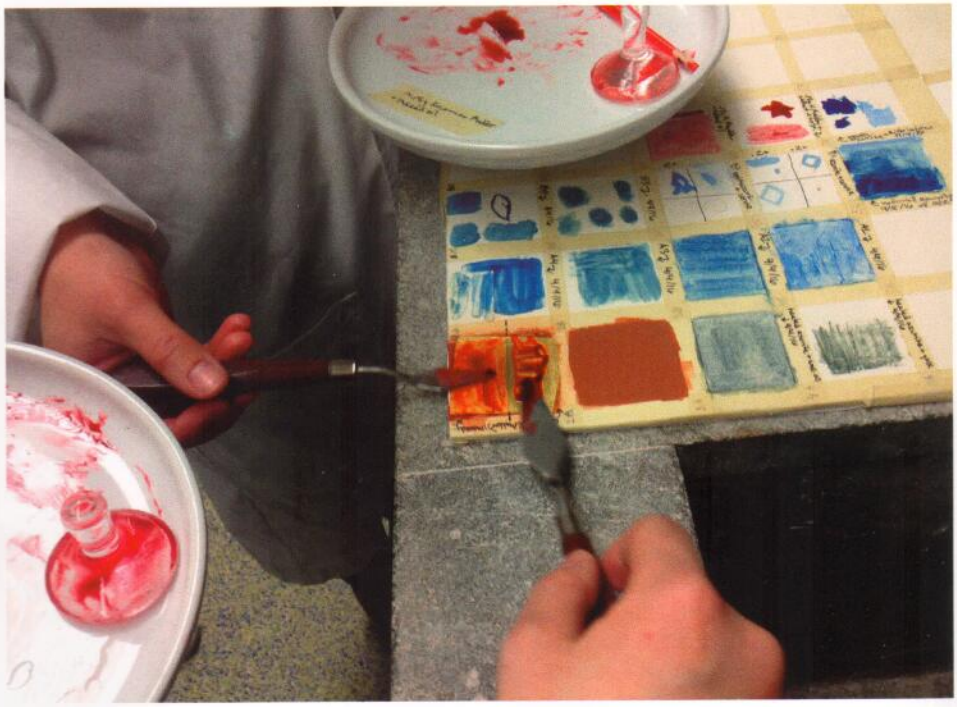
Experiments in the early modern European investigation of nature

Pamela H. Smith describes the experiments and experiences of the hands-on history taking place in the Making and Knowing Project.

The Making and Knowing Project began in 2014 with the goal of creating an open-access critical digital edition of an intriguing late 16th-century French manuscript, *Bibliothèque nationale de France, Ms. Fr. 640*. This anonymous manuscript is the written result of actual workshop practice in the 16th century, and it gives unique insight into craft and artistic techniques, daily life in the 16th century, and material and intellectual understandings of the natural world.

The Making and Knowing Project is producing the digital edition and English translation of this manuscript by a series of "expert crowd sourcing" workshops and courses that involve students, practitioners (such as sculptors and conservators), scholars of the humanities and social sciences (history, art history, anthropology, and museum scholars), natural scientists (chemists and conservation scientists), and practitioner-scholars from the emerging field of the digital humanities.

The first stage of transcription and translation of the manuscript was carried out in a series of three-week summer palaeography workshops that bring together graduate students (of, for example, French literature, history, and art history) to gain skills in middle French script by transcribing and translating the manuscript. The first palaeography workshop was held in June 2014, during which 15 students from European and North American universities transcribed and translated about a third of the manuscript (concentrating on metalworking "recipes"). The following summer (focusing on colourmaking recipes), the students were able to complete a draft of the entire transcription and translation. The next workshop (which will also include digital text analysis as well) is scheduled for June 2016.

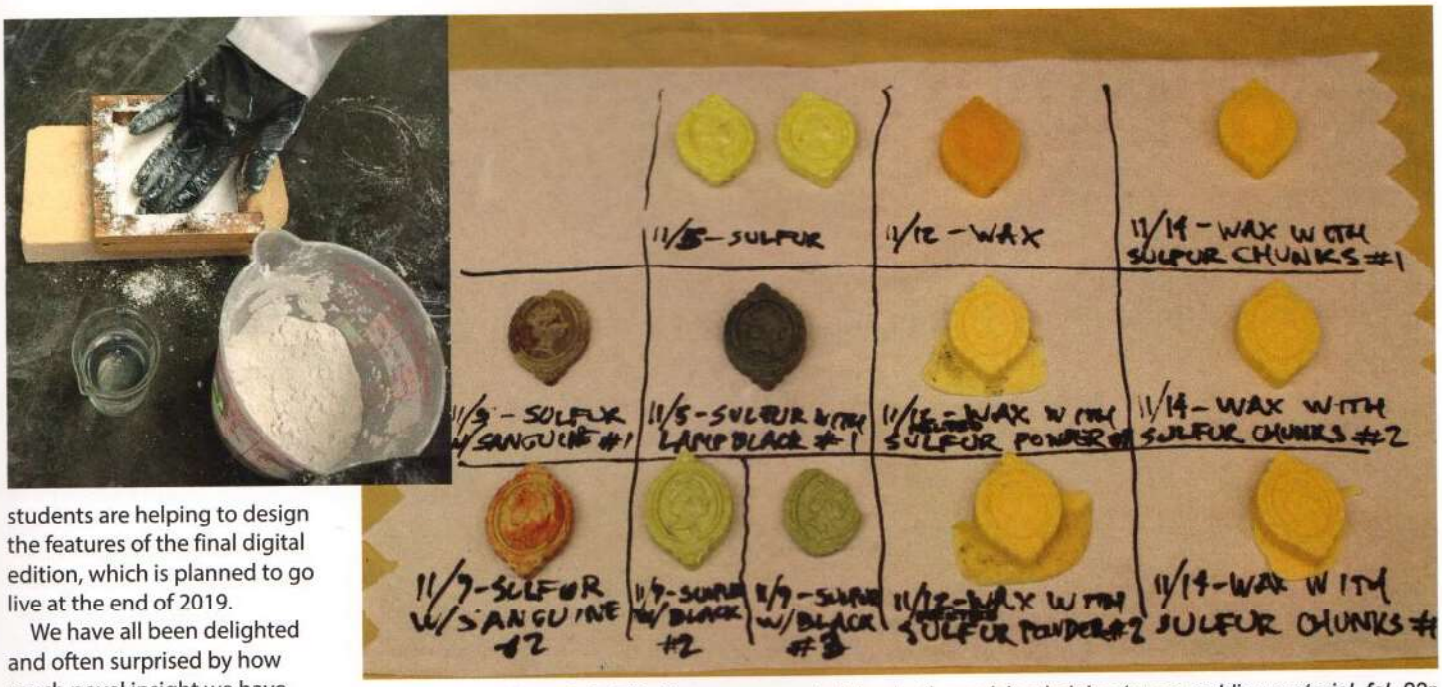


Above: Colourmaking in the Making and Knowing Project, 2015-16. Below: The colour of gold without gold on silver, fol. 29v. Images courtesy of the Making and Knowing Project.

With the support of a National Science Foundation grant, the second stage of the project--the Laboratory Seminar--began in September 2014. In the Laboratory Seminar (Columbia University graduate history course: Craft and Science), students (12 each semester) conduct historical and laboratory research on the recipes transcribed and translated by the palaeography workshop. Laboratory research focuses on attempting to understand the materials, techniques, and processes recorded by the "author-practitioner" in the manuscript, as well as gaining insight into the mental and material world of a 16th-century workshop. The students engage in text- and object-based research, as well as hands-on reconstructing recipes in the manuscript. They then bring together this research by the end of the semester in multi-media essays that form the historical and material commentary for the critical edition of the manuscript. The course is offered every semester for at least three years (2014-17).

The yearly cycle of the Project culminates in a Working Group Meeting that brings together scholars, practitioners, and the students from both semesters of the Craft and Science seminars to discuss and critique the student-authored annotations, as well as to listen to lectures and discussions by scholars and practitioners on the year's theme. This phase of the project is designed to provide expert oversight over student work and on the critical edition.

The final phase of the project, which we began in 2015, is the design and development of the digital environment for the completed critical edition and translation. This stage includes a Digital Humanities Seminar



Above left: Thinking across materials : testing calcined alabaster as molding material, fol. 83r. Above right: Altering sulphur in various ways. Below: Red lake making (left) and horn scrapings colored with red lake to make a "rose," fol. 10r (right). Images courtesy of the Making and Knowing Project.

students are helping to design the features of the final digital edition, which is planned to go live at the end of 2019.

We have all been delighted and often surprised by how much novel insight we have gained through reconstruction of the author-practitioner's instructions and recipes. Our research has allowed us to decipher the manuscript's often obscure recipes, materials and techniques; it has taught us about the nature of experiential knowledge, showing us that failure, repetition, and "extension" are simply normal aspects of learning through experience, a useful lesson in today's high-stakes testing educational regime.

Our experiments have also taught us much both about the unexpected lives (and instability) of materials, as well as their properties. We have come to understand better the author-practitioner's bodily intimacy with some materials he used, and how this understanding may have shaped his classification of materials into taxonomies. We have been able to begin to delimit some parts of his taxonomy of materials—his material imaginary—to see the ways in which he reasoned and experimented across types of materials in order to hypothesize about useful materials and probable results of his trials (see above left). We have gained insight into his primary areas of interest, which include imitation of all types, from life casting roses in metal, to sleight of hand tricks, to transforming the state or properties of one material to resemble another (see previous page, bottom), or attempting to alter a material to take on properties that are not native to it, such as transforming a brittle material (such as sulphur) into a malleable one (such as wax, see above right).

The author-practitioner worked to challenge his materials, manipulating them to take on the often contrary properties of another material in order to transform the rough into the "impalpable," the lean into the fat, the hard or brittle into the workable, the sour into the sweet, and the elements of earth and stones into the simulacra of gemstones. Over the last two years, we have thought much about why the author-practitioner might compile this record of practice, and we are always fretting as well about the potentials and pitfalls of using our reconstructions as historical evidence.

After all this work, I have come to see how odd it is that historians whose object of study is historical materials and techniques, including historians of material culture, of art, and of science, have generally not considered engagement with the materials of their historical topics as an essential part of their training and research. I have come to think that we have missed a necessary part of our intellectual toolbox, namely, a literacy in materials and techniques. I think the only efficient—perhaps the sole—way of beginning to acquire this literacy is through hands-on work with materials and techniques. The reconstruction of historical techniques and objects provided to students by the Making and Knowing Project cannot make any of the participants truly proficient in this literacy, but it can begin to provide such a training. It can make the student aware of what she does not know, or does not yet even know how to ask. While students in the semester-long course will never reach the stage of true literacy or skilled and expert practice-knowledge, they will begin to appreciate the rigor and time needed to attain it, and will catch a glimpse of the shores that limn the vast seas of our historical ignorance.

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Some Further Reading:

- Project website: www.makingandknowing.org/
- Donna Bilak, Jenny Boulboullé, Joel Klein, and Pamela H. Smith, "The Making and Knowing Project - Reflections, Methods, and New Directions," in Pamela H. Smith, ed., *New Directions in Making and Knowing, a special Issue of West 86th: A Journal of Decorative Arts, Design History, and Material Culture*, forthcoming 2016.
- More photographs from the project: www.flickr.com/photos/128418753@N06/albums