

SYLLABUS

CLASS: HISTORY OF THE SCIENTIFIC REVOLUTION IN WESTERN EUROPE

A Syllabus
Integrating
Wiley Digital
Archives' Primary
Sources Into Study
Materials and
Classroom Activities

From about 1500 to 1700, ways of understanding the natural world, the body, and the cosmos changed dramatically throughout Western Europe. This course is an introduction to the cultural, social, and intellectual history of these processes of change, often called the Scientific Revolution. Practitioners of astronomy, alchemy, natural philosophy, and mathematics began to adopt new approaches to their work and incorporate new ideas into their disciplines. These new views and practices shook the foundations of early modern European society and helped to shape the modern world as we know it today.

This course is intended for undergraduate students of all levels. You do not need to have a background in history, science, or mathematics to succeed in and enjoy this course. I encourage you to ask questions, challenge what you may think of as received wisdom, and be willing to engage critically with both primary and secondary source materials.

Image Credit: "Andreae Vesalii Bruxellensis, Scholae Medicorum Patavinae Professoris, De Humani Corporis Fabrica Libri Septem." RCP Library. Oporinus, Joannes. 1543. <http://WDAgo.com/s/d1a40b43>



STUDENT LEARNING OUTCOMES

Students who successfully complete this course will:

- Critically engage with and analyze both primary and secondary sources
- Evaluate and analyze the arguments of other historians
- Build their own arguments rooted in historical evidence from primary sources
- Articulate and present their arguments in class discussions and written assignments.



CLASS REQUIREMENTS

Your grade will be determined as follows:

- Midterm exam (20%)
- Final examination (20%)
- Two papers (20%)
- Class participation and attendance (20%)
- Short responses: primary source analysis (20%)



SHORT RESPONSES: PRIMARY SOURCE ANALYSIS

Short response papers are the first kind of written work you will be turning in for this course. These short responses should be about 500 words each, typed. They should respond to an issue raised in the primary source materials for that week. There are two opportunities to write a response each week – one on Tuesday and one on Thursday. Prompts for the short responses are included after each primary source reading on this syllabus. Your short response paper should address the prompt for the source(s) to which it responds, but you can feel free to expand on the discussion prompt that is included on the syllabus. Each student is responsible for turning in five short responses, three before the midterm exam and two after. *Even if you do not write a short response paper for a given set of primary source materials, you should look at the discussion prompts and consider them as you read.* Since readings are to be completed after lecture, short responses are due to me by email at 11:59pm on Friday of each week.



PAPERS

You will write two papers for this course. Each paper should be between 5 and 6 pages long. I will circulate the prompts for each paper several weeks before the due date. Paper #1 will give you a chance to do more

in-depth analysis of the primary sources we use for this class. Think of your short responses as practice using the analytical skills that you will need to write an excellent first paper. For paper #2, you will read 2 works on a similar topic by different historians with different viewpoints. You will consider their historiographical interventions and give your own reasoned opinion about the arguments they make, which is more convincing to you, and why.



EXAMS

There will be an in-class midterm and a final exam during the final exam period at the end of the semester. If you have questions about the material that will be on the exams, I encourage you to come and visit me in office hours.



ATTENDANCE

Attendance is mandatory and a crucial part of your success in this class. You are allowed 1 free absence that will not negatively impact your grade. If you are going to have to miss class for a second time, please email me in advance. Attendance and participation is 20% of your overall grade in this course.



SUPPORT

I am available to discuss your work. I encourage you to meet with me when you are writing your papers and to email me if you have questions about the reading and course content that are not covered in class.



CLASSROOM POLICIES

Please do not use your cell phone in class. You may use your laptop to take notes as long as you remain engaged in the lecture and discussion. If you are using your laptop during class, I reserve the right to call on you if I ask a question. All written work must conform to university rules regarding plagiarism.



DISABILITY-RELATED ACCOMMODATIONS

In order to receive disability-related academic accommodations, students must first be registered with Services for Students with Disabilities. Please notify me of any academic accommodations that you will require as soon as possible in the semester. Students who have (or think they may have) a disability are invited to contact Services for Students with Disabilities for a confidential discussion by phone or by email.

CLASS SCHEDULE

WEEK 1: INTRODUCTION & ANCIENT KNOWLEDGE

TUESDAY: What is “Scientific” Knowledge?

- Secondary Source: Steven Shapin, “Making Science / Discovering Art,” *KNOW: A Journal on the Formation of Knowledge* (2018): 177-205.
- Primary Source: James Finlayson, “Galen: A Bibliographical Demonstration.” RCP Library, 1892. <http://WDAgo.com/s/efbdfb71>
 - How does Finlayson describe Galen, one of the great medical minds of ancient times, differently than a historian today might describe Galen? How does this fit in with what Shapin says about “discovering” facts?

THURSDAY: Ancient Knowledge, Continued

- Secondary Source: Peter Dear, “Introduction,” “Chapter 1,” and part of “Chapter 2” in *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Princeton: Princeton University Press, 2009): 1-35.
- Primary Source: Avicenna, “Al-Qanun Fi ‘Ilm Al-Tibb. The Canon of Avicenna. Book 1.” Tritton Oriental Manuscripts. <http://WDAgo.com/s/a402b4ac>
 - Look through the pages of this document (you don’t have to read the text). What observations can you make about the document itself? What might this tell us about the context in which it was used and why is this important?

WEEK 2: UNDERSTANDING THE HEAVENS & EARTH

TUESDAY: Life on Earth

- Secondary Source: James McClellan and Harold Dorn, “Europe and the Solar System,” and “Plows, Stirrups, Guns, and Plagues,” in *Science and Technology in World History: An Introduction* (Baltimore: The Johns Hopkins University Press, 2006): 175-201.

- Primary Source #1: Robert Barker, “Certain Necessary Directions Aswell for the Cure of the Plague, as for Preuenting the Infection; with Many Easie Medicines of Small Charge, Very Profitable to His Maiesties Subiects.” 1636. RCP Library. <http://WDAgo.com/s/0862817c>. Read/look at Image 8 to Image 27.
- Primary Source #2: “Proclamation by James I, proroguing Parliament on account of the plague in London.” Regulation of Clinical Practice and Standards, 1608. <http://WDAgo.com/s/08947359>
 - Based on what we discussed in lecture, what McClellan and Dorn say in their article, and the contents of these primary sources, how did the plague influence the development of natural philosophical thought in early modern Europe?

THURSDAY: Looking to the Heavens

- Secondary Source: The rest of “Chapter 2,” in Peter Dear, *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Princeton: Princeton University Press, 2009): 36-43.
- Primary Source: Nicholas Copernicus, *On the Revolutions in the Heavens*. Translated by Edward Rosen. (Baltimore: The Johns Hopkins University Press, 1978): xv-xvii, 3-11, 18-22, 244-247.
 - Based on what we discussed in lecture and what you read, why do you think Copernicus’ work received the reception it did?

WEEK 3: REVOLUTIONARY BEGINNINGS

TUESDAY: The Microcosm & The Macrocosm, 1543

- Secondary Source: Katherine Park, “Introduction,” “The Empire of Anatomy,” and “Epilogue,” in *Secrets of Women* (Cambridge: Zone Books, 2010), 13-21, 207-261.
- Primary Source: Andreas Vesalius, “Dedication,” in *The Fabric of the Human Body* (1555), trans. Daniel Garrison and Malcolm Hast, 2r-4v.
 - How does Vesalius present himself to his reader? Why?

THURSDAY: Tycho Brahe, The Last of the Naked-Eye Astronomers

- Secondary Sources: Robert S. Westman, "The Astronomer's Role in the Sixteenth Century: A Preliminary Study," *History of Science* 18 (1980): 105-47; John R. Christianson, *On Tycho's Island: Tycho Brahe and His Assistants, 1570-1601* (Cambridge: Cambridge University Press, 2000): 58-124.
 - There are no primary source readings today. Instead, read the secondary sources and pay close attention to what each author argues. What do you think of their arguments and why?

WEEK 4: TRANSFORMATIONS: ALCHEMY & MAGIC

TUESDAY: Alchemists & Mathematicians

- Secondary Source: Pamela Smith, "Artisanal Epistemologies," and "The Body of the Artisan," in *The Body of the Artisan* (Chicago: University of Chicago Press, 2004): 60-127.
- Primary Source: "The Translator to the Reader," and part of "John Dee his Mathematicall Preface," in John Dee, *The Elements of Geometrie of the Most Auncient Philosopher Euclide of Megara*. RCP Library. 1570. <http://WDAgo.com/s/a3ee6284>. Read from the front matter through the first paragraph on page 13.
 - What does Dee use the term "nature" to mean? Why?

THURSDAY: Magic & Wonder

- Secondary Source: William Eamon, "Natural Magic and the Secrets of Nature," in *Science and the Secrets of Nature* (Princeton, 1994), 194-233.
- Primary Source: Look through Giambattista della Porta, *Natural Magick* (translated 1658 edition). In particular, read Book 1, Chapters 1-7, and all of Book 8. Look at the table of contents and read at least 2 other chapters that interest you. (Each chapter is about one or two paragraphs long.)
 - Did anything about Della Porta's text surprise you? Why or why not?

WEEK 5: HARMONIES & HEAVENLY BODIES

TUESDAY: Johannes Kepler

- Secondary Source: "Chapter 4," in Peter Dear, *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Princeton: Princeton University Press, 2009): 65-78.
- Primary Source #1: Johannes Kepler, *Mysterium Cosmographicum*, translated by A.M. Duncan (New York: Abaris Books, 1999): 75-91;
- Primary Source #2: Johannes Kepler, "Book 4," in *Epitome of Copernican Astronomy* (New York: Prometheus Books, 1995): 845-64, 887-905.
 - Compare Kepler's ideas about what orders the universe with the ideas of previous thinkers we have discussed, especially Ptolemy, Tycho Brahe, and Aristotle.

THURSDAY: Galileo Galilei

- Secondary Source: Mario Biagioli, "Galileo the Emblem Maker," *Isis* 81 (1990): 230-258.
- Primary Source: Galileo Galilei, *Sidereus Nuncius, or The Sidereal Messenger*, translated by Albert van Helden (Chicago: University of Chicago Press, 1989).
 - Who is Galileo's target audience? How do you know?

WEEK 6: HUMAN BODIES I

TUESDAY: William Harvey

- Secondary Source: Michael J. Neuss, "Blood Money: Harvey's De Motu Cordis (1628) as an Exercise in Accounting," *The British Journal for the History of Science* 51, no. 2 (June 2018): 181-203.
- "Primary Source" #1: Thomas Henry Huxley, "William Harvey," RCP Library. January 26, 1878. <http://WDAgo.com/s/c344241c>.
 - Would you describe this source as a primary source or a secondary source? Why? How does Huxley describe Harvey?
- Primary Source #2: William Harvey, "Facsimile of Letter from William Harvey to Samuel Ward," RCP Library. 1849. <http://WDAgo.com/s/579a2e03>

- Based on the perspectives put forth in these sources, how was Harvey's work received by the public? By educated elites?

Paper #1 due at the start of class on Thursday

THURSDAY: Medicine & Surgery

- Secondary Source: Eleanor Decamp, "Naming of Parts," in *Civic and Medical Worlds in Early Modern England* (London: Palgrave Macmillan, 2016): 1-29.
- Primary Source: Thomas Brown, "Physick Lies a Bleeding; Or, the Apothecary Turned Doctor..." 1697. College Collection. E. Whitlock.
<http://WDAgo.com/s/2aa6fc15>
 - Why does Brown say his work is "Absolutely necessary for all Persons who are sick, or may be sick"? Do you think his work supports Decamp's argument?

WEEK 7: HUMAN BODIES II

TUESDAY: Understanding the Body

- Secondary Source: Richard Sugg, "The Body as Proof," in *Murder After Death* (Ithaca: Cornell University Press, 2007): 87-129.
- Primary Source: Johann Jakob Wecker, "The Epistle," "The Translator to the Reader, and "Chapter XII: Of a Wounde in the Veines and Arteries," in *A Compendious Chyrurgerie*, 1585. Look at/read image 6 to image 18; and image 385 to image 391.
<http://WDAgo.com/s/4deaa9a5>
 - How is Wecker's writing patriotic? How is it pious? What words does he use to describe the human body and why is this significant?

THURSDAY: Normative & Non-Normative Bodies

- Secondary Sources: Lorraine Daston and Park, "Monsters: A Case Study," in *Wonders and the Order of Nature 1150-1750* (New York: Zone Books, 1998): 175-215; Alison P. Hobgood and David Houston Wood, "Introduction," in *Recovering Disability in Early Modern England* (Columbus: The Ohio State University Press, 2013): 1-22.

- Primary source: Edward Tyson, "Drawings of Natural History and Comparative Anatomy." 1693.
<http://WDAgo.com/s/25c0905a>
 - How does Tyson portray the body? What is the anatomy in question being compared to?

WEEK 8: CURIOSITY & CAPITALISM

TUESDAY: Commerce & Natural Science

- Secondary Source: Harold Cook, "Wordly Goods and the Transformations of Objectivity," "An Information Economy," and "Gardens of the Indies Transported," in *Matters of Exchange* (New Haven: Yale University Press, 2007): 1-42; 304-338.
- Primary source: Albert Gray, "Dutch Voyages to East India," in "The Sir Albert Gray Collection. Notes on Voyages to the East Indies and Maldive Islands." Small Special Collections. 1592-1984. Image 102.
<http://WDAgo.com/s/83920c04>
 - If you find it difficult to read the handwriting in the manuscript, you can download the table in Excel format by clicking on the "download" button on the upper left-hand side of your screen. In the Excel table, you can read a typed transcription of the data shown on this page. What do you notice about the voyages going from the Dutch Republic to the East Indies? Based on the data in the table, who do you think took part in these voyages and why?

THURSDAY: Sir Francis Bacon & Sir Hugh Plat

- Secondary Source: Deborah Harkness, "From The Jewel House to Solomon's House," and "Coda," in *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven, Yale University Press, 2008): 211-261.
- Primary Source: Francis Bacon, *New Atlantis* (Irving: Center for Thomas More Studies, 2003).
 - What are the advantages and disadvantages of the systems of knowledge production that Francis Bacon and Hugh Plat use, according to Harkness and your understanding of *New Atlantis*?

WEEK 9: KNOWLEDGE & POWER

TUESDAY: Midterm Exam in Class

- No readings for today.

THURSDAY: Colonization & Imperialism in the Scientific Revolution

- Secondary Source: Lazlo Kontler, Antonella Romano, Silvia Sebastiani, and Borbala Zsuzsana Torok, "Introduction," in *Negotiating Knowledge in Early Modern Empires* (New York: Palgrave Macmillan, 2014): 1-22; Hugh Raffles, "Intimate Knowledge," *International Social Science Journal* 54, no. 173 (2002): 325-335.
- Primary Source: Thomas Vicary, William Turner, et al., "The English-Mans Treasure, with the True Anatomie of Mans Body," RCP Library, 1641. Images 156-162. <http://WDAgo.com/s/da216335>
 - Why do you think this book is entitled "The English-Mans Treasure"? What different forms of local, intimate, indigenous, and imperial knowledge do you see reflected in this section of the book?

SPRING BREAK. ENJOY YOUR TIME OFF!

WEEK 10: GENDER & MECHANICAL PHILOSOPHY

TUESDAY: Gender & the Scientific Revolution

- Secondary Sources: Carolyn Merchant, "Introduction," "The Mechanical Order," and "Mechanism as Power" in *The Death of Nature: Women, Ecology, and the Scientific Revolution* (New York: HarperOne Publishers, 1990): xix-xxiv; 192-216; Caroline Merchant, "The Scientific Revolution and *The Death of Nature*," *Isis* 97, no. 3 (2006): 513-533.
- Primary Source: Look through Andrew Plowden, "A Book of Chirurgie and Phisick of Mistress Honorie Henslow," 1601. <http://WDAgo.com/s/188136f9>
 - Choose at least 1 entry to analyze closely. Then consider: Who do you think compiled this book? Who wrote it? How does it reflect gendered ideas about knowledge production and what is "natural"?

THURSDAY: Descartes & Mechanical Philosophy

- Secondary Sources: Peter Dear, "Chapter 5," in *Revolutionizing the Sciences: European Knowledge and its Ambitions, 1500-1700* (Princeton: Princeton University Press, 2009): 79-98; Emerson McMullen, "The Origin of Descartes' Mechanical Philosophy," *Georgia Journal of Science* 60, no. 2 (2002): 127-143.
- Primary Source: René Descartes, "Treatise on Man," in *The World and Other Writings*, translated and edited by Stephen Gaukroger (Cambridge: Cambridge University Press, 1998): 99-117.
 - What does Descartes argue here? Why was his argument about the body controversial?

WEEK 11: THE AIR PUMP & THE VACUUM

TUESDAY: Robert Boyle & the Air Pump

- Secondary Source: Stephen Shapin and Simon Schaffer, "Chapter 1," and "Chapter 2," in *Leviathan and the Air Pump* 2011 edition (Princeton, Princeton University Press, 2011): 3-79.
- Primary Source: Robert Boyle, "Letter to Moray, July 1662," in *The Correspondence of Robert Boyle* vol. 2, edited by Michael Hunter, Antonio Clericuzio and Lawrence M. Principe (London, Pickering & Chatto, 2001): 26-29.
 - What is Boyle's stated purpose for writing this letter? What are some other reasons why he might have written it, and written it precisely the way he did?

THURSDAY: Why Does The Vacuum Matter?

- Secondary Source: Stephen Shapin and Simon Schaffer, "Chapter 4," and "Chapter 8," in *Leviathan and the Air Pump* 2011 edition (Princeton, Princeton University Press, 2011): 110-154; 332-344.
- Primary Source: Blaise Pascal, *Pensées and Other Writings*, translated by Honor Levi (New York: Oxford University Press, 2008): 66-73.
 - Do you think that Pascal's views, as he expresses them here, are voluntarist or intellectualist? Why?

WEEK 12: MECHANISM & MICROSCOPY

TUESDAY: Robert Hooke

- Secondary Source: Rob Iliffe, "Material Doubts: Hooke, Artisan Culture and the Exchange of Information in 1670s London." *British Journal for the History of Science* 28, no. 98 (1995): 285-318.
- Primary Source: Robert Hooke, *Micrographia* (London: Printed for John Martyn, printer to the Royal Society, and to be sold at his shop at the Bell a little without Temple Barr, 1667): 169-175, 210-211.
 - What did you find most remarkable about *Micrographia*? Why? How did this work convey information in a new way?

Paper #2 due at the start of class on Thursday

THURSDAY: Microscopy & Merian

- Secondary Source: Natalie Zemon Davis, "Metamorphoses: Maria Sibylla Merian," in *Women on the Margins: Three Seventeenth-Century Lives* (Cambridge: Harvard University Press, 1995): 140-202.
- Primary Source: Patrick Lennon, "Translation *Metamorphosis Insectorum Surinamensium*, [sic]" in *Maria Sibylla Merian: Metamorphosis Insectorum Surinamensium* (Tiel: Lannoo Publishers, 2016): 177-188.
 - Where does Merian focus her reader's attention in this work? Why?

WEEK 13: ISAAC NEWTON, THE LAST OF THE MAGICIANS

TUESDAY: The Newton You Know

- Secondary Source: Simon Schaffer, "Newton on the Beach: The Information Order of Principia Mathematica," *History of Science* 47, no. 157 (2009), 243-276.
- Primary Source: Isaac Newton, "Newton's *Principia*: Rules of Reasoning in Natural Philosophy," in *The Mathematical Principles of Natural Philosophy by Sir Isaac Newton*, translated by Andrew Motte (London: 1729): 202-205.

- How did Newton's rules of reasoning change the way he (and others) understood the world and the universe as a whole? Do you see this reflected in the primary source you read for today?

THURSDAY: The Newton You Don't

- Secondary Source: Charles Webster, "Spiritual Magic," in *From Paracelsus to Newton: Magic and the Making of Modern Science* (Cambridge: Cambridge University Press, 1983): 48-74.
- Primary Source: Paracelsus, "The Book Concerning the Tincture of Philosophers," in *The Heretical and Alchemical Writings of Aureolus Phillipus Theophrastic Bombast, of Hohenheim, called Paracelsus the Great*, edited by Arthur Edward Waite (London: James Elliot & Co., 1894): 19-30.
 - Based on what we discussed in class about Newton's views, what you read in Webster's book, and what you read in this primary source from Paracelsus, how are Newton's views a departure from Paracelsus' views? In what ways were their views similar? How do you know?

WEEK 14: THE BEST OF ALL POSSIBLE WORLDS

TUESDAY: From Leibniz to du Châtelet

- Secondary Source: Murray, Michael J. and Greenberg, Sean, "Leibniz on the Problem of Evil," in *The Stanford Encyclopedia of Philosophy* (Winter 2016 edition), edited by Edward N. Zalta. (Stanford: Stanford University Press, 2016): 1-16.
- Primary Source: Émilie du Châtelet, "Commentary on Newton's *Principia*," in *Selected Philosophical and Scientific Writings*, edited by Judith P. Zinsser (Chicago: University of Chicago Press, 2009): 263-290.
 - How and why does du Châtelet's work bring together the ideas of many of the mathematicians, natural philosophers, and astronomers that we have discussed this semester? Based on this primary source and what we discussed in class, what do you think makes her contribution unique and important?

THURSDAY: The Enlightenment

- Secondary Source: Dan Edelstein, "Introduction," and "Interpreting the Enlightenment: On Methods," in *The Enlightenment: A Genealogy* (Chicago, University of Chicago Press, 2010): 1-19.
- Primary Source: James Thomson, *A Poem Sacred to the Memory of Sir Isaac Newton* (London : printed for J. Millan; and sold at his shop, 1727).
 - Why might Edelstein argue that Thomson's work contributes to what he calls "the narrative of the Enlightenment" (p. 2)? Why does this narrative matter, and do you agree with Edelstein's assessment of it based on your reading of Thomson's work and the things we discussed in class?

WEEK 15: CONCLUSION

TUESDAY: Challenging the Scientific Revolution

- Secondary Source: Mikuláš Teich, "The Scientific Revolution: The Big Picture," in *The Scientific Revolution Revisited*, Cambridge: Open Book Publishers, 2015.
- Primary Source: "Outline of Purpose for the World Science Center." *Records on the Proposed World Science Center*, Box 1, Folder 11, n.d, The New York Academy of Sciences. <http://WDAgo.com/s/9ae0fbf2>
 - What do the authors of this document use the term "scientific revolution" to mean? How does the context in which this document was created shape that meaning? unique and important?

THURSDAY: Review for Final Exam

- There are no additional assigned readings for today. Instead, review your notes from class for the semester and come to class with questions prepared for our review.

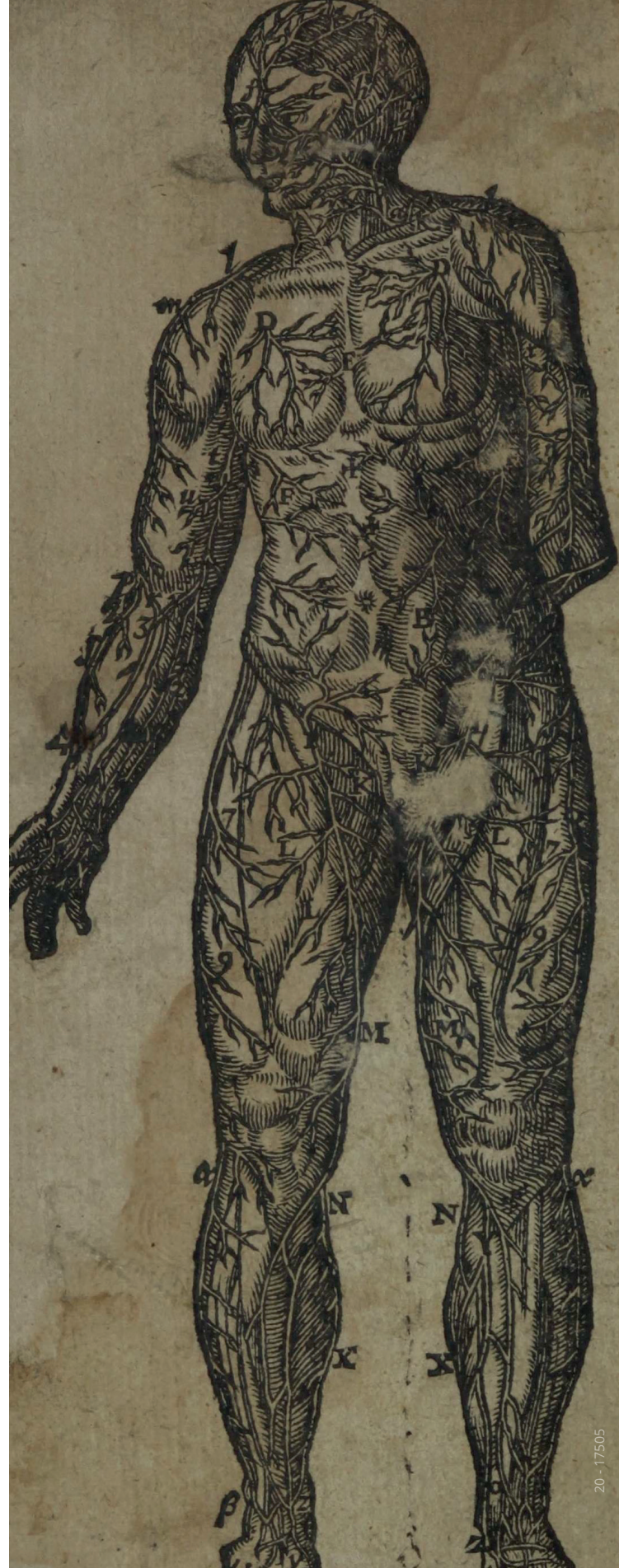


Image Credit: "The English-Mans Treasure, with the True Anatomie of Mans Body," RCP Library, 1641. <http://WDAgo.com/s/da216335>

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