

HIST G8906
Craft and Science: Objects and Their Making in the Early Modern World
Fall 2014
Tuesday & Friday 9-10:50AM
Chandler 260

This course will be scheduled in a 1-hr, 50-minute seminar slot on Tuesdays and Fridays. This will provide enough time for substantive discussion and laboratory work. Expert Makers will be in residence for 10 days, during which meetings may be more frequent.

The course will be offered both semesters, and students can participate as often as they like, but they can only take it for full credit (4 points) once.

Co-Instructors:

Prof. Pamela Smith

Office: Fayerweather 605

Dr. Donna Bilak

Office: Heyman Center B206

Dr. Jenny Boulboulé

Office: Heyman Center B206

Dr. Joel Klein

Office: Heyman Center B206

This course will study the materials, techniques, settings, and meanings of skilled craft and artistic practices in the early modern period (1350-1750), in order to reflect upon a series of issues, including craft knowledge and artisanal epistemology; the intersections between craft and science; and questions of historical methodology and evidence in the reconstruction of historical experience. The course will be run as a “Laboratory Seminar,” with discussions of primary and secondary materials, as well as hands-on work in a laboratory. This course is one component of the Making and Knowing Initiative of the Center for Science and Society. Thus, in its first years, this course contributes to the collective production of a transcription, English translation, and critical edition of a late sixteenth-century manuscript in French, Ms. Fr. 640.

A prerequisite of this course is to complete laboratory safety training. The safety training schedule can be found via the [Environmental Health and Safety website](#). No registration is required for safety training; you may simply show up and attend. Your attendance will be recorded and stored electronically in the RASCAL system, where you will be able to print a training certificate as proof of training. If you have not taken laboratory safety training by the first day of class, you will have an opportunity to attend on September 5 (but please try to take it before the first day of class, as training sessions will get very crowded!)

Course Organization

This course will be conducted by discussion of readings and hands-on work in the laboratory. Readings will include primary sources and literature drawn from material culture studies, anthropology, history of science and technology, and art history, as well as an introduction to historical reconstruction and to BnF Ms. Fr. 640. Students will contribute to the research on MS. Fr. 640 by finding and comparing contemporaneous primary sources and discussing their value for a better understanding of the recipes and methods described in the Ms. Fr. 640. At the same time, a series of introductory lab sessions on making and materials will be conducted. The course will then turn to the reconstruction of the techniques in Ms. Fr. 640. Using a transcription and English translation, the laboratory portion of the course will focus each year on a single set of related techniques described in the manuscript. In 2014-15, the focus will be metalworking, mold-making, and sand casting, including portrait medal making.

Work in the laboratory each semester will include a two-week residency by an expert maker, who will participate in the seminar and lead demonstrations and experiments in the lab. This expert will come from conservation, studio art, or craft, and will have expertise in historical techniques in areas relevant to the manuscript. This semester's expert practitioner will be Tonny Beentjes, Programme leader metals conservation and researcher, University of Amsterdam. He will be in residence October 6-17.

On May 28-30, 2015, a Working Group Meeting of experts in metalworking and casting will be held at Columbia to review the progress made on the project. Students from both semesters will be expected to attend. On June 1-19, a Renaissance French Paleography seminar will be offered at Columbia in order to "crowdsource" the pigment and painting recipes in the manuscript. A Call for Applications will be forthcoming during the semester.

Assignments and Evaluation

Discussion

Students will assist in leading a discussion session by preparing a response to the reading and posing topics for discussion. **Discussion participation accounts for about 20% of the total grade.**

Hands-on Assignments

Students will keep laboratory notebooks and contribute to the Class Wiki's "Ethnographic Field Notes" (in written, visual, or podcast form) documenting their experiments in reconstruction, as well as their methodological reflections on the uses of hands-on work and reconstruction as historical sources. **The laboratory component of the course will be worth 30% of the grade.**

Written assignments

Students will contribute to the decipherment of the text of Ms. Fr. 640, and they will contribute to annotation of the translation and critical edition of the manuscript. They will assist in maintaining and contributing to the course Wiki and Field Notes, and they will take part in the Working Group Meeting to be held in May.

Students will contribute three short essays (750-1000 words) to the critical edition, similar to a catalog entry for an exhibition. These essays will make use of a whole range of visual

and critical sources, and will integrate their laboratory experiences into a written or visual presentation of important material, techniques, and institutions. These essays may be written or in the form of a video or podcast. One of the most important components of this assignment is the research that students will undertake on the relationship of recipes in Ms. Fr. 640 to other earlier and contemporaneous recipe collections. **The essay assignments comprise 50% of the grade.**

Student research essays resulting from this semester are contained in [*Secrets of Craft and Nature in Renaissance France. A Digital Critical Edition and English Translation of BnF Ms. Fr. 640.*](#)

- [Casting in Frames](#)
- [Creating Original Patterns for Casting in Ms. Fr. 640](#)
- [Eau Magistra: Investigating Binders for Sand Molds](#)
- [Excellent Mustard](#)
- [Fat, Lean, Sweet, Sour: Sand of Ox Bone and Rock Salt](#)
- [Lean Sands and Fat Binders](#)
- [Molding Hollow on One Side and in Relief on the Other](#)
- [Molding Paper with Raised Letters](#)
- [Molded Roses in Sixteenth-Century France](#)
- [Try Burnt Oysters: Deciphering Marginalia](#)
- [Uses of Sulfur for Casting](#)
- [Wax and Tallow: Material Explorations](#)

Reading

The following **required** course books are available at Book Culture (112th between Broadway and Amsterdam) and on 2-day reserve at Butler Library.

Cennino Cennini, *Il libro dell'Arte (The Craftsman's Handbook)*, trans. Daniel V. Thompson, Jr. (New York: Dover, 1960).

Vannoccio Biringuccio, *Pirotechnia* (1540), trans. Cyril Stanley Smith and Martha Teach Gnudi (repr., Cambridge, MA, 1966).

Theophilus, *The Various Arts: De Diversis Artibus*, ed. and trans. C. R. Dodwell (Oxford: Clarendon Press, 1986).

Benvenuto Cellini, *Two Treatises*, trans. C. R. Ashbee (repr. 2006).

Pamela O. Long, *Artisan Practitioners and the Rise of the New Sciences, 1400-1600* (Oregon State UP, 2011).

Robert Tarule, *The Artisan of Ipswich: Craftsmanship and Community in Colonial New England* (Johns Hopkins University Press, 2004).

Recommended:

Tim Ingold, *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill* (London and New York: Routledge, 2000).

Tim Ingold, *Making: Anthropology, archaeology, art, and architecture* (Abingdon, Oxon: Routledge, 2013).

Pamela H. Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago and London: The University of Chicago Press, 2004).

All other readings on the syllabus (and much else) are in the Course Dropbox which you will be invited to join.

Class Schedule

Below you will find what to prepare for class in **the week before** the class meeting, and what to expect on the day of class. Please be sure to ask in advance if anything is not clear!

Week 1: HISTORY OF ART AND SCIENCE (September 2 & 5)

In preparation for the first day of class (Tuesday Sept. 2), make sure you have watched and read the following:

- Watch "[Lions, Dragons, and Other Beasts](#)"
- Watch the [introduction to the manuscript and the project](#)
- Browse the [manuscript](#)
- Explore the manuscript on Google Drive

Required Reading:

- Pamela H. Smith and Tonny Beentjes, "Nature and Art, Making and Knowing: Reconstructing Sixteenth-Century Life Casting Techniques," *Renaissance Quarterly*, 63 (2010): 28-179.
- Pamela H. Smith, "In the Workshop of History: Making, Writing, and Meaning," *West 86th: A Journal of Decorative Arts, Design History, and Material Culture*, vol. 19 (2012): 431.

Optional Reading:

- George Didi-Huberman, "Viscosities and Survivals. Art History Put to the Test by the Material," *Ephemeral bodies: Wax Sculpture and The Human Figure*, ed. Roberta Panzanelli (Los Angeles: Getty Research Institute, 2008).
- Pamela H. Smith, "Science in Motion: Recent Trends in the History of Early Modern Science," *Renaissance Quarterly*, 62 (2009): 345-375.

What to expect in class on Tuesday, September 2:

- Bring your laptop or tablet to class.
- Introduction to the project
- The course in brief, expectations, skills, and your contribution to the project. Come with questions!
- Navigating the manuscript
- Divide yourselves up into groups of two (ideally different disciplinary backgrounds)
- Historical Recipe Reconstruction (HRR) Assignment handed out in class. **Due Tuesday, Sept. 9 in class.**

In Preparation for Friday September 5:

You will want to start on the HRR right away, by reading the assignment carefully, exploring and using the websites listed on the HRR assignment sheet to search for comparable recipes in contemporaneous sources, and doing the following

Required Reading:

- Ken Albala, "Cooking as Research Methodology: Experiments in Renaissance Cuisine," *Renaissance Food from Rabelais to Shakespeare: Culinary Readings and Culinary Histories*, ed. Joan Fitzpatrick (Aldershot, UK: Ashgate, 2010), pp. 73-88.
- See also [Ken Albala's blog](#)

- *Art of the Past: Sources and Reconstructions: Proceedings of the First Symposium of ATSR Study Group* (2005), Ch. 1-2, e-book available in Clio.
- Maartje Stols-Witlox, "Sizing layers for oil paintings..." *Proceedings of the Second ATSR Symposium*(2008), pp. 148-163.

Come to class with recipes you have found that help you understand the recipe your group has chosen. Be prepared to talk about the recipes and how they were helpful.

September 5:

What to expect in class:

- Discussion of the recipes you have identified, how you searched, and collective discussion and further research.
- 10am - Safety Training

Week 2: RECIPES AND FIELD NOTES (September 9 & 12)

In preparation for Class on September 9, Tuesday:

- We will meet in The Studio at Butler (Butler 208b)
- Bring your tablet or laptop
- Bring the material results of your HRR. We will consume them, if safe!

Required Reading and Watching:

- Adelheid Voskuhl, "Recreating Herschel's Actinometry: An Essay in the Historiography of Experimental Practice," *British Journal for the History of Science*, 30.3 (1997): 337-355.
- Michael W. Coy, ed., *Apprenticeship: From Theory to Method and Back Again* (Albany: State University of New York Press, 1989): Michael Coy, Introduction, xi-xv; "From Theory", 1-11, and "To Method", 107-113
- Francisco Alonso-Almeida, "Genre conventions in English recipes, 1600-1800," *Reading and Writing Recipe Books, 1550-1800*, Michelle DiMeo and Sara Pennell (Manchester: Manchester University Press, 2013), pp. 68-90.
- Reconstruction of alchemical experiments ([Chymistry of Isaac Newton](#))
- Watch the lecture that Bill Newman recently gave in he does two of the experiments from the website (both demonstrating the vegetability of metals). Start the video at about 27 mins for one of the experiments.

Optional reading:

- Leora Auslander, Amy Bentley, Leor Halevi, H. Otto Sibum, and Christopher Witmore, "AHR Conversation: Historians and the Study of Material Culture," *American Historical Review* 114 (2009): 1355-1404.
- Maartje Stols-Witlox, Luc Megens and Leslie Carlyle, "'To prepare white excellent...': reconstructions investigating the influence of washing, grinding and decanting of stack-process lead white on pigment composition and particle size," *ATSR* 4: 112-28.
- Heinz Otto Sibum, "Reworking the mechanical value of heat: Instruments of precision and gestures of accuracy in early Victorian England," *Studies in history and philosophy of science* 26 (1995): 73 -106.
- Peter Heering, "The Enlightened Microscope: Re-enactment and Analysis of Projections with Eighteenth-century Solar Microscopes," *British Journal for the History of Science* 41 (2008): 345-67.
- P. Heering and R. Wittje (eds.), *Learning by Doing: Experiments and Instruments in History of Science Teaching* (Stuttgart: Franz Steiner Verlag, 2011).
- Klaus Staubermann (ed.), *Reconstructions: Recreating Science and Technology of the Past* (Edinburgh: National Museums Scotland, 2011).
- Heinz Otto Sibum, "Experimental history of science," *Museums of modern science*, ed. Svante Lindqvist (Canton, MA, 2000), pp. 77-86.

- Larry Principe, "Apparatus and Reproducibility in Alchemy," *Instruments + Experimentation in Hist. Chem.* (2000): 55-74.
- Hilary Davidson and Anna Hodson, "Joining forces: the intersection of two replica garments," *Textiles and Text*, eds. Maria Hayward and Elizabeth Kramer (London: Archetype Publications, 2007), pp. 204-210.

What to expect in class on September 9:

- Discussion and Digestion of recipes, reconstruction, and the use of field notes.
- Discussion of your re-written recipes.
- Visit from CCNMTL to learn to use Class Wiki and Field Notes
- Hand out Bread Molding Recipe (BMR) Instructions. **Due September 19 in class.**

In preparation for September 12:

Find all bread molding recipes in the following sources:

BnF Ms. Fr. 640

Alessio Piemontese, *Book of Secrets* (1555); various English versions on EEBO; French versions on Gallica; Italian versions—you find them!—different groups use different editions BEFORE 1600.

(Fore English: Search for Ruscelli, Girolamo, *The secretes of the reuerende Maister Alexis of Piemount Containyng excellent remedies against diuers diseases, woundes, and other accidents, with the manner to make distillations, parfumes, confitures, diynges, colours, fusions and meltynges. ... Translated out of Frenche into Englishe, by Wyllyam Warde* (1558).

Platt, Hugh. *The Jewell House of Art and Nature: Containing divers rare and profitable Inventions, together with sundry new experimentes in the Art of Husbandry, Distillation, and Molding* (London, 1594).

Check the following for bread molding, and note other materials of which molds can be made:

- Cennino Cennini, *Il libro dell'Arte (The Craftsman's Handbook)*, trans. Daniel V. Thompson, Jr. (New York: Dover, 1960).
- Vannoccio Biringuccio, *Pirotechnia* (1540), trans. Cyril Stanley Smith and Martha Teach Gnudi (repr., Cambridge, MA, 1966).
- Theophilus, *The Various Arts: De Diversis Artibus*, ed. and trans. C. R. Dodwell (Oxford: Clarendon Press, 1986).
- Benvenuto Cellini, *Two Treatises*, trans. C. R. Ashbee (repr. 2006).
- Hans Sachs, *The Book of Trades*

Check any other relevant sources from the BMR assignment sheet.

Friday, September 12. What to expect in class:

- Report on the bread molding recipes you have found, and report to the class on what other materials are used for molding, with what properties?

Week 3: MATERIALS (September 16 & 19)

Preparation for Tuesday, September 16:

- Find four examples of instances in Ms. Fr. 640 in which the author-practitioner invested materials with meanings or values that we no longer employ in our understanding of the natural world.

Required Reading and Watching:

- Bernard Palissy, *The Admirable Discourses*, pp. 78-110.
- Michael W. Cole, "Cellini's Blood," *The Art Bulletin* 81.2 (1999): 215-35.
- Pamela Smith, *The Body of the Artisan: Art and Experience in the Scientific Revolution* (Chicago and London: The University of Chicago Press, 2004), pp. 1-30, 59-127.
- Tim Ingold, *Making: Anthropology, archaeology, art, and architecture*, Intro.
- Ann-Sophie Lehmann, "Wedging, Throwing, Dipping and Dragging – How Motions, Tools and Materials Make Art," *Folded Stones*, eds. Barbara Baert and Trees de Mits (Institute for Practice-based Research in the Arts: Ghent 2009), pp. 41-60.
- Ann-Sophie Lehmann, "How materials make meaning," *Netherlands Yearbook for History of Art*, 62.1, pp. 6 –26.
- Tim Ingold, *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill* (London and New York: Routledge, 2000), Intro and Ch. 1.
- Robert Tarule, *The Artisan of Ipswich: Craftsmanship and Community in Colonial New England* (Johns Hopkins University Press, 2004).
- The film by Ian Hankey on "[Working with Venetian Style Glass](#)"

Optional Reading on the meanings of materials:

- Samuel Quiccheberg, *The First Treatise on Museums: Samuel Quiccheberg's Inscriptioes* (1565), trans. Mark Meadows and Bruce Robertson (The Getty Research Institute, 2013).
- Thomas DaCosta Kaufmann, "From Mastery of the World to Mastery of Nature: The *Kunstammer*, Politics, and Science," *The Mastery of Nature: Aspects of Art, Science, and Humanism in the Renaissance* (Princeton, New Jersey: Princeton University Press, 1993), pp. 174-194.
- Martin Kemp, "'Wrought by No Artist's Hand': The Natural, the Artificial, the Exotic, and the Scientific in Some Artefacts from the Renaissance", *Reframing the Renaissance: Visual Culture in Europe and Latin America 1450-1650*, ed. Claire Farago (New Haven and London: Yale University Press, 1995), pp. 176-196.
- Michael Baxandall, *Painting and Experience in Fifteenth-century Italy*, pp. 1-108.
- Michael W. Cole, *Cellini and the Principles of Sculpture* (Cambridge University Press, 2002), Ch. 1 and 3.
- Pamela H. Smith, "Collecting Nature and Art: Artisans and Knowledge in the *Kunstammer*," *Engaging With Nature: Essays on the Natural World in Medieval and Early Modern Europe*, ed. Barbara Hannawalt and Lisa Kiser (University of Notre Dame Press, 2008), pp. 115-136.
- Michael Baxandall, *The Limewood Sculptors of Renaissance Germany* (1982), pp. 1-49 and 123-163.
- Malcolm Baker, "Limewood, Chiromancy and Narratives of Making. Writing about the materials and processes of sculpture," *Art History*, 21 (1998): 498-530.
- Michael Baxandall, "Hubert Gerhard and the Altar of Christoph Fugger: The Sculpture and its Making," *Münchner Jahrbuch der bildenden Kunst*, ser. 3, vol 17 (1966): 127-144.
- Karen Barad, "Agential Realism: How Material-Discursive Practices Matter," *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Ch. 4.

- Jules David Prown, “The truth of material culture: History or fiction?” *History from things: Essays on material culture*, ed. Steven Lubar and W. David Kingery (Washington, D.C., 1993), pp. 1-19.
- Sébastien Clerbois and Martina Droth (eds.), *Revival and Invention: Sculpture through its Material Histories* (Oxford: Peter Lang, 2011), Chs. by Cole (pp. 1-15, esp. bibliography); Hirsch (pp. 63-90); Delbeke (pp. 91-119); Malgouyres (pp. 153-69).
- Joseph J. Corn, “Object lessons/object myths? What historians of technology learn from things,” *Learning from things: Method and theory of material culture studies*, ed. W. David Kingery (Washington, D.C., 1996), pp. 35-54.
- Ulinka Rublack, “Matter in the Material Renaissance,” *Past and Present*, 219 (May 2013): 41-85.

What to expect in class on Tuesday, September 16:

- Discussion of materials (early modern European understandings of materials, insights from material culture studies, and our own perspectives informed by natural sciences and our own research and scholarship). **Students will be called upon to do on-the-spot 5-minute summaries of the argument of each of the required readings, and two students will volunteer to tell us why we should read two of the optional readings.**

Preparation for Friday, September 19:

- Bring the results of the BMR
- Be ready to discuss your experiments, especially in relation to the various properties of materials that you encountered (either in practice or in the various written recipes you found in sources contemporaneous with Ms. Fr. 640).

What to expect in class on Friday September 19:

(Smith in Berlin)

- Discussion of BMR results and experiments
- Hand out Sugar Cast Recipe Assignment (SCR)

WEEK 4: SUGAR AND PLASTER (September 23 & 26)

Preparation for Tuesday September 23:

- Find all sugar casting and sculpture recipes in Ms. Fr. 640
- Find all sugar casting and sculpture recipes in pre-1600 sources (the sources you have easily to hand and know well by now—Plat, Piemontese, Biringuccio, Cennino, Cellini, Theophilus)
- Find at least three additional pre-1600 recipes for sugar casting or sculpture in sources you have not yet used, either online or using a NYC rare book library: Butler Rare Book Library, Union Theological Seminary library, NY Public Library, or other.

Required Reading and Watching:

- Cennino Cennini, *Il libro dell'Arte (The Craftsman's Handbook)*, trans. Daniel V. Thompson, Jr. (New York: Dover, 1960), on casting.
- Theophilus, “On bell-casting,” *De diversis artibus*, pp. 77-103; 167-176.
- Biringuccio, “On casting,” *Pirotechnia*, pp. 213-34, and elsewhere.

- Francesca G. Bewer, "The Sculpture of Adriaen de Vries: A Technical Study," *Small Bronzes in the Renaissance*, ed. Debra Pincus (Washington, D. C.: Center for Advanced Study in the Visual Arts, 2001), pp. 159-193.
- Richard E Stone, "Antico and the Development of Bronze Casting in Italy at the End of the Quattrocento," *Metropolitan Museum Journal* 16 (1982): 87-116.
- **Find** sugar casting and lost waxing casting demonstrations on YouTube and send valuable links to all members of the class before September 23.

What to expect in class on Tuesday, September 23:

- Discussion of the recipes and libraries you have located. Questions about process. Mock ups of sugar casting recipe/protocol—begin writing them up
- Two students will volunteer to tell us why we should read two of the optional readings from a previous week.

Preparation for Friday, September 26:

- Write out your sugar mold experiment protocol. Be ready to bring it to class and to implement it on Friday!

What to expect in class on Friday, September 26:

Mold-making!

WEEK 5: CRAFT AND SKILL (September 30 & October 3)

To prepare for Tuesday, September 30:

What skills did you lack in last Friday's mold making experiments? What mistakes helped you to improve?

- Post about this on the Field Notes
- Write out a new, improved protocol for your mold-making. Bring this to class with you.

Required Reading:

- Read through all completed pages of the manuscript (i.e., those that have initials next to the page number).
- Find all the recipes that relate to plaster casting, flies, plants, spiders, and other small patterns
- H.M. Collins, "Tacit Knowledge, Trust and the Q of Sapphire," *Social Studies of Science* 31.1 (2001): 71-85
- Richard Sennett, *The Craftsman* (2008), Ch. 5, pp. 149-78.
- Michael Polanyi, *Personal Knowledge: Towards a Post-Critical Philosophy* (1962; repr., London: Routledge, 1998), pp. 49-65.
- Tim Ingold, *The Perception of the Environment: Essays in Livelihood, Dwelling and Skill*, (London and New York: Routledge, 2000), Ch. 18-19 (pp. 339-361).
- Erin O'Connor, "Embodied knowledge in glassblowing: the experience of meaning and the struggle towards proficiency," *Sociological Review* (2007): 126-141.
- Raymond Tallis, *The Hand: A Philosophical Inquiry into Human Being*, Ch. 1.
- Browse *The Journal of Visualized Experiments*
- Landing page: <http://www.jove.com>
- "Nature Protocols" video supplements
- Search *Nature* and *Science* for the recent controversy about replicability in science.

Optional reading:

- Charles M. Keller, "Thought and Production: Insights of the Practitioner," *Anthropological Perspectives on Technology*, ed. Michael Brian Schiffer (Albuquerque, NM: University of New Mexico Press, 2001), pp. 33-45.
- Yiyu Xu, "The Knowledge System of the Traditional Chinese Craftsman," *West 86th: A Journal of Decorative Arts, Design History, and Material Culture* 20.2 (Fall-Winter 2013): 155-172.

What to expect in class on September 30:

- Discussion of readings and skill on the shop floor, as we try mold-making again, with either sugar mold making or small creature molding.

Preparation for October 3, Friday:

- Think about the relationship of writing, picturing, and doing—What is a recipe, what is an experiment protocol, how does skill relate to writing, what is a representation (pictorial or abstract)? Contribute to Field Notes about this

Required Reading:

- Linda Seidel, "Visual Representation as Instructional Text: Jan van Eyck and *The Ghent Altarpiece*," *Making Knowledge in Early Modern Europe: Practices, Objects, and Texts, 1400-1800*, eds. Pamela H. Smith and Benjamin Schmidt (Chicago: University of Chicago Press, 2008), pp. 45-67.
- D. Turnbull, "The Ad Hoc Collective work of Building gothic Cathedrals with Templates, String, and Geometry," *Science, Technology, and Human Values* 18 (3), (1993): 315-40.
- Elaine Leong and Alisha Rankin (eds.), *Secrets and Knowledge in Medicine and Science, 1500-1800* (Aldershot: Ashgate, 2011), Intro, and Ch. 1.
- Pamela O. Long, *Artisan Practitioners and the Rise of the New Sciences, 1400-1600* (Oregon State UP, 2011), Ch. 1, pp.10-29.
- Deborah Harkness, "From the Jewel House to Salomon's House: Hugh Plat, Francis Bacon, and the Social Foundations of the Scientific Revolution," *The Jewel House: Elizabethan London and the Scientific Revolution* (New Haven: Yale University Press, 2007), Ch. 6.

Optional Reading:

- Jacob Eyferth, "Craft Knowledge at the Interface of Written and Oral Cultures," *East Asian Science, Technology and Society* 4 (2010): 185–205.
- Pamela H. Smith, "[Why Write a Book? From Lived Experience to the Written Word in Early Modern Europe](#)," *Bulletin of the German Historical Institute* 47 (Fall 2010): 25-50.
- Erma Hermens, "The *Botteghe degli Artisti*: artistic enterprise at the della Rovere and Medici courts in the late sixteenth century," *The Renaissance Workshop*, ed. David Saunders, Marika Spring and Andrew Meek (London: Archetype Publications Ltd, 2013), pp. 105-113.
- Fanny Kieffer, "The Laboratories of Art and Alchemy at the Uffizi Gallery in Renaissance Florence: Some Material Aspects," *Laboratories of Art*, ed. Sven Dupré (Springer 2014).
- John K. Ferguson, *Bibliographical Notes on Histories of Inventions and Books of Secrets*, 2 vols. (London: Holland Press, 1959 [originally 1898]).
- Pamela O. Long, *Openness, Secrecy, Authorship: Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance* (Baltimore: Johns Hopkins University Press, 2001).
- Natasha Glaisyer and Sara Pennell (eds.), *Didactic Literature in England 1500-1800: Expertise Constructed* (Aldershot: Ashgate, 2003).

- Alison Kavey, *Books of Secrets: Natural Philosophy in England, 1550-1600* (Urbana: University of Illinois Press, 2007).
- Pascal Dubourg Glatigny and H el ene V erin, *R eduire en art: la technologie de la Renaissance aux Lumi eres* (Paris:  ditions de la Maison des sciences de l'homme, 2008);
- Jo Wheeler (with the assistance of Katy Temple), *Renaissance Secrets, Recipes and Formulas* (London: V&A, 2009).
- Mark Clarke, Bert De Munck and Sven Dupr e (eds.), *Transmission of Artists' Knowledge* (Koninklijke Vlaamse Academie van Belgie voor Wetenschappen en Kunsten, 2012).
- Francesca Bray, "Science, technique, technology: passages between matter and knowledge in Imperial Chinese agriculture," *British Journal for the History of Science* 41 (2008): 319-44.

What to expect in class on October 3:

- Discussion and plaster mold making of small creatures and plants.
- Students will be called upon to do on-the-spot 5-minute summaries of the argument of each of the required readings, and two students will volunteer to tell us why we should read two of the optional readings.

Week 6 & 7: MOLD MAKING AND SAND CASTING (October 7-17)

EXPERT MAKER RESIDENCY: Discussion and practice on the Shop Floor

Visitor: Tonny Beentjes, Programme Leader, Metalwork Conservation, University of Amsterdam

In Preparation for these two weeks:

- Find all recipes in Ms. Fr. 640 that mention "sand," "plaster," "magistry," "experiment." Write out experimentation protocols, based on all available information in the manuscript.
- Begin searching relevant source materials for more information on sand casting recipes and experiments (Piemontese, etc). **All students must bring in to class on October 10 a full list of all the sand casting recipes they have found in Ms. Fr. 640 and in other sources.**

Required reading and watching:

- Study Ms. Fr. 640 and additional sources very carefully.
- Find films on Youtube on sandcasting and lost wax casting. Here are a couple:
 - [Sandcasting with Philip White](#) — multi part
 - [Sandcasting with "Delft Clay"](#) (actually sand and "magistry", i.e., binding medium)
 - [Part 1](#): making the mold — [Part 2](#): casting the metal — Part 3: missing
 - [Casting a pewter stool at the beach](#)

Optional Reading:

- Suzanne B. Butters, *The Triumph of Vulcan: Sculptors' Tools, Porphyry, and the Prince in Ducal Florence*, 2 vols. (Florence: Leo S. Olschki, 1996).
- Richard Stone, "A New Interpretation of the Casting of Donatello's *Judith and Holofernes*," *Small Bronzes in the Renaissance*, ed. Debra Pincus, pp. 55–67. *Studies in the History of Art* 62 (New Haven, 2001).
- *Bronze. The Power of Life and Death* (Henry Moore Institute, 2006).
- Peta Motture, *Bells & Mortars* (London: V&A 2001), pp. 18-33.
- Several other recent catalogues on bronze sculpture contain relevant essays, notably:

- *Andrea Riccio. Renaissance Master of Bronze*, New York (2008), esp essays by Denise Allen, Peta Motture, Richard Stone.
- Eleanora Luciano (ed.), *Antico. The Golden Age of Bronzes*, (Washington, 2011). (esp. essays by Denise Allen, and Dylan Smith and Shelley Sturman)

Note: On Friday, October 17, groups will be assigned mold-making recipes for experimentation and annotation, and will compile materials lists.

Week 8: RECIPES, ANNOTATIONS, AND THE DIGITAL EDITION

In preparation for October 21, Tuesday:

- Write out first protocols and material lists for your group's recipe experiments.

Required Reading:

- John A. Walsh and Wallace Edd Hooper, "The Library of Invention: Alchemical discourse and information technology standardization," *Journal of the Alliance of Digital Humanities Organizations* vol.27, no.1 (April 2012): 55-79.
- Susan Schriebman, Ray Siemens, and John Unsworth, "The Digital Humanities and Humanities Computing: An Introduction," *A Companion to Digital Humanities*, eds. Schriebman, Siemens and Unsworth (Oxford: Blackwell Publishing, 2004), xxiii-xxvii.
- Daniel V. Pitti, "Designing Sustainable Projects and Publications," *A Companion to Digital Humanities* (2004), pp. 471-487.
- Sue Breakell, "For One and All: Participation and Exchange in the Archive," *Revisualizing Visual Culture*, eds. Chris Bailey and Hazel Gardiner (Burlington, VT: Ashgate, 2010), pp. 97-108.
- Willard McCarty, "Introduction," *Text and Genre in Reconstruction: Effects of Digitalization on Ideas, Behaviours, Products and Institutions*, ed. Willard McCarty (Cambridge: Open Book Publishers, 2010), pp.1-12
- Alan Galey, "The Human Presence in Digital Artefacts," *Text and Genre in Reconstruction: Effects of Digitalization on Ideas, Behaviours, Products and Institutions* (2010), pp. 93-117.

What to expect in class on Tuesday, October 21:

- Brainstorming about annotation forms, digital format, and experiment protocols. Materials lists must be finalized.

Preparation for Friday, October 24:

- Be completely ready to implement your experiments—protocols written, materials gathered, etc.

What to expect in class on Friday, October 24:

Experimenting!

Week 9: EXPERIMENTING, ANNOTATING, AND IMPROVISING

Tuesday, October 28: Practice.

Friday, October 31: Practice, Practice, Practice.

Week 10:

Tuesday, November 4: University holiday

Friday, November 7: Experimenting

Week 11: REVISITING ARTISANAL EPISTEMOLOGY

- In preparation for Tuesday, November 11, think about artisanal epistemology again in the light of your practical experience

Required Reading:

- Andrea Bernardoni, “Artisanal Processes and Epistemological Debate in the Works of
- Leonardo Da Vinci and Vannoccio Biringuccio;”
- Henrike Haug, “Artificial Interventions in the Natural Form of Things: Shared Metallogenetical Concepts of Goldsmiths and Alchemists;”
- Lawrence M. Principe, “Goldsmiths and Chymists: The Activity of Artisans Within Alchemical Circles,”
- all in Sven Dupré (ed.), *Laboratories of Art: Alchemy and Art Technology from Antiquity to the Eighteenth Century* (Springer, 2014).

Friday, November 14: Experimenting.

Week 12

Tuesday, November 18: Annotation essay drafts due to the dropbox before class.

Collective discussion of the drafts.

Friday, November 21: Practice, Practice, Practice.

Week 13:

Tuesday, November 25: Practice, Practice, Practice.

Friday, November 28: University Holiday

Week 14:

Tuesday, December 2: Practice, Practice, Practice.

Friday, December 5: Student presentations

Week 15:

Tuesday, December 9: Student presentations

Four questions to consider in working with objects and materials:

1. Materials: What material(s) make up your object? What are that material’s properties? Where was it sourced? What determined its quality? How is the material described today (scientific analysis)? How was the material described in written sources of the time (e.g., “unctuous,” composed of water and earth, etc)? In addition to “workability,” properties might also include the availability of materials in certain locales (by virtue of natural morphology or of trading patterns). How was knowledge of materials transmitted and disseminated (orally, by group working conditions, in writing, by templates)?

2. Technology: What tools, instruments and techniques were used for the transformation of your material in different places at different moments? How did that technology move and change over time? What were the consequences of these changes?

3. Performance: How did a specific conjunction of materials and technologies give rise to certain practices of making? In what ways did they constrain makers or require know-how? How did makers work against these limits (for example by manipulating the materials to

vary their properties)? What were the circumstances for the display of skill: did makers change their practices when working in different places or when being watched by particular audiences? What were regarded as the signs of virtuosity, and how did these vary at different places at different moments? What was the role of the individual maker as opposed to the collaborative team? How does an object generate a "personality" or "sensibility" for the person or workshop that produced it?

4. The system of the arts: What were the social structures that supported certain forms of production and consumption (e.g., associations such as guilds, workshops, manufactories)? How were practices of making limited by the law? Reshaped by ambition? What practices of making were interdependent? Which were siblings? What was the relationship between making and status? How was the meaning of an object made manifest by its use, which could occur in rituals, through written treatises, or through daily use of the object?"

Two further issues to consider throughout:

Evidence: How do we know what a thing was made of and how it was made? What do texts tell us, what can we learn directly from objects or from present-day practices? How does one kind of evidence affect the way we understand another?

Historiography: How have historians treated these materials and their transformation? What kinds of narratives have historians constructed around and about materials and processes that give them meaning (whether bound up with professional and national narratives, with issues of identity or of rationality, or something else)?