5 vols. New York: McGraw-Hill, 1974.

Serlio, Sebastiano. *Sebastiano Serlio on Architecture: Books I-V of Tutte L'Opere d'Architettura et Prospetiva*. Translated, with an introduction and commentary, by Vaughan Hart and Peter Hicks. New Haven: Yale University Press, 1996.
Read front matter, pp. 252-255, and 287.

Vesalius, Andreas. *De Humani Corporis Fabrica*. Basel, 1555.

Vesalius. *On the Fabric of the Human Body*. 2 vols. Translated by William Frank Richardson and John B. Carman. San Francisco: Norman Publishing, 1998.
Read Vol. 1: frontispiece, dedication to Charles V; letter to Oporinus (xlvii-lxii), and pp. 1-18 and 370-384 ("How the Bones and Cartilages of the Human Body are Prepared for Study -chapter xxxix)

Gabbey, Alan. "Between *Ars* and *Philosophia Naturalis*: Reflections on the Historiography of Early Modern Mechnics." *Renaissance and Revolution: Humanists, Scholars, Craftsman, and Natural Philosophers in Early Modern Europe*. Edited by J. V. Field and Frank A.J.L. James. Cambridge; New York: Cambridge University Press, 1993, pp. 133-145.

Long, Pamela O. "Power, Patronage, and the Authorship of *Ars*: From Mechanical Know-how to Mechanical Knowledge in the Last Scribal Age," *Isis* 88 (March 1997): 1-41.

Supplementary Primary Reading:
Colonna, Francesco. *Hypnerotomachia Poliphili: The Strife of Love in a Dream*. Translated by Joscelyn Godwin. New York: Thames and Hudson, 1999.

Da Vinci, Leonardo. *Leonardo Da Vinci on the Human Body: The Anatomical, Physiological, and Embryological Drawings of Leonardo Da Vinci*. Translations, emendations, and a biographical introduction by Charles D. O'Malley and J. B. de C. M. Saunders. New York: H. Schuman, 1952.

Da Vinci, Leonardo. *Leonardo on Painting: An Anthology of Writings by Leonardo Da Vinci with a Selection of Documents Relating to his Career as an Artist*. Edited by Martin Kemp; Translated by Margaret Walker. New Haven: Yale University Press, 1989.

Paré, Ambroise. *An Explanation of the Fashion and Use of the Three and Fifty Instruments of Chirurgery*. Facsimile of the 1631 London edition. New York: Da Capo Press, 1969.

Serlio, Sebastiano. *Tutte L'Opere d'Architettura*. Venice, 1584.

Taccola, Mariano. *De Machinis: The Engineering Treatise of 1449*. Introduction, Latin texts, and technical commentaries by Gustina Scaglia. Wiesbaden: Reichert, 1971.

Supplementary Secondary Reading:
Edgerton, Samuel Y. *The Heritage of Giotto's Geometry: Art and Science on the Eve of the Scientific Revolution*. Ithaca: Cornell University Press, 1991.

Elkins, James. *The Poetics of Perspective*. Ithaca: Cornell University Press, 1994.

Kemp, Martin. *Leonardo Da Vinci: The Marvelous Works of Nature and Man*. Cambridge, Massachusetts: Cambridge University Press, 1981.

Kemp, Martin. *The Science of Art: Optical Themes in Western Art from Brunelleschi to Seurat*. New Haven: Yale University Press, 1990.

Reeves, Eileen A. *Painting the Heavens: Art and Science in the Age of Galileo*. Princeton: Princeton University Press, 1997.

Rossi, Paolo. *Philosophy, Technology, and the Arts in the Early Modern Era*. Translated by Salvator Attanasio. New York: Harper & Row, 1970.

Summers, David. *The Judgment of Sense: Renaissance Naturalism and the Rise of Aesthetics*. Cambridge: Cambridge University Press, 1987.

Disciplining Experience: Cartography and Mathematics

Visiting Faculty: Chandra Mukerji, Professor of Communications, Sociology, and Science Studies, University of California at San Diego; and Jim Bennett, Keeper of the Museum of the History of Science, Oxford

Monday:
Cortés, Martín. *Breve compendio de la sphera*. Seville, 1551.

La Cosa, Juan de. Spanish World Chart, ca. 1500.

Mukerji, Chandra. *Territorial Ambitions and the Gardens of Versailles*. Cambridge; New York: Cambridge University Press, 1997.
Read chapters 3 and 4.

Harley, J.B. "Silences and Secrecy: The Hidden Agenda of Cartography in Early Modern Europe," *Imago Mundi* 40 (1988): 57-76.

Turnbull, David. "Tricksters and Cartographers: Maps, Science and the state in the making of a modern scientific knowledge space." *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*. Newark: Gordon & Breach, 2000, pp. 89-130.

Tuesday:
Mukerji, Chandra. "Cartography, Entrepreneurialism, and Power in the Reign of Louis XIV: The Case of the Canal du Midi." *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*. Edited by Pamela H. Smith and Paula Findlen. New York: Routledge, 2002.

Turnbull, David. "Pacific Navigation: An Alternative Scientific Tradition." *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific & Indigenous Knowledge*. Newark: Gordon & Breach, 2000, pp. 131-160.

Alexander, Amir. "Lunar Maps and Coastal Outlines: Thomas Hariot's Mapping of the Moon," *Studies in History and Philosophy of Science* 29.3 (1998): 345-368.

Latour, Bruno. "Drawing things together." *Representation in Scientific Practice*. Edited by Michael Lynch and Steve Woolgar. Cambridge, Massachusetts: MIT Press, 1990, pp. 19-68.

Wednesday:
Dee, John. Preface, *The elements of geometrie of … Euclide*. London, 1570.

Gilbert, William. *De Magnete*. Translated by P. Fleury Mottelay. New York. Dover, 1958.
Read pp. 1-25 and pp. 272-304.

Norman, Robert. *The Newe Attractive*. London, 1581. Amsterdam: Theatrum Orbis Terrarum, 1974. Read prefatory material and pp. 1-26.

Bennett, J. A. "The Mechanics' Philosophy and the Mechanical Philosophy," *History of Science* 24 (1986): 1-28.

Zilsel, Edgar. "The Origins of William Gilbert's Scientific Method," *Journal of the History of Ideas* 2 (1941): 1-32.

Henry, John. "Animism and Empiricism: Copernican Physics and the Origins of William Gilbert's Experimental Method," *Journal of the History of Ideas* 62 (January 2001): 99-119.

Hooke, Robert. *Micrographia, or Descriptions of some Minute Bodies Made by Magnifying Glasses* (1665). *Early Science in Oxford*. Edited by R. T. Gunther. Oxford: Oxford University Press, 1938, Vol. 13: "The Preface"; Observation #1 "Of the point of a sharp small needle," pp. 1-4; and Observation #53 "Of a flea," pp. 210-211.

Hooke, Robert. "An Attempt to Prove the Motion of the Earth" and "Animadversions on the *Machina Coelestis* of Johannes Hevelius,"

from *The Cutler Lectures of Robert Hooke*. Early Science in Oxford. Edited by R. T. Gunther. Oxford: Oxford University Press, 1931, Vol. 8: the prefatory material and pp. 1-114.

Thursday:
Instrument Session, The Bern Dibner Collection, Museum of American History.

Borough, William. *A Discours of the Variation of the Cumpas, or Magneticall Needle*. London, 1581.

Supplementary Reading:
Hood, Thomas. *A copie of the speache made by the Mathematicall* Lecture. London, 1588.

Blith, Walter. *The English Improover, or, A New Survey of Husbandry*. London, 1649.

Brotton, Jerry. *Trading Territories: Mapping the Early Modern World*. Ithaca: Cornell University Press, 1998.

Chandra Mukerji, "Cartography, Entrepreneuralism, and Power in the Reign of Louis XIV: The Cast of the Canal du Midi," *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe*. Edited by Pamela H. Smith and Paula Findlen. New York: Routledge, 2002, pp. 248-276.

Schmitt, Charles B. "Experience and Experiment: A Comparison of Zabarella's View with Galileo's in *De Motu*," *Studies in the Renaissance* 16 (1969): 80-138.

Ramelli, Agostino. *The Various and Ingenious Machines of Agostino Ramelli: A Classic Sixteenth-Century Illustrated Treatise on Technology*. Translated and edited by Martha Teach Gnudi and Eugene S. Ferguson. London: Scolar Press, 1976.

Zilsel, Edgar. "The Sociological Roots of Science," *American Journal of Sociology* 47 (1942): 544-562.

Buisseret, David. *Monarchs, Ministers, and Maps: The Emergence of Cartography as a Tool of Government in Early Modern Europe*. Chicago: University of Chicago Press, 1992.

Conley, Tom. *The Self-Made Map: Cartographic Writing in Ealry Modern France*. Minneapolis: University of Minnesota Press, 1996.

Woodward, David, ed. `. Chicago: University of Chicago Press, 1987.

Objects of Art/Objects of Nature

Visiting Faculty: Paula Findlen, Director of the Science, Technology, and Society Program and Professor of History, Stanford University

Monday:
Cennini, Cennino. *The Craftsman's Handbook*. "*Il Libro dell' Arte*." Translated by Daniel V. Thompson, Jr. New York: Dover, 1960.
Read pp. 1-7, 16-20, and 123-131.

Palissy, Bernard. *Admirable Discourses*. Translated by Aurèle La Rocque. Urbana: University of Illinois, 1957.
Read pp. 188-219.

Dürer, Albrecht. *Dürer's Record of Journeys to Venice and the Low Countries*. Edited by Roger Fry. New York: Dover, 1995.
Read pp. 31-99.

Montaigne, Michel de. "On Experience." *The Complete Essays of Montaigne*. Translated by Donald Frame. Stanford: Stanford University Press, 1957.
Read pp. 815-857.

Tuesday:
Session in the National Gallery with Dr. Peter Parshall in the exhibit

"The Unfinished Print," 1:00 - 3:00 p.m.

Parshall, Peter. "Introduction," *The Unfinished Print* exhibition catalogue, forthcoming.

Parshall, Peter. "Imago contrafacta: Images and Facts in the Northern Renaissance," *Art History* 16 (1993): 554-579.

Stone, Richard E. "Antico and the Development of Bronze Casting in Italy at the End of the Quattrocento," *Metropolitan Museum Journal* 16 (1982): 87-116.

Bewer, Francesca G. "The Sculpture of Adriaen de Vries: A Technical Study." *Small Bronzes in the Renaissance*. Edited by Debra Pincus. Washington, DC: Center for Advanced Study in the Visual Arts, 2001, pp. 159-193.

Sturman, Shelley, "A group of Giambologna Female Nudes: Analysis and Manufacture." *Small Bronzes in the Renaissance*. Edited by Debra Pincus. Washington, DC: Center for Advanced Study in the Visual Arts, 2001, pp. 120-141.

Wednesday:
Bacon, Francis. *Novum Organum; With Other Parts of The Great Instauration*. Translated and edited by Peter Urbach and John Gibson. Chicago: Open Court, 1994.

Bacon, Francis. "The New Atlantis." *The Works of Francis Bacon*. Collected and edited by James Spedding, Robert Leslie Ellis, and Douglas Denon Heath. 14 vols. London: Longmans & Co., 1857-1874, Vol. 3: pp. 119-166.

Booker, John. *A Bloody Irish Almanack, or, Rebellious and Bloody Ireland. . .* .London, 1646.

Daston, Lorraine, and Katharine Park. *Wonders and the Order of Nature, 1150-1750*. New York: Zone Books, 1998.
Read especially chapters 6 and 7.

Kemp, Martin. "'Wrought by No Artist's Hand': The Natural, the Artificial, the Exotic, and the Scientific in Some Artifacts from the Renaissance." *Reframing the Renaissance: Visual Culture in Europe and Latin America, 1450-1650*. Edited by Claire Farago. New Haven: Yale University Press, 1995, pp. 177-196.

Thursday:
Session in the National Gallery sculpture collection and conservation lab with Dr. Shelley
Sturman and Dr. Debra Pincus, 3:30 - 5:00 p.m.

Findlen. Paula. "Inventing Nature: Commerce, Art, and Science in the Early Modern Cabinet of Curiosities." *Merchants and Marvels*. Edited by Pamela H. Smith and Paula Findlen, eds. *Merchants and Marvels: Commerce, Science, and Art in Early Modern Europe* (New York: Routledge, 2002).

Findlen, Paula. "Jokes of Nature and Jokes of Knowledge: The Playfulness of Scientific Discourse in Early Modern Europe," *Renaissance Quarterly* 43 (1990): 292-331.

Kaufmann, Thomas Dacosta. "From Mastery of the World to Mastery of Nature: The Kunstkammer, Politics, and Science." *The Mastery of Nature: Aspects of Art, Science, and Humanism in the Renaissance*. Princeton: Princeton University Press, 1993, pp. 174-94.

Supplementary Reading:
Cellini, Benvenuto. *The treatises of Benvenuto Cellini on goldsmithing and sculpture*. Translated by C. R. Ashbee. New York: Dover, 1967.

Cole, Michael, "Cellini's Blood," *Art Bulletin* 81 (1999): 215-35.

Daston, Lorraine. "The Nature of Nature in Early Modern Europe," *Configurations* 6 (1998): 149-72.

Dürer, Albrecht. *The Painter's Manual: A Manual of Measurement of Lines, Areas, and Solids by Means of Compass and Ruler. Assembled by Albrecht Dürer for the use of All Lovers of Art with Appropriate Illustrations (1525)*. Translated and with a commentary by Walter L. Strauss. New York: Abaris Books, 1977.

Dürer, Albrecht. *Vier Bücher von Menschlicher Proportion, Nürnberg, 1528*. Nördlingen: A. Uhl, 1996.

Findlen, Paula. *Possessing Nature: Museums, Collecting, and Scientific Culture in Early Modern Italy*. Berkeley: University of California Press, 1994.

Jardine, Lisa and Alan Stewart. *Hostage to Fortune: The Troubled Life of Francis Bacon*. London: Victor Gollancz, 1998.

The Origins of Museums: The Cabinet of Curiosities in Sixteenth- and Seventeenth-Century Europe. Edited by Oliver Impey and Arthur MacGregor. Oxford: Oxford University Press, 1985.

Pérez-Ramos, Antonio. *Francis Bacon's Idea of Science and the Maker's Knowledge Tradition*. Oxford: Clarendon Press, 1988.

Experience and Experiment in the Scientific Revolution

Visiting Faculty: Peter Dear, Professor of History and of Science & Technology Studies, Cornell University; and Adrian Johns, Professor of History, University of Chicago

Monday:

Boyle, Robert. "Experiments Physico-Mechanical touching the Spring and Weight of Air." *The Works of Robert Boyle*. 14 vols. Edited by Michael Hunter and Edward Davis. Brookfield, Vermont: Pickering and Chatto, 1999-2000, Vol. 1, pp. 143-300.

Shapin, Steven and Simon Schaffer. *'Leviathan' and the Air-pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press, 1985.
Read chapter 2.

Frank, Robert G., Jr. *Harvey and the Oxford Physiologists: Scientific Ideas and Social Interaction*. Berkeley: University of California Press, 1980.
Read especially pp. 115-163.

Sprat, Thomas. *A History of the Royal Society of London*. Edited with critical apparatus by Jackson I. Cope and Harold Whitmore Jones. St. Louis: Washington University, 1958.
Read especially pp. 1-71.

Tuesday:

Galilei, Galileo. *Sidereus Nuncius, or, the Sidereal Messenger*. Edited and translated by Albert van Helden. Chicago: University of Chicago Press, 1989.

Hooke, Robert. *The Diary of Robert Hooke, 1672-1680*. Edited by Henry Robinson and Walter Adams. London: Taylor & Francis, 1935.

Hooke, Robert. "The Present State of Natural Philosophy" and "Of the True Method of Building a Solid Philosophy, or of a Philosophical Algebra" *Posthumous Works . . . containing his Cutlerian Lectures and other discourses*. London, 1705, pp. 1-70.

Henry, John. "Robert Hooke, the Incongruous Mechanist." *Robert Hooke: New Studies*. Edited by Michael Hunter and Simon Schaffer. Woodbridge: Boydell, 1989, pp. 149-180.

Iliffe, Rob. "Material Doubts: Hooke, Artisan Culture, and the Exchange of Information in 1670s London," *British Journal for the History of Science* 28 (1995): 285-318.

Shapin, Steven. "Who was Robert Hooke?" *Robert Hooke: New Studies*. Edited by Michael Hunter and Simon Schaffer. Woodbridge: Boydell, 1989, pp. 253-285.

Wednesday:
Dear, Peter. *Discipline & Experience: The Mathematical Way in the Scientific Revolution*. Chicago: University of Chicago Press, 1995.
Read especially chapters 1, 6, 7, and 8.

Shapin, Steven and Simon Schaffer. *'Leviathan' and the Air-pump: Hobbes, Boyle, and the Experimental Life*. Princeton: Princeton University Press, 1985.
Read chapter 4.

Shapin, Steven. "The House of Experiment in Seventeenth-Century England," *Isis* 79 (1988): 373-404.

Thursday:
Pascal, Blaise. "A Treatise of the Equilibrium of Liquids." *The Physical Treatises of Pascal*. New York: Columbia University Press, 1937, pp. 3-26.

Newton, Isaac. *The Optical Papers of Isaac Newton. Volume I: Optical Lectures, 1670-1672*. Edited by Alan E. Shapiro. Cambridge: Cambridge University Press, 1984.
Read especially pp. 81-99.

Newton, Isaac. "New Theory about Light and Colours," Phil. Trans. 6 (1672): 3075-87.

Supplementary Reading:
Dear, Peter. *Revolutionizing the Sciences: European Knowledge and its Ambitions 1500-1700*. Princeton: Princeton University Press, 2001.

Johns, Adrian. *The Nature of the Book: Print and Knowledge in the Making*. Chicago: University of Chicago Press, 1998.

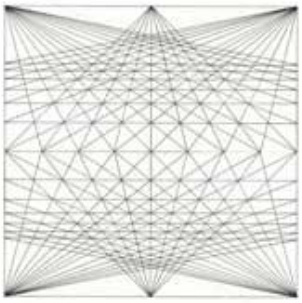
Rogers, John. *The Matter of Revolution: Science, Poetry, and Politics in the Age of Milton*. Ithaca: Cornell University Press, 1996.

Smith, Pamela H. "Science and Taste: Painting, the Passions, and the New Philosophy in Seventeenth-century Leiden," *Isis* 90 (1999): 420-461.

Smith, Pamela H. *The Business of Alchemy: Science and Culture in the Holy Roman Empire*. Princeton: Princeton University Press, 1994.

Jardine, Lisa. *Ingenious Pursuits: Building the Scientific Revolution*. New York: Nan A. Talese, 1999.

Johns, Adrian. *The Nature of the Book: Print and Knowledge in the Making*. Chicago: University of Chicago Press, 1998.



- Syllabus
- Primary Sources
- Web Resources

Selected Primary Sources at the Folger Shakespeare Library

The Textures of Experience

Agrippa, Henry Cornelius (1486?-1535).
De occulta philosophia.
Cologne, 1533, and Lyon [Lugduni], 1600.
Folger Library Call Numbers: 212797 and 164979

Agrippa, Henry Cornelius (1486?-1535).
Three books of occult philosophy.
London, 1651.
Folger Library Call Number: 184128

Aristotle.
Enarratio de anima ex aristotelis [*De anima* in Latin].
Brescia, 1495.
Folger Library Call Number: Inc A351

Aristotle.
L'anima d'Aristotele [*De anima* in Italian].
N.p., 1551.
Folger Library Call Number: PA 3903 A1 A6 1551 Cage

Aristotle.
[*Parva naturalia*].
N.p., 1523, and Venice, 1573.
Folger Library Call Numbers: PA 3903 A1 N4 P2 1523 Cage and 167-118.3f

Descartes, René (1596-1650).
De homine [*Traités de l'homme* in Latin].
Leiden [Lugduni Batavorum], 1662.
Folger Library Call Number: QP 29 D4 1662 Cage

Descartes, René (1596-1650).
Traités de l'homme.
Paris, 1664.
Folger Library Call Number: 158235

Descartes, René (1596-1650).
Opera philosophica.
Amsterdam, 1664.
Folger Library Call Number: B 1836 1664 Cage

Digby, Kenelm Sir (1603-1665).
Two treatises.
Paris, 1644, and London, 1669.
Folger Library Call Numbers: 131522 and 135598

Ficino, Marsilio (1433-1499).
De triplici vita.
Strasbourg [Argeñ], 1511.
Folger Library Call Number: R 128.6 F5 1511 Cage

Ficino, Marsilio (1433-1499).
De vita libri tres [*De triplici vita* in French].
Basel, 1549.
Folger Library Call Number: 159-527q

Paracelsus (1493-1547).
De urinarum ac pulsuum indicijs.
Basel, 1568, and Strasbourg [Argentinae], 1568.
Folger Library Call Number: 165-464q and 184-931q

Paracelsus (1493-1547).
Paracelsi genannt [Selected works in German].

Basel, 1590.
Folger Library Call Number: R 128.6 P2 B8 Cage

Paracelsus (1493-1547).
Of the chymical transmutation, genealogy and generation of metals & minerals. Also, of the urim and thummim of the Jews.
London, 1657.
Folger Library Call Number: B3543 Bd.w. H1677

Pliny the Elder.
Naturalis historia [Latin].
Parma, 1481, and Venice, 1483.
Folger Library Call Number: Inc P722 and Inc P723 2 cop.

Pliny the Elder.
Historia naturale [*Naturalis historia* in Italian].
Venice, 1489.
Folger Library Call Number: Inc P732

Pliny the Elder.
L'histoire du monde [*Naturalis historia* in French].
Lyon, 1566.
Folger Library Call Number: PA 6613 F7 1566 Cage 2 cop.

Pliny the Elder.
Bücher und Schriffen von Natur, Art, und Eygenschafft [*Naturalis historia* in German].
Frankfurt, 1600.
Folger Library Call Number: PA 6613 G4 1600 Cage

Pomponazzi, Pietro (1462-1524).
De immortalitate animae.
N.p., 1534.
Folger Library Call Number: B785 P8 T8a

Porta, Giambattista della (1535?-1615).
De i miracoli et maragliosi [*Magiae naturalis* in Italian].
Venice, 1562.
Folger Library Call Number: 182-329q

Porta, Giambattista della.
Magiae naturalis.
Lyon [Lugduni], 1569.
Folger Library Call Number: Q155 P8 1569 Cage

Porta, Giambattista della.
Natural Magick [*Magiae naturalis* in English].
London, 1658.
Folger Library Call Number: 144662

Vernacular Epistemologies

Aristotle's Masterpiece: or The Secrets of Generation.
London, 1694.
Folger Library Call Number: A3689A

Bacon, Francis (1561-1626).
Sylva Sylvarum: or A Naturall Historie.
London, 1626.
Folger Library Call Number: STC 1168 2 cop.

Bacon, Francis (1561-1626).
Histoire naturelle [*Sylva Sylvarum* in French].
Paris, 1631.
Folger Library Call Number: PR 2206 S9 F7 1631 Cage

Bacon, Francis (1561-1626).
Sylva Sylvarum [Latin].
Amsterdam, 1661.
Folger Library Call Number: PR 2206 S9 L5 1661 Cage

Culpeper, Nicholas (1616-1642).
Directory for Midwives.

London, 1684.
Folger Library Call Number: C7494.2

Galilei, Galileo (1564-1642).
Systema cosmicum [*Dialogo dei massimi sistemi* in Latin].
London, 1663.
Folger Library Call Number: G168

Galilei, Galileo (1564-1642).
Discorsi e dimstrationi mathematiche.
Bologna, 1655.
Folger Library Call Number: QC 123 G12 1655 Cage

Galilei, Galileo (1564-1642).
Opere [Latin].
Bologna, 1655.
Folger Library Call Number: QB 3 G14 1655 Cage

Lupton, Thomas (fl. 1583).
A thousand notable things of sundrie sorts.
London, 1601.
Folger Library Call Number: STC 16959

Moffett, Thomas (1553-1604).
Healths Improvement.
London, 1655.
Folger Library Call Number: M2382

Vaughan, William (1577-1641).
Directions for health, naturall and artificiall [*Natural and artificial directions*].
London, 1633.
Folger Library Call Number: STC 24618

Mechanical Arts, Natural Philosophy, and Visual Representation

Alberti, Leon Battista (1404-1472).
L'Architettura [*De re aedificatoria* in Italian].
Venice, 1565.
Folger Library Call Number: NA 2515 A5 I8

Homer.
Poetarum omnium secularum longe principis Homeri Ilias [*Iliad* in Latin].
Basel, 1540.
Folger Library Call Number: 203-876q

Ovid.
Metamorphoseos vulgare [*Metamorphoses* in Italian].
Venice, 1522.
Folger Library Call Number: 162-165q

Vesalius, Andreas (1514-1564).
De humani corporis fabrica.
Basel, 1555.
Folger Library Call Number: QM 25 V4 1555 CAGE

Disciplining Experience: Cartography and Mathematics

Blith, Walter (fl. 1649).
The English improver, or a New Survey of Husbandry.
London, 1649.
Folger Library Call Number: B3194

Dee, John (1527-1608).
Preface, The Elements of Geometrie of … Euclide.
London, 1570.
Folger Library Call Number: STC 10650

Gilbert, William (1540-1603).
De Magnete [Latin].

London, 1600.
Folger Library Call Number: STC 11883 2 cop.

Norman, Robert (fl. 1590).
The Newe Attractive.
London, 1581.
Folger Library Call Number: STC 3389

Objects of Art/Objects of Nature

Bacon, Francis (1561-1626).
Sylva Sylvarum: or A Naturall Historie.
London, 1626.
Folger Library Call Number: 1168 2 cop.

Bacon, Francis (1561-1626).
Instauratio Magna [*Novum Organum* in Latin].
London, 1620
Folger Library Call Number: STC 1163 4 cop.

Bacon, Francis (1561-1626).
Nova Atlantis. [*New Atlantis* in Latin].
Utrecht [Ultraict], 1643.
Folger Library Call Number: PR 2283 H7 M8 1643 Cage

Dürer, Albrecht (1471-1528).
Les quatre livres [*De symmetria* in French].
Paris, 1557.
Folger Library Call Number: 155-502f

Dürer, Albrecht (1471-1528).
Unterweisung der Messung.
Nuremberg, 1538.
Folger Library Call Number: 170-649f

Montaigne, Michel de (1533-1592).
Les Essais.
Lyon, 1595.
Folger Library Call Number: PQ 1641 A1 1595 Cage

Palissy, Bernard (1510?-1590).
Discours Admirables.
Paris, 1580.
Folger Library Call Number: Q 155 P192 1580 Cage

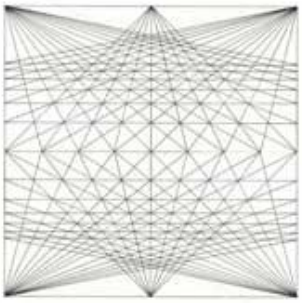
Experience and Experiment in the Scientific Revolution

Boyle, Robert (1627-1691).
Tracts . . . containing new experiments, touching the relation betwixt flame and air.
London, 1672.
Folger Library Call Number: B4060

Hooke, Robert (1635-1703).
Micrographia: or some physiological descriptions of minute bodies made by magnifying glasses. London, 1667.
Folger Library Call Number: 140490

Hooke, Robert (1635-1703).
The Posthumous Works . . . containing his Cutlerian lectures and other discourses.
London, 1705.
Folger Library Call Number: 165791

Newton, Isaac Sir (1642-1727).
New theory about light and colours.
London, 1672.
Folger Library Call Number: R 2152.5



Web Resources

Architecture

Architecture Virtual Library
http://www.clr.toronto.edu:1080/VIRTUALLIB/ARCH/hist.html

Images from Serlio's Architettura
http://rubens.anu.edu.au/htdocs/bytype/arch.sources/serlio/

Musei Vaticani e Cappella Sistina
http://www.christusrex.org/www1/vaticano/0-Musei.html

Renaissance and Baroque Architecture
http://www.lib.virginia.edu/dic/colls/arh102/index.html

Society of Architectural Historians
http://www.sah.org/netresources.html

Cartography

Library of Congress Geography and Map Reading Room
http://lcweb.loc.gov/rr/geogmap/

History of Science Societies and Institutes

History of Science Society
http://www.hssonline.org/

Max Planck Institute for the History of Science
http://www.mpiwg-berlin.mpg.de/ENGLHOME.HTM

SHOT Society for the History of Technology
http://www.shot.jhu.edu/

Dibner Institute for the History of Science and Technology
http://dibinst.mit.edu/

History of Science Sites

The Alchemy Website and Virtual Library
http://www.levity.com/alchemy/home.html

Catalog of the Scientific Community in the 16th and 17th Centuries
http://es.rice.edu/ES/humsoc/Galileo/Catalog/catalog.html

History of Science on the World Wide Web
http://www.ou.edu/cas/hsci/rel-site.htm

The Universal Laboratory for the History of Science
http://www.its.caltech.edu/~winter/

Individuals and their Works

Galileo Galilei's Notes on Motion
http://galileo.imss.firenze.it/ms72/index.html

The Galileo Project
http://es.rice.edu/ES/humsoc/Galileo/

Leon Battista Alberti's On Painting
http://www.noteaccess.com/Texts/Alberti

The Robert Boyle Project
http://www.bbk.ac.uk/Boyle/

Instrumentation

Epact: Scientific Instruments of Medieval and Renaissance Europe
http://www.mhs.ox.ac.uk/EPACT

Journals and Periodicals

Arts Journal
http://artsjournal.com

Bulletin of the History of Medicine
http://muse.jhu.edu/journals/bulletin_of_the_history_of_medicine/

Technology and Culture
http://www.press.jhu.edu/journals/technology_and_culture/

Mathematics

MacTutor History of Mathematics Archive St. Andrews, Scotland
http://www-groups.dcs.st-and.ac.uk:80/

Miscellaneous

Octavodigital rare books
http://www.octavo.com

A Romantic Natural History
http://www.dickinson.edu/%7Enicholsa/Romnat/romnat1.htm

Women Writers Project
http://www.wwp.brown.edu/wwp_home.html

Museums and Libraries

Museums in the District of Columbia
http://www.museumca.org/usa/dc.html

Museum of the History of Science, University of Oxford
http://www.mhs.ox.ac.uk/

National Gallery, London
http://www.nationalgallery.org.uk/

National Library of Medicine
http://www.nlm.nih.gov/

Smithsonian Institution Libraries
http://www.sil.si.edu/

Visual Arts

ArtLex Visual Arts Directory
http://www.artlex.com

The Art of Renaissance Science
http://www.mcm.edu/academic/galileo/ars/arshtml/arstitle.html

Johannes Vermeer and Delft Geography
http://www.xs4all.nl/~kalden/