

Hands-on History: Benefits and Drawbacks

Victor Elgersma

13 October, 2026

Utrecht

victor@vjbe.net

1475 words (ex. captions and figures)

HISTORIANS OF SCIENCE HAVE OFTEN been tempted to get their hands dirty when textual evidence is not enough to settle a dispute: when Alexandre Koyré¹ suggested that Galileo could not have obtained the results he reported in *Two New Sciences*, Thomas Settle responded, through a painstaking reproduction, by establishing that Galileo's results in fact *were possible* given the instruments available at the time². Recent historiographical developments have valorised similar “hands-on” approaches to history of science, encouraging historians to recreate, reproduce, and experiment³.

In taking the course *History of Knowledge* at Utrecht University, I had the opportunity to get a glimpse at this hands-on historiography: first by recreating an iron-gall ink recipe from a Renaissance *Book of Secrets*⁴ (Figure 2), then by sketching a fig tree “ad vivum” in the Old Hortus in Utrecht (Figure 5 and Figure 6), and finally by transferring the sketch

¹Alexandre Koyré, “A Documentary History of the Problem of Fall from Kepler to Newton: De Motu Gravium Naturaliter Cadentium in Hypothesi Terrae Motae,” *Transactions of the American Philosophical Society* 45, no. 4 (1955): 329, <https://doi.org/10.2307/1005755>.

²Thomas B. Settle, “An Experiment in the History of Science: With a Simple but Ingenious Device Galileo Could Obtain Relatively Precise Time Measurements,” *Science* 133, no. 3445 (1961): 19–23, <https://doi.org/10.1126/science.133.3445.19>.

³Hjalmar Fors et al., “From the Library to the Laboratory and Back Again: Experiment as a Tool for Historians of Science,” *Ambix* 63, no. 2 (2016): 85–97, <https://doi.org/10.1080/00026980.2016.1213009>.

⁴Girolamo Ruscelli and William Ward, *The Secrets of the Reverend Maister Alexis of Piemont: Containing Excellent Remedies against Diverse Diseases, Wounds, And Other Accidents, With the Maner to Make Distillations, Perfumes, Confitures, Dying, Colours, Fusions, And Meltings ...*, Francis A. Countway Library of Medicine—Medical Heritage Library Digitization Project (P. Short for T. Wight, 1595), <https://archive.org/details/secretsofverenoorusc>.

into a zinc plate (Figure 7) and creating a print of it (Figure 8). These activities were designed to supplement my readings on early modern ink-and print- making, such as Jessie Chen's article on embodied knowledge in sixteenth-century botanical woodblocks⁵ and Sietske Fransen & Katherine Reinhart's article on the knowledge-generating aspects of copying in early modern Europe⁶.

But did the activities improve my understanding of the texts, or would my time have been better spent in the library? This essay aims to address this question.



Figure 1: Making iron-gall ink: Frying crushed *gall nuts*



Figure 2: Observing the reaction between iron and the tannins in the *gall nuts*

⁵Jessie Wei-Hsuan Chen, “Remaking Sixteenth-Century Botanical Woodblocks: Embodied Artisanal Knowledge in Early Modern Woodcutting,” in *Embodied Experiences of Making in Early Modern Europe*, by Sarah A. Bendall and Serena Dyer (Amsterdam University Press, 2024), https://doi.org/10.5117/9789463722698_ch07.

⁶Sietske Fransen and Katherine M. Reinhart, “The Practice of Copying in Making Knowledge in Early Modern Europe: An Introduction,” *Word & Image* 35, no. 3 (2019): 211–22, <https://doi.org/10.1080/02666286.2019.1628611>.

Ye shall take good Galles, and breake them in three or foure peices, that is to saie, **stampe** them slightly, and put them in a frying panne, or some other **such panne** with a litle oyle, frying them a little, then take a pound of them, and put it in some **vessel leaded**, pouring into it as much white wine as will cover it over, more than a **good hand breadth**

Prens noix de galle tresbonne, & les romps en trois ou quatre pieces, c'est a dire, **estampe** les legement, & les mets en une **poelle de fer**, avec un peu d'huile, les faisant quelque peu frir, puis en prens une livre & la mets en quelque **vaisseau plombé**, y versant du vin blanc, tant qu'il les surmonte plus d'une **grande paulme**

Table 1: The first sentence of the ink recipe in the English and French versions of the *Secrets*. Highlighted phrases that are obscure in the English are clarified by the French.



Figure 3: Making iron-gall ink: final product

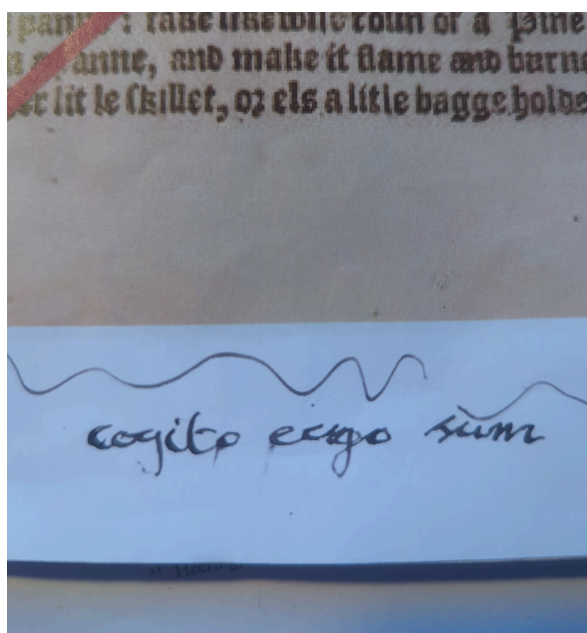


Figure 4: Making iron-gall ink: finished ink used for writing

Knowing that I was expected to roll up my sleeves and make some ink made me pay much closer attention to Girolamo Ruscelli's recipe⁷ than I would have otherwise. Rather than skimming over words I found unclear I forced myself to compare the English⁸ version to the French⁹ to resolve ambiguities in the text (see Table 1). It helped that the French version did not use English blackletter type.

Experiment can thus be seen as one type of active reading: similar to taking notes, coming up with discussion questions, or writing an argumentative essay. But historical lab-work can do more: it can recover information that was not codified to begin with. Thus, in *Remaking Sixteenth-Century Botanical Woodblocks*, Jessie Chen found that only through practice could she learn how to predict the thickness of the lines in a printing block before carving into the wood¹⁰. Despite closely reading the extensive treatment of woodcutting in Jean-Michel Papillon's book¹¹ on the matter, this is a piece of knowledge Chen had to find out for herself as it never was (nor could have been) written down.

Knowledge that was once codified may also have been lost through a process of translation or tran-

⁷Ruscelli and Ward, *The Secrets of the Reverend Maister Alexis of Piemont*.

⁸Ruscelli and Ward, *The Secrets of the Reverend Maister Alexis of Piemont*.

⁹*Les Secrets Du Seigneur Alexis Piemontois, Divisez En Deux Parties* (1573).

¹⁰Chen, "Remaking Sixteenth-Century Botanical Woodblocks," p. 177.

¹¹Jean-Michel Papillon, *Traité Historique Et Pratique De La Gravure En Bois* (1766), <https://archive.org/details/traitehistorique23papi>.

scription. While comparing versions of Ruscelli's *Secrets*, I found an ambiguity as to the exact ratio of *gum arabic* ("gumme Arabicke") to *gall nuts* ("Galles"). The Dutch version offered 1:1, whereas the English version preferred 2:1. Experiment may help resolve these ambiguities. We performed the experiment in groups, and different groups chose different ratios. The fact that all the groups managed to set off the correct reaction suggests that Renaissance authors may have had considerable leeway in this ratio, too.

The workshop on iron-gall ink-making didn't so much answer questions that I already had as raise new ones. Producing the ink showed just how underdetermined the text was. How long should we fry the galls for? How much is a "good hand breadth"? How do we tell whether we "have need" to "boyle it a little"¹²? These are reminders that, in many cases, the knowledge we need to perform our tasks and duties lives in the heads and practices of our fellow-creatures, not in the written word.

This underdetermination also reminds us that, while Ruscelli may have done natural history a great favour by codifying the knowledge obtained by interviewing "poor women, artificers [craftsmen], peasants, and all sorts of men"¹³, the knowledge obtained still stubbornly resists explicit codification.

The *vitriol*¹⁴, *gum arabic*, and *gall nuts* naturally raised the question about the provenance of the ingredients for Renaissance ink, which otherwise would not have occurred to me. The suspicion that many of these ingredients relied on extensive trade networks with the Middle East prompted me to read the Preface of the *Secrets*, in which the pseudonymous 82-year-old *Alexis of Piemont* (Girolamo Ruscelli) recounts his extensive travels¹⁵.

¹²Ruscelli and Ward, *The Secrets of the Reverend Maister Alexis of Piemont*, p. 94.

¹³Ruscelli and Ward, *The Secrets of the Reverend Maister Alexis of Piemont*, Preface.

¹⁴We used lab-grade iron(II) sulphate

¹⁵Ruscelli and Ward, *The Secrets of the Reverend Maister Alexis of Piemont*, "Moreover, I have been three times to the Levant, and at sundry times have travelled almost all other parts of the world, without resting or sojourning at any time in one place above five months." (Preface).

Before the print-making workshop, I suspected that we were going to use the iron-gall ink we had previously concocted (Figure 3). Instead, I was surprised that we used an oil-based ink. I later learned the ink used in copperplate printing varied from country to country and was often a trade secret, but the most common type was known as 'ivory black', made by burning vegetable matter left over in wine-making¹⁶. These considerations illustrate Hjalmar Fors' assertion that "in the best cases there will be a dynamic relationship between library and laboratory"¹⁷.

But there are limits to what historians can learn by recreations, which we shall turn to next.



Figure 5: The author sketching a fig tree in the *Old Hortus*

Fransen & Reinhart argue that early modern copying practices were a way of *making* knowledge – in some cases copies carried more authority than originals¹⁸. When I, however, made a sketch (Figure 6), turned it into an engraving (Figure 7) and printed it (Figure 8), I was struck by the amount of detail that I lost at each stage. The lesson I draw from this experience is that we should be extremely careful in supposing that the "embodied knowledge" that we gain from a few hours' experimenting can even approach the decades of experience known by the 'invisible technicians'¹⁹ that studies such as Chen's are homing in on; a few

¹⁶Antony Griffiths, *The Print Before Photography* (British Museum Press, 2016), p. 32.

¹⁷Fors et al., "From the Library to the Laboratory and Back Again," p. 89.

¹⁸Fransen and Reinhart, "The Practice of Copying in Making Knowledge in Early Modern Europe," p. 219.

¹⁹Steven Shapin, "The Invisible Technician," *American Scientist* 77 (1989): 554–63.

hours' practice is a thin basis for understanding them, and may even be misleading.

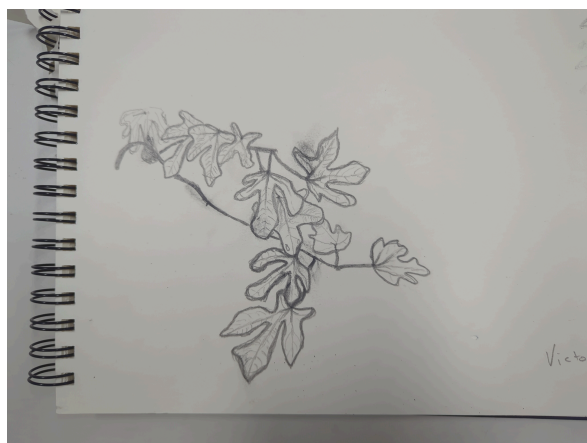


Figure 6: Sketch.



Figure 7: Engraved zinc plate.



Figure 8: Print.

I concede that, as Chen and others have shown, some embodied knowledge may be recovered through modern-day experimentation²⁰. But it would be a mistake to suppose that it is *only* through practice that we can recover or capitalize on embodied knowledge. Clearly, the most valuable tacit knowledge we are after is that held by the historical

actors themselves. But it may be a mistake to suppose that the “next best thing” is to recreate their practices. That knowledge may not be explicitly stated in the written corpus, and yet it may still be through close reading that the historian can best make use of it. To the extent that William Ward, the English translator of the *Secrets*, had tacit knowledge of the contents of the recipes, we capitalized on his embodied knowledge through a comparative reading of the French and English text. Ultimately, then, it was the tacit knowledge of the translator, not our own, that was most useful to us in understanding the sixteenth-century recipe.

We have seen that the lab setting raises new questions which would not have been raised in the library. But we must pause and ask whether these questions are necessarily the best ones. Steven Shapin considers silly the distinction between “social factors” and “intellectual” in science²¹. With apologies to Shapin, it still seems to me that “Did Galileo make his own ink?” and “Did Galileo believe in circular inertia?” are a very different kind of question which lead to a different kind of history, and my suspicion is that the former may risk distracting, rather than illuminating, the latter.

Most importantly perhaps, I would like to stress that history, unlike archaeology, is primarily a textual enterprise for a good reason: Embodied knowledge disappears when the body dies, but text lives on.

Jessie Chen may have recovered some embodied knowledge, but we do not have access to her muscle memory, and by her own admission she cannot transmit through text “how to angle the knife, where to start making an incision, and how and in what direction to turn the block”²². Similarly, once I had managed to make ink with a good consistency for writing (Figure 4), I was able to use my experience to advise fellow students. But this *techne*, whatever it is worth, will die with me.

It is the duty of historians *qua* historians to preserve and transmit as much as possible of their knowledge through writing. But this presents “hands-on

²¹Steven Shapin, *The Scientific Revolution* (University of Chicago Press, 1996), p. 9.

²²Chen, “Remaking Sixteenth-Century Botanical Wood-blocks,” p. 177.

²⁰Chen, “Remaking Sixteenth-Century Botanical Wood-blocks”.

historians” with the same problems as the authors of Renaissance “How-to” books like Ruscelli and Papillon: some knowledge simply resists being written down.

In conclusion, historical recreations can help add context to the historian’s archival and close-reading practice. They can help recover “embodied” knowledge, and they raise new questions for historical study. However, they also steer the historian further into cultural and material history and may make us ask certain questions at the expense of other, more interesting ones. Moreover, as Thomas Settle’s recreation²³ shows, hands-on approaches may answer whether something *could* have happened, but textual evidence is still the best way to determine whether or not something *did* actually happen. Ultimately, we are historians, not archaeologists. Text is still king. Therefore, I would keep hands-on history as a historiographical tool, but it must be at the service of understanding texts.

Bibliography

- Chen, Jessie Wei-Hsuan. “Remaking Sixteenth-Century Botanical Woodblocks: Embodied Artisanal Knowledge in Early Modern Woodcutting.” In *Embodied Experiences of Making in Early Modern Europe*, by Sarah A. Bendall and Serena Dyer. Amsterdam University Press, 2024. https://doi.org/10.5117/9789463722698_ch07.
- Fors, Hjalmar, Lawrence M. Principe, and H. Otto Sibum. “From the Library to the Laboratory and Back Again: Experiment as a Tool for Historians of Science.” *Ambix* 63, no. 2 (2016): 85–97. <https://doi.org/10.1080/00026980.2016.1213009>.
- Fransen, Sietske, and Katherine M. Reinhart. “The Practice of Copying in Making Knowledge in Early Modern Europe: An Introduction.” *Word & Image* 35, no. 3 (2019): 211–22. <https://doi.org/10.1080/026666286.2019.1628611>.
- Griffiths, Antony. *The Print Before Photography*. British Museum Press, 2016.
- Koyré, Alexandre. “A Documentary History of the Problem of Fall from Kepler to Newton: De Motu Gravium Naturaliter Cadentium in Hypothesi Terrae Motae.” *Transactions of the American Philosophical Society* 45, no. 4 (1955): 329. <https://doi.org/10.2307/1005755>.
- Les Secrets Du Seigneur Alexis Piemontois, Divisez En Deux Parties*. 1573.
- Papillon, Jean-Michel. *Traité Historique Et Pratique De La Gravure En Bois*. 1766. <https://archive.org/details/traitehistorique23papi>.
- Ruscelli, Girolamo, and William Ward. *The Secrets of the Reverend Maister Alexis of Piemont: Containing Excellent Remedies against Diverse Diseases, Wounds, And Other Accidents, With the Maner to Make Distillations, Parfumes, Confitures, Dying, Colours, Fusions, And Meltings ...* Francis A. Countway Library of Medicine—Medical Heritage Library Digitization Project. P. Short for T. Wight, 1595. <https://archive.org/details/secretsofreverenoorusc>.
- Settle, Thomas B. “An Experiment in the History of Science: With a Simple but Ingenious Device Galileo Could Obtain Relatively Precise Time Measurements..” *Science* 133, no. 3445 (1961): 19–23. <https://doi.org/10.1126/science.133.3445.19>.
- Shapin, Steven. “The Invisible Technician.” *American Scientist* 77 (1989): 554–63.
- Shapin, Steven. *The Scientific Revolution*. University of Chicago Press, 1996.

²³Settle, “An Experiment in the History of Science”.