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Wax and Tallow: A Material Investigation

p109r

*“The light is God, the wax is man, Christ is both.”*[[1]](#footnote-0)

C. Musso (1579)

*“It is as precious as it is ambiguous in its duality, for wax--poised between a solid and liquid state--fluctuates between presence and absence, strength and weakness, will and obedience, virtue and vice, memory and oblivion, death and resurrection.”*[[2]](#footnote-1)

G.A. Guerzoni (2012)

Wax and tallow are mentioned throughout BnF Ms Fr 640, but a few recipes focus on changing the qualities of the material itself, particularly to alter its hardness or softness. On folio 109r, the author recounts a recipe for “working rough in wax.” He writes, “When the wax is too hard, one mixes in some turpentine or a bit of butter, which renders the wax malleable, and leaner than tallow, which the *Italians* mix in…” Given the frequency of wax[[3]](#footnote-2) and tallow[[4]](#footnote-3) in the manuscript, how can we understand the material properties of each substance, and how do they work together? How do the suggested additives perform comparatively? How do these mixtures relate more broadly to themes of material transformation in BnF Ms Fr 640 and other early modern sources?

In the early modern period, wax was a commonly purchased commodity that had a variety of uses in workshops, apothecaries, and ecclesiastical spaces, as well as, of course, the household.[[5]](#footnote-4) It could also be used as a device of imitation or trickery, as wax could easily imitate other materials.[[6]](#footnote-5) Tallow, or rendered animal fat, was less expensive and could be sourced more easily. It shared many of the material properties and uses of wax, even though it was considered to be a material of lower quality.[[7]](#footnote-6) Both wax and tallow were used regularly by the early modern craftsman: both could be used to carve and model patterns for sculptures,[[8]](#footnote-7) or they could be used in other processes, like copper etching, bronze casting, and gilding.[[9]](#footnote-8) Both materials were used to make candles for illumination--though the expense of wax made it more likely to be used to illuminate sacred spaces. Wax was also a key ingredient for many medicinal remedies, creams, ointments, and cosmetics.[[10]](#footnote-9) These materials, which could readily change from one state to another, from solid to liquid, evoked the trope of transformation and mimicked the material properties of metals, which could be melted down and reconstituted into new objects. For wax, the duality of the material also had a spiritual dimension, as seen both in alchemical and devotional[[11]](#footnote-10) practices.

Wax and tallow share many properties and material characteristics. Both substances ideally undergo a purification process before they can be utilized by a craftsperson. In the early modern period, wax was purified and bleached in earthenware pots, boiled in a mixture of “fresh seawater, alum, and saltpetre several times, until no traces of impurities remain[ed].”[[12]](#footnote-11) Tallow also undergoes a purification process before being used. Early modern sources on rendering tallow are scarce, perhaps because this process was considered common knowledge and thus unimportant to record, like recipes for baking bread.[[13]](#footnote-12) Modern recipes that describe tallow rendering techniques, however, are plentiful[[14]](#footnote-13) and easily available on the internet.[[15]](#footnote-14) We rendered our beef fat and pork fat in a modern slow cooker, but this could have also been done over many hours in an oven or on a stove. It is essential in the rendering process to apply heat to the fat for many hours without burning it and then strain the rendered fat through cheesecloth to remove the impurities. This straining process could be repeated multiple times to achieve an ever more purified and perhaps firmer substance.

Variations in wax and tallow reveal different sensory and functional properties of these raw materials. In his article on “The Use and Abuse of Beeswax,” Guido Antonio Guerzoni writes that in order to assess the quality of wax, “one must carefully examine the color. The finest is yellow: the lighter it is, the better, and the darker, the worse.”[[16]](#footnote-15) In the manuscript, the author refers to “white wax” in many recipes, perhaps privileging a higher quality of wax.[[17]](#footnote-16) Scent could also play a role in determining the quality of the wax, as a “rotten or mouldy” scent could indicate that tallow had been added to the wax in order to make the expensive material go further.[[18]](#footnote-17) Tallow was much easier to procure and less expensive than beeswax; the fat of different animals could be used, and each of these fats possessed different material properties with their own distinct advantages. For instance, lamb tallow is mentioned in the manuscript in a recipe for burnishing gold, and Biringuccio notes goat tallow as an ingredient in a wax mixture.[[19]](#footnote-18) In our experiments, we rendered both beef and pork tallow in multiple iterations. In general, the pork tallow had a much smoother texture[[20]](#footnote-19) than the beef tallow; the consistency of the once-rendered beef tallow was reminiscent of mashed potatoes, while the consistency of the once-rendered pork was closer to thick yogurt. After rendering the fats for an additional five hours, the twice-rendered pork fat was even creamier in texture; however, the twice-rendered beef fat had a particulate consistency that could be compared to hard rice pudding. [fig. 1] It seems to clear to us that these differences in sensory properties could relate directly to performance capabilities.

On fol.109r of BnF Ms Fr 640, turpentine and butter are listed as softening agents for wax, though it is not clear how much should be added to achieve the desired texture. This led us to conclude that tallow is also a softening agent, though one that, it seems, the author would prefer not to use.[[21]](#footnote-20) In our experiments with wax, a 1:1 mixture of wax and beef tallow yielded a mixture that was soft and released easily from the molds but was prone to breaking and cracking after it hardened. We therefore opted for mixtures that contained smaller amounts of the softening agent than of wax. We made mixtures of wax and turpentine, wax and butter, wax and beef tallow, and finally, wax and pork tallow. [fig. 2] Adding two teaspoons of Venice Turpentine to a quarter cup of wax produced a gummy, sticky result that could be carved easily with a stylus. The butter, however, when mixed with the wax, was difficult to carve; the carving tool got stuck in the material, making it difficult to control.[[22]](#footnote-21) Despite the misgivings of the manuscript author, the tallow mixtures worked particularly well for carving. As mentioned above, a 1:1 mixture was too soft and fragile, but mixtures that included “a little” tallow (in our experiments, two or four teaspoons of tallow to a half cup of wax) resulted in a wax that was more malleable than both the pine rosin and butter mixtures.[[23]](#footnote-22) The best mixtures were wax and pork tallow. Carving tools cut cleanly through the material, making it easy to manipulate and carve, while the overall structure remained solid enough to endure manual manipulation. [fig. 3]

The author of BnF Ms Fr 640 also writes about how wax can be hardened on fol.120r in a recipe titled “Impress medals made from wax.” Here, he states that “You can mold your relief with wax mixed with a bit of resin to make it harder and firmer…”[[24]](#footnote-23) and he goes on to describe a process of striking medals.[[25]](#footnote-24) A resin and wax mixture is also mentioned on fol.160v in the recipe for “Molding a foot or a hand.”[[26]](#footnote-25) Rosin and resin are mentioned in several instances in the manuscript, including in the making of imitation coral, purpurine, adhering lead to glass, and using resin candles for smoking molds.[[27]](#footnote-26) In this recipe, the French word *rousine* is used; while other recipes use the more common *résine* or *la gemme*, (gum). In modern usage, rosin, resin, and gum have some interchangeable meanings. The material we used to try the wax-resin mixture was sold as “pine gum rosin,” which is a refined form of resin. In our experiment, we were concerned about mixing the two substances due to the higher melting temperature of the pine gum rosin. Would the wax burn or smoke if poured into melted rosin? We melted the wax first and then dropped in pieces of the rosin. The rosin, like an ice cube in cool water, slowly dissolved and became more gelatinous. The resulting mixture once hardened was resistant to the impression of the stylus and thus more difficult to carve.

The softness and hardness of wax and its ability to take on different states and appearances was an oft-remarked subject for early modern craft writers. Cellini, for example, notes how the seasons affected the conditions of wax, and the temperature of the workshop could determine how the material responded to the craftsman’s hand and tools.[[28]](#footnote-27) On fol. 151r, the author-practitioner of BnF Ms. Fr. 640 recommends mixing coal with white wax to make it strong,[[29]](#footnote-28) and Hugh Platt also mentions this mixture (“Note also that you must first cast all your curious patternes in yellow wax tempered with the fine powder of smale cole”).[[30]](#footnote-29) Platt also mentions red ochre as an additive to color the wax, which makes the pattern more visible.[[31]](#footnote-30) Biringuccio mentions adding Grecian pitch or “ship’s tar” to wax,[[32]](#footnote-31) while both Biringuccio and Cellini write about the benefits of mixing white lead with wax for the purpose of softening the wax.[[33]](#footnote-32) Indeed, the remarkable ability of both wax and tallow to easily transform and combine with other substances made them useful as well as symbolically important in the early modern workshop and in early modern culture more generally, which evinced a fascination with material transformation.

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1. “Il lume è Iddio, la cera è l’huomo, Christo è l’uno & l’altro.” Cornelio Musso, *Il quarto libro delle prediche del reverndissimo mons. Cornelio Musso, vescovo di Bitonto.* (Venice: Giovanni e Gio, 1579), 138, quoted in Guido Antonio Guerzoni, “Use and Abuse of Beeswax in the Early Modern Age. Two Apologues and a Taste,” in *Waxing Eloquent: Italian Portraits in Wax*, Andrea Daninos, ed., (Milano: Officina Libraria, 2012), 49. [↑](#footnote-ref-0)
2. Guerzoni, “Use and Abuse of Beeswax,” 49. [↑](#footnote-ref-1)
3. A complete list of recipes that mention the word wax (French: *cire*) include the following: fol. 12v, “Molding stucco promptly”; fol. 26r, “Mortar”; fol. 42r, “Wax for seals and stamps” and “Casting in plaster”; fol. 44v, “Stucco”; fol. 50r, “Molding”; fol. 59v, “To mend holes painting”; fol. 94r, “Burnisher”; fol. 103r, “Something excellent against burns”; fol. 104v, “For casting”; fol. 109r, “Working in rough with wax,” “Wax for molding,” and “Molding wax”; fol. 112v, “Affixing and arranging animals”; fol. 116r, “Molding as a core” and “Molding snakes”; fol. 117r, “A way to mold flowers and herbs”; fol. 120r, “Stamped medals made from wax”; fol. 121r, “Keeping fruit over a year”; fol. 122v, “Molding hollow”; fol. 122r, “Fixing diverse animals”; fol. 124v, “Casting gold” and “Casting small lizards”; fol. 125r, “Molding fruits and animals in sugar”; fol. 125r, “Plaster” and “Plaster to cast with wax”; fol. 126v, “Plaster”; fol. 127r, “Plaster mold for wax”; fol. 129v, “Advice about casting”; fol. 130v, “For molding thinly”; fol. 130r, “Drying animals in an oven”; fol. 131r, “Molded wax”; fol. 133r, “Hard wax to imprinting seals” and “Casting the feet of small lizards in gold and silver”; fol. 133v, “Thing that cannot be stripped from the mold” and “Animals entwined”; fol. 134v, “Secret for soldering small works made of gold and silver”; fol. 135r, “Casting” and “Vine leaf and small frog”; fol. 137v, “Wetting sand to mold flat medals”; fol. 138v, “Imitation diamonds put into the work”; fol. 139v, “Casting wax to mold an animal that one has not got”; fol. 140v, “To cast in sulfur”; fol. 141v, “Molding crayfishes”; fol. 143v, “Openwork carcanets”; fol. 145v, “Molding herbs and flowers”; fol. 149v, “Molding vases in several pieces” and “Bats”; fol. 150v, “Molding hollow”; fol. 150r, “Very strong wax”; fol. 151r; fol. 152v, “Reworking cast things”; fol. 153r, “Molding hollow seals or other things”; fol. 153r, “Molding hollow seals or other things”; fol. 155r, “Molding a rose”; fol. 155v, “Rose”; fol. 156v, “Molding a fly”; fol. 156r, “Quickly molding hollow mold and relief”; fol. 157r, “The mode in which goldsmiths mold hollow molds” and “Flies”; fol. 159r, “Wax paintings”; fol. 160v, “Molding a foot or a hand”; fol. 163v, “Crayfish”; fol. 165v, “Wings of fly”; fol. 165r, “Reworking snakes and lizards” and “Reworking”; fol. 166v, “Scented candle from Le Mans”; fol. 167v, “Mortars”; fol. 169v, “How to reduce a round form into a hollow one”; fol. 170r, “How to clean closed molds”. [↑](#footnote-ref-2)
4. A complete list of recipes that mention tallow (French: *suif*) include the following: fol. 6r, “To put and make hole some burnished gold and produce some red or green or blue”; fol. 13v, “Candles”; fol. 50r, “Molding”; fol. 69r, “Sand”; fol. 80v, “Casters of small tin work”; fol. 81v, “Sand”; fol. 96r, “The furbisher”; fol. 109r, “Working in rough with wax”; fol. 118v, “Casting in box mold”; fol. 120v, “Making silver runny”; fol. 122v, “Molding hollow”; fol. 150v, “Molding hollow”; fol. 154r, “Metal file dust”; fol. 156v, “Molding a fly”. [↑](#footnote-ref-3)
5. For more on various uses of wax, see Marco Beretta, “Usi scientifici della cera nell’antichità,” *Quaderni Storici* 44, no. 1 (2009): 15-34; Reinhard Büll, *Das grosse Buch vom Wachs: Geschichte, Kultur, Technik* (Munich: Callwey, 1977); T.W. Cowan, *Wax Craft*, *All About Beeswax; Its history, Production, Adulteration, and Commercial Value* (London: S. Low, Marston & Co. 1908). [↑](#footnote-ref-4)
6. Guerzoni, “Use and Abuse of Beeswax,” 54-55. [↑](#footnote-ref-5)
7. For the economic considerations of wax and tallow, see Guerzoni, “Use and Abuse of Beeswax,” 47. In 1619, one hundred pounds of Native Wax cost 79 guilders; one hundred pounds of Baltic Tallow, on the other hand, cost 22.5 guilders. Early modern Dutch price data for three different kinds of wax (Baltic Dry Wax, Native Wax, and Riga Wax) and five tallow products (Baltic Tallow, Waits Tallow, and three categories of Native Tallow) can be found in the database “Prices (Posthumus),” Medieval and Early Modern Data Bank, http://www2.scc.rutgers.edu/memdb/index.html. [↑](#footnote-ref-6)
8. Vannoccio Biringuccio, *The Pirotechnia of Vannoccio Biringuccio. The Classic Sixteenth-Century Treatise on Metals and Metallurgy*, trans. and ed. Cyril Stanley Smith and Martha Teach Gnudi (New York: Dover Publications, 1990), 221. [↑](#footnote-ref-7)
9. For gilding and etching processes, see Benvenuto Cellini, *The Treatises of Benvenuto Cellini On Goldsmithing and Sculpture,* trans. C.R. Ashbee(New York: Dover Publications, 1967), 100-101 and 105. [↑](#footnote-ref-8)
10. Guerzoni, “Use and Abuse of Beeswax,” 45. [↑](#footnote-ref-9)
11. For more on the materiality of sacramental objects in the Late Medieval Period see Caroline Walker Bynum, *Christian Materiality: An Essay on Religion in Late Medieval Europe*, (New York: Zone Books, 2011), 145-154. For more on the materiality of wax in art see Sharon Hacker’s “Fleeting Revelations The Demise of Duration in Medardo Rosso’s Wax Sculpture” and Georges Didi-Huberman’s “Viscosities and Survivals. Art History Put to the Test by the Material,” both in *Ephemeral bodies: Wax Sculpture and The Human Figure*, ed. Roberta Panzanelli (Los Angeles: Getty Research Institute, 2008); and Hanneke Grootenboer, “Introduction: On the Substance of Wax,” *Oxford Journal of Art,* Special Issue: *Theorizing Wax: On the Meaning of a Disappearing Medium*, vol. 36, no. 1 (2013), 1-12. [↑](#footnote-ref-10)
12. Guerzoni, “Use and Abuse of Beeswax,” 46. [↑](#footnote-ref-11)
13. Bread is mentioned as a molding material in Bnf. Ms. Fr. 640, but a recipe is not provided. On fol. 156r in the recipe “Quickly molding hollow mold and relief,” the author instructs the reader to use a bread loaf, “prepared as you know [*preparée comme tu sçais*].” [↑](#footnote-ref-12)
14. Many back-to-basics blogs and affordable lifestyle websites feature content on the reintegration of traditional methods such as fat rendering into the modern home. For examples, see The Prairie Homestead ([www.theprairiehomestead.com](http://www.theprairiehomestead.com)), The Browning Homestead ([www.thebrowninghomestead](http://www.thebrowninghomestead)), or The Paleo Leap ([www.paleoleap.com](http://www.paleoleap.com)). [↑](#footnote-ref-13)
15. Here, we use the word “render” to describe the purification process of applying heat to animal fat over a long period of time. This process is not described in Bnf. Ms. Fr. 640, and the French word *rendre* used in the manuscript carries a more distinctive meaning related to making and transformation. [↑](#footnote-ref-14)
16. Guerzoni, “Use and Abuse of Beeswax,” 47. [↑](#footnote-ref-15)
17. For more recipes that mention “white wax,” see Bnf. Ms. Fr. 640, 59v, “To mend holes [in] painting”; 131r, “Molded Wax”; 133r, “Hard wax to imprinting seals”; 139v, “Casting wax to mold an animal that one has not got”; 151r, “Molding hollow”; 153r, “Molding hollow seals or other things”; 155v, “Rose”; 156v, “Molding a fly”; and 159r, “Wax paintings.” [↑](#footnote-ref-16)
18. Guerzoni, “Use and Abuse of Beeswax,” 47. [↑](#footnote-ref-17)
19. See Bnf. Ms. Fr. 640, fol. 6r, “For laying down and setting burnish gold and giving red or green or blue”; as well as Biringuccio, *Pyrotechnia*, 330. [↑](#footnote-ref-18)
20. This property is rooted in the saturated fat content. Saturated fats appear more solid at room temperature. [↑](#footnote-ref-19)
21. The author does mention the mixing of wax and tallow on fol. 122v, “Molding hollow”: “But tallow alone is not good and that is why you have to mix wax and tallow together.” In French, “Mays quand la cire & le suif sont meslés, l’ouvrage s’en conduit bien.” [↑](#footnote-ref-20)
22. We used all-natural, organic butter, but might have had a different result had we made our own butter or clarified the store-bought butter. See Cataldo and Visco Field Notes, 16 November 2014, “Wax and tallow and elm infusion.” [↑](#footnote-ref-21)
23. Biringuccio says to mix “a little” tallow into the wax. See Biringuccio, *Pirotechnia*, 330. [↑](#footnote-ref-22)
24. Bnf. Ms. Fr. 640, fol. 120r, “Tu peulx mouler en cire meslée d’un peu de rousine pour estre plus dure & ferme…” [↑](#footnote-ref-23)
25. Rosin-wax mixtures are also mentioned in Hugh Plat, *The jewel house of art and nature: containing divers rare and profitable inventions, together with sundry new experiments in in [sic] the art of husbandry, with divers chymical conclusions concerning the art of distillation, and the rare practises and uses thereof* (London: Elizabeth Alsop, 1653) 60. [↑](#footnote-ref-24)
26. Bnf. Ms. Fr. 640, fol. 160v, “Molding a foot or a hand.” [↑](#footnote-ref-25)
27. Bnf Ms Fr 640, fol 3r, “Imitation coral”; fol. 43r, “Purpurine”; fol. 49r, “Lead Casting” and “Pewterers.” [↑](#footnote-ref-26)
28. Cellini*, Treatises,* 118. [↑](#footnote-ref-27)
29. Bnf Ms Fr 640, fol. 151r, “Very strong wax.” [↑](#footnote-ref-28)
30. Plat, *The Jewell House*, 59. [↑](#footnote-ref-29)
31. Plat, *The Jewell House*, 59. [↑](#footnote-ref-30)
32. Biringuccio, *Pyrotechnia,* 330. [↑](#footnote-ref-31)
33. Cellini, *Treatises*, 100-101 and Biringuccio, *Pyrotechnia*, 330. [↑](#footnote-ref-32)