CHAPTER 2

# Scarlet Letters: Sir Theodore de Mayerne and the Early Stuart Color World in the Royal Society

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## 1 Introduction: Archives in Afterlife

Death often stymied the pursuit of long-term research goals in the early modern experimental study of nature. As Dániel Margócsy has argued, in contrast to the impersonal institutions that would later make individual participants replaceable parts of large-scale research projects, in the early modern period, "there was no established method to replace a human correspondent. Death put an end to communication and to scientific collaborations."[1] This was not always the case. Experiment could survive death within the papers that were left behind. *Archival Afterlives* explores the myriad ways that later experimentalists sought to interrogate, collaborate with, or spy upon the deceased through their papers. Margócsy is right, however, to stress the personal nature of the human correspondents making up early modern scientific networks, as well as the methodological pluralism of the time. As Richard Yeo has discussed, this was a period of fertile creativity concerning methods of archival practice, particularly for experimental records.[2] Those investigating the experimental papers of the recent past in the early modern period thus faced peculiar quandaries, as well as opportunities. They had to engage not just with the content of an experiment, but with a personality. The form in which past experimental content appeared might be very different from their own, and it would be perhaps highly inflected by the social world and idiosyncracies of the deceased personality. Finally, in order to enter into and trace the course

1 Dániel Margócsy, "A long history of breakdowns: A historiographical review," *Social Studies of Science,* 47, 3 (2017): 307–325 (on p. 315). I would like to thank Rupert Baker and Katherine Marshall of the Royal Society Archive for assistance with manuscripts and permission to reproduce images. I would also like to thank Michael Hunter for advice on this chapter, as well as for pointing me toward the additional Mayerne manuscript transcriptions in the Hooke papers, and my fellow editors, Anna Marie Roos and Elizabeth Yale.

2 Richard Yeo, *Notebooks, English Virtuosi, and Early Modern Science* (Chicago: University of Chicago Press, 2014).

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of previous research, the reader of an archive would have to, as it were, reanimate dead social networks, following the threads of past conversations and perhaps picking them up again in the present. The personal nature of early modern scientific networks made passage through death challenging. It also allowed archives a robust afterlife, one rich not just in information, but in the personalities, aesthetics, and diverse methodologies of the past.

Scholars of material culture have long been interested in afterlives, from the "fascination with ruins" to the study of wear and tear. Textiles, in particular, because they "often function in intimate contact with the human body—garments, coverings, bandages, shrouds" are "exemplary 'biographical' objects," telling poignant stories of "people, events, and passing time in their physical dissolution."[3] By contrast, archives in their very nature aim for pristine preservation, legibility, and credence. The impersonal nature of government documents and large institutions today do not make archives obvious candidates for bringing us in contact with lives once lived. Some exceptional archives contain biographical objects due to their peculiarly personal, emotional or bodily contents, such as autographs, orphans' tokens, or the Leigh Hunt hair collection at the Ransom Center.[4] Still rarer are archival files that themselves serve as evocative material objects.[5] Recently, however, apparent registers of fact in the early modern period, such as account and commonplace books, have been reconsidered as more akin to traditional egodocuments.[6] The very evocation of personality and the passage of time in an archive, complete with idiosyncratic methods of organization, could serve a function for later users of the archive, above and beyond the information that it contained.

The archival afterlife explored in this chapter offers, I argue, a case in point. This chapter identifies a previously unknown cache of papers on inks and dyes dating from 1618 to 1650 (with some undated pieces likely older),

3 Victoria Kelley, "Time, Wear and Maintenance: The Afterlife of Things," *Writing Material Culture History,* Anne Gerritsen and Giorgio Riello, eds. (London: Bloomsbury Academic, 2015), 191–7.

4 John Styles, "Objects of Emotion: The London Foundling Hospital Tokens, 1740–60," *Writing Material Culture History,* Anne Gerritsen and Giorgio Riello, eds. (London: Bloomsbury Academic, 2015), 165–172.

5 A rare example is the Archive Gallery at the Haus der Kunst in Munich, which opened in 2014.

6 Adam Smyth, *Autobiography in early modern England* (Cambridge: Cambridge University Press, 2010) and Jason Scott-Warren, "Early Modern Bookkeeping and Life-Writing Revisited: Accounting for Richard Stonley," *Past & Present*, 230, Issue Supplement 11 (2016): 151–170.

in the archives of the Royal Society originally collected by Sir Theodore de Mayerne (1573–1655), the Huguenot royal physician in the early Stuart court (Fig. 2.1).[7] The papers were brought to the Royal Society by Mayerne's godson and fellow Huguenot royal physician, Sir Theodore de Vaux (1628–1694), a year after his election to the Society in 1665. The story of the transmission of the Mayerne papers offers a veritable palimpsest of archival afterlives, since Mayerne's papers themselves contain papers drawn from a wide range of other informants, some of them holographs in French, English, German and Latin.[8] This group of papers offers a more immediate view of Mayerne's interaction with his informants and of his own experimental method than do the formal volumes he drew up, with the help of amanuenses, on the basis of such documents.[9] Mayerne's experimental method is self-consciously innovative and idiosyncratic, everywhere marked with his possessive monogram claiming credit for his ideas. He saturated his papers with the color inks that were themselves the objects of his research. As the remains of a practice Mayerne doggedly pursued on a daily basis for years within a domestic setting, his papers, continually re-read and cross-referenced by him, can be compared to a favorite piece of clothing interacting closely with the body of its wearer. The personal nature of the archive, I argue, at times served as an obstacle but was also part of its allure to later experimentalists.

Despite Mayerne's massive collections and their prestigious resting places in the collections of Sloane, the Royal Society, Oxford, Cambridge, and the Royal College of Physicians, the significance of his papers to later naturalists has

7 Royal Society, ClP/3i/27, ClP/3i/28, ClP/3i/29, ClP/3i/30, ClP/3i/31, ClP/3i/33, ClP/3i/34, ClP/3i/35,ClP/3i/36, ClP/3i/37, ClP/3i/38, ClP/3i/39, ClP/3i/40. ClP/3i/32, on treating mouse skins, doesn't seem to be related to dyes. It was a technique (in German) taught to the original owner of the paper by Johann Friedrich Fuchs of Hagenau on June 7, 1618. See also ClP/24/80, ClP/24/81 and ClP/24/82, and thanks to Michael Hunter for pointing out the materials in volume 24.

8 All translations are my own. Transcriptions are not modernized and follow the source's orthography.

9 Unlike the more formal compilations of the many Mayerne volumes now in the Sloane collection (on these, see Alison Walker's chapter in this volume), the papers in the Royal Society were collected by Mayerne at different times, and not originally as part of a specific collection devoted to color research. ClP/3i/34 mixes an autograph manuscript on wine preservation from "M. Peter Bodinus Germanus" with the dyes of Jan Davidszoon and de La Noy. Bodin's more relevant recipes for cinnabar and whitewash are now ClP/3i/33. Mayerne's personal correspondence was largely lost or destroyed. Hugh Trevor-Roper, *Europe's Physician: The Various Life of Sir Theodore de Mayerne*, Blair Worden, ed. (New Haven: Yale University Press, 2006), 372–4.

FIGURE 2.1 Sir Theodore Turquet de Mayerne. *Attributed to Paul van Somer, probably after 1625.*


faded from recent historiography of London science. Mayerne, for instance, is only mentioned once in passing in Harkness's *Jewel House,* an omission all the stranger given that Paul L'Obel (son of Matthias de l'Obel, one of Harkness's central figures) married Mayerne's sister.[10] Meanwhile, the significance of the

10 Although many individual figures are well known, the culture of early Stuart experimentalism remains underexplored even today. Mordechai Feingold regretted in *The Mathematician's Apprenticeship: Science, Universities and Society in England, 1560–1640* (Cambridge: Cambridge University Press 1984), 198 that "no study of James's interest in, and patronage of, science" exists, noting that "the pursuit of the mechanically curious reached new heights" under the Stuarts. This remains the case. Stephen Pumfrey and Frances Dawbarn attempted a partial survey in "Science and Patronage in England, 1570–1625: A Preliminary Study," *History of Science* 42 (2004): 137–188, with unduly pessimistic findings. Harkness, notably, skipped over the early Stuart period to argue that Elizabethan science formed the basis for Restoration experimentalism. Deborah Harkness, *The Jewel House of Art and Nature: Elizabethan London and the Social Foundations of the Scientific Revolution* (New Haven, Conn.: Yale University Press, 2007). Recently, this orientation

similar project of Samuel Hartlib for many early Fellows of the Royal Society has attracted increasing attention since Hugh Trevor-Roper's 1960 essay, "The Three Foreigners" and Charles Webster's 1976 *Great Instauration*.[11] In his magisterial biography of Mayerne (published posthumously in 2006), Hugh Trevor-Roper ends on a melancholic note, seeing Mayerne's "Paracelsian and Hermetic ideas" "discredited" in the "scientific revolution," and concluding that the "fate of Mayerne's writings is likewise a melancholy tale," and "Mayerne's mental world had passed."[12] In his 1960 essay, "The Three Foreigners," Trevor-Roper likewise cast the efforts of the similar (although rival) figure of Samuel Hartlib as evaporating in the advent of the Royal Society.[13] Since then Hartlib, and his contributions to the aims and practices of the nascent Royal Society have received ever more attention. Oddly, the same has not been true for Mayerne. It was in part, I argue, because Mayerne's papers did point to a world that had passed, that is, to the experimental culture of the early Stuart courtier, that they became a precious resource to the Royal Society, with an afterlife in the Society's archive.

This chapter begins with exploring the reasons behind Mayerne's assembly of his collections. It then turns to the retrospective valences of early Stuart color research among Hartlib's associates during the Interregnum and following the Restoration. It compares Mayerne's project to the History of Trades program and sets the story of de Vaux's gift of the Mayerne manuscripts in the context of the Royal Society's turn toward artistic techniques and Robert Hooke's investigations in the History of Trades. Finally, it will suggest that the value of Mayerne's manuscripts was threefold; they offered access to the techniques of artisans, to Mayerne's own practices of experimental note-taking and speculation, and to the lost color world visibly suffusing his papers.[14]

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toward the Tudors has begun to shift. Eric Ash, whose prior work stressed Elizabethan expertise, has turned to early Stuart projecting. Eric Ash, *Power, Knowledge and Expertise in Elizabethan England* (Baltimore: Johns Hopkins University Press, 2004). Eric Ash, *The Draining of the Fens: Projectors, Popular Politics and State Building in Early Modern England* (Baltimore: Johns Hopkins University Press, 2017). See also William Cavert, *The Smoke of London: Energy and Environment in the Early Modern City* (Cambridge: Cambridge University Press, 2016). I hope to contribute to this trend in a monograph tentatively entitled *Interlopers: Cornelis Drebbel (1572–1633) and Early Stuart Science on the World Stage.*

11 Mark Greengrass, "Three Foreigners: The Philosophers of the Puritan Revolution," in *Hugh Trevor-Roper: The Historian*, Blair Worden, ed. (London: Tauris, 2016), 85–98.

12 Trevor-Roper, *Europe's Physician*, 367–8.

13 Trevor-Roper points out the similarities between Mayerne and Hartlib in *Europe's Physician*, 338.

14 For the term "color world," see Tawrin Baker, Sven Dupré, Sachiko Kusukawa and Karin Leonhard, "Introduction. Early Modern Color Worlds," *Early Science and Medicine* 20 (2015): 289–307.

## 2 Mayerne and the Social Status of Craft

Among the many manuscripts Mayerne left on his death in 1655, the best known today is indubitably Sloane 2052, "*Pictoria, Sculptoria & quae subalternarum artium,*" the so-called "Mayerne manuscript," published in multiple versions.[15] Art historians have long mined this manuscript for techniques of the old masters that would otherwise be unknown. The fact that this manuscript still serves as such a resource suggests the unprecedented degree of access to artistic techniques Mayerne succeeded in gaining, and his success in preserving those techniques in a lasting and accessible form. The fame of "the Mayerne manuscript," however, has obscured the importance of the many other scattered Mayerne manuscripts on pigments, inks and dyes, such as Sloane 1990, Sloane 2079 and Sloane 3423, in addition to Mayerne's numerous medical and chymical collections.[16] As Trevor-Roper wrote, although "art historians mostly confine themselves to the 'Mayerne manuscript,' it is only the most striking of the many papers of Mayerne that reveal his artistic interests."[17] These include the Mayerne papers in the Royal Society, which have not been identified before and were unknown to Trevor-Roper himself. Several of the informants of the Mayerne papers in the Royal Society, such as Nicolas Briot, Jean Petitot, Louis le Myre, Pierre Antoine Bourdin, Mark Anthony of Brussels, and Nicholas Lanier, were also informants of the famous "Mayerne manuscript," Sloane 2052.

The reasons why Mayerne collected artisanal techniques so methodically in the first place have eluded Mayerne scholars. Both Trevor-Roper and Karin Leonhard raised this question, suggesting that perhaps the answer might lie in Mayerne's chymical interests, since such techniques also supplied him with materials for chymical processes.[18] Romana Sammern suggested that art writing by physicians of Mayerne's generation served to

15 J. A. van de Graaf, ed., *Het de Mayerne Manuscript als bron voor de schildertechniek van de barok. British Museum. Sloane 2052* (Mijdrecht: Verweij, 1968). Donald C. Fels, trans., *Lost Secrets of Flemish Painting: Including the First Complete English Translation of the De Mayerne Manuscrip*t, B.M. Sloane 2052 (Hillsville, Va.: Alchemist, 2001).

16 On Sloane 1990, see A. E. Werner, "A 'New' de Mayerne Manuscript," *Studies in Conservation*, 9,4 (1964): 130–134.

17 Trevor-Roper, *Europe's Physician,* 346.

18 Karin Leonhard, "Painted Gems. The Color Worlds of Portrait Miniature Painting in Sixteenth- and Seventeenth- Century Britain," *Early Science and Medicine* 20 (2015): 428–457.

distinguish them as virtuosi from medical empirics.[19] While both these suggestions are doubtless true, neither provides a full explanation for the extent and duration of Mayerne's project. Artistic and alchemical techniques often mingled in books of secrets, but Mayerne's artistic collections far surpassed the norm.[20] Someone of Mayerne's erudition and family background did not require such extensive collections to confirm his status. Furthermore, Mayerne's interests encompassed not only techniques that we recognize as artistic today, but also practical skills that may not have served similarly as a marker of social elevation.

Trevor-Roper speculated that a Vasari translation by Mayerne's father, the political writer and would-be reformer Louis Turquet (1533/4-1618), may have stimulated Mayerne's artistic interests. It may also point to the notions of socioeconomic reform animating the craft research of both Louis Turquet and Mayerne. Louis Turquet did not translate Vasari's artistic biographies, but his introductory material dealing with materials and craft techniques (the draft, with Theodore's marginalia, is now Sloane 2057; the presentation copy is Sloane 2001).[21] In his dedicatory letter to François de Roaldès, Louis Turquet defended the political benefits of the arts, which taught man how "to live well, comfortably, and happily."[22] Like others of the time, Louis Turquet championed the nobility of the mechanical arts and castigated those who considered the once honorable title, "mechanical," as the "most vile and abject epithet one could imagine."[23] Turquet was among those writing on the reason of state and "good police" (and one of the first to employ the term "political economy"). He also published works emphasizing manufactures within the well-run polity and promoted in particular silk manufacture, an industry that Louis Turquet's father, Étienne Turquet, had established in Lyon.[24]

19 Romana Sammern, "Red, White and Black: Colors of Beauty, Tints of Health and Cosmetic Materials in Early Modern English Art Writing," *Early Science and Medicine* 20 (2015): 397–427.

20 Compare, for instance, Mayerne's extensive experimentation on dyes in Sloane 3423 with the more typical collection of medical, chymical, and artisanal receipts in Sloane 3426, 1-28v (excerpted by Mayerne in London, November, 1626, "ex Miscellaneis D. [Nicholas] Briot") or with the receipts of Sloane 2079.

21 Trevor-Roper, *Europe's Physician,* 18 and 347.

22 Sloane 2057. "de l'homme a bien, commodement, et heuresement vivre."

23 Ibid. "aujourdhuy attribué pour le plus vil et abjet epithete qu'on scauroit penser." For similar defenses of the nobility of the mechanical arts by Agricola and Guidobaldo del Monte, see Paolo Rossi, *I filosofi e le macchine, 1400–1700* (Milan: Feltrinelli, 2002), 72–75.

24 Mark Greengrass, "The Calvinist and the Chancellor: The Mental World of Louis Turquet de Mayerne," *Francia-Forschungen zur westeuropäischen Geschichte* 34,2

Mayerne's interests in even the lowliest of the mechanical crafts, such as tallow chandling, are perhaps not as difficult to explain as has been supposed, given period attempts to elevate the status of the mechanical arts for the benefit of the polity.[25] Mayerne may have left us a signally methodical collection, yet he was far from alone among the early Stuart courtiers developing profitable consumer trades.[26] Trevor-Roper himself pointed out Mayerne's many entrepreneurial projects, although he interpreted Mayerne's experimentation as a retreat into a private world, following a period of disappointment with the possibilities for international Calvinism ca. 1620. Given the views current in Mayerne's context, including those voiced by his father, concerning the political importance of fostering profitable industries, it is possible to see his experiments rather as public-minded and part of a wider culture of elite projectors.[27]

## 3 Mayerne and the Early Stuart Fashion for Experiment

Mayerne participated in a generation of methodologically creative early Stuart experimentalists that has been occluded by sociopolitical disorder, the later dominance of Sir Francis Bacon, and by changing mores in the early Royal Society regarding the long-standing relationship between courtly experimentation and craft knowledge. Like other social elites of his generation, Mayerne did not exhibit the same squeamishness regarding profitable crafts as some Fellows of the Royal Society later would. In his published discussion of colors, Robert Boyle purposefully omitted "the Lucriferous practise of Trades-men about colours; as the ways of making Pigments, of Bleanching wax, of dying Scarlet, &c. though to divers of them I be not a stranger, and of some I have myself made Tryall."[28] William Petty likewise affected to leave the "Fixing of colours for Use" to "more

(2007): 1–23. Germano Maifreda, *From Oikonomia to Political Economy: Constructing Economic Knowledge from the Renaissance to the Scientific Revolution* (London: Routledge, 2016), 179.

25 For tallow, ClP/3i/26.

26 Linda Levy Peck, *Consuming Splendor: Society and Culture in Seventeenth-century England* (Cambridge: Cambridge University Press, 2005).

27 Trevor-Roper, *Europe's Physician,* 348. Vera Keller and Ted McCormick, "Towards a History of Projects," *Early Science and Medicine*, 21, 5 (2016): 423–444.

28 Robert Boyle, *The Works of Robert Boyle; Vol. 4, Colours* and *Cold, 1664–5,* ed. Michael Hunter and Edward B. Davis (London: Pickering & Chatto, 1999), 7–8.

experienced persons."[29] In manuscript notes to his *Experimental Philosophy,* Henry Power defended his color research, noting, "Though our designe here be the Employment of Knowledge & not of Trades, yet these Experiments of Colours, may bee not only of Speculative but practicall use & may not only advantage the Contemplative Naturalist, but also ennoble the Painters art & dyers Trade. Especially if we understand the Nature of Sulphureous Acid & Alkalizate Salts or Liquors."[30]

These later views have made Mayerne's pursuit of profitable trades puzzling in retrospect. Mayerne's motivations for experimenting with dyes in particular baffled Trevor-Roper since Mayerne "was not himself an artist or a craftsman: he did not intend to exercise the arts which he studies. It is difficult to detect an economic motive in this case…."[31] A few of Mayerne's experiments were destined to serve as gifts, as in a pair of stockings dyed for "la petite Colladon (presumably an offspring of Mayerne's protegé, Jean Colladon who had married his favorite niece, Aimée)."[32] Most, though, aimed at the most lucrative dyes. Despite his wealth and social standing, Mayerne pursued profit unabashedly, a phenomenon only in need of explanation from the later perspective of the Royal Society.

Mayerne moved easily between multiple domains of knowledge production concerning color, including dyers, painters, and heralds, who recorded the significance of and recipes for inks, dyes and pigments.[33] The rich access to multi-lingual and international artisans his papers offered would have made them a precious resource to the Royal Society's History of Trades program, which struggled to collect such firsthand accounts from practitioners.[34] Mayerne also drew upon a world of early Stuart gentlemen

29 William Petty, "Some Observations, Touching Colours, in Order to the Increase of Dyes, and the Fixation of Colours," *Philosophical Transactions* 6 (1671): 2132–2136 (on p. 2134).

30 Henry Power, *Experimental Philosophy* (London: Martin, 1664), 74, ms. notes by the author, British Library, General Reference Collection 537.h.1. Power's notes on the various colors produced by calcining metals on glass are at p. 45.

31 Trevor-Roper, *Europe's Physician*, 347.

32 Sloane 3423, 15r.

33 eg. British Library Stowe 680 and Additional MS 6284.

34 Early Fellows of the Royal Society such as Robert Boyle and Nehemiah Grew purposefully sought access to the color world of dyers, using their processes as a central platform from which to analyse the saline chymistry of color. Anna Marie Roos, "The Saline Chymistry of Color in Seventeenth-Century English Natural History," *Early Science and Medicine* 20 (2015): 562–588. Michael Hunter, *Science and Society*

experimentalists to which many of the Royal Society Fellows were intimately related but which, like the color world of artisanal informants, had become difficult of access in the Restoration.[35] He offered a firsthand view of the culture of early Stuart curious gentlemen (known variously as *virtuosi, liefhebbers,* or *amateurs*) encouraged by Henry Peacham (1578–1644?), who urged the student of heraldry "to undertake more Philosophicall and particular examination of the causes of colours."[36] While Mayerne's papers on coloration do not preserve material relics like the fabled Garter jewel Charles I passed off on the scaffold, they do contain a paper, discussed further below, with the once famous and otherwise lost technique of staining images into artificial agates developed by Sir Edmund Bacon (1566–1649). The paper, complete with Mayerne's interview with Bacon and further speculations on the technique, represents a remnant from a once vivid circle of courtier-researchers into color techniques, a circle later lyrically recalled by figures such as John Beale (1608–1683), a future fellow of the Royal Society.

This view of early Stuart *virtuoso* experimenters, made distant not so much through passing time as by intervening political fortune, afforded Restoration gentlemen philosophers elite models of experimental practice above and beyond the papers' role as a repository of matters of fact. Mayerne's papers explicitly served as one possible model for experiment in Royal Society discussions. His literary techniques and apparatus were carefully copied in the

*in Restoration England* (Cambridge: Cambridge University Press, 1981), 87–112. Kathleen H. Ochs, "The Royal Society of London's History of Trades Programme: An Early Episode in Applied Science," *Notes and Records of the Royal Society of London* 39, 2 (1985): 129–158. William Eamon, *Science and the Secrets of Nature: Books of Secrets in Medieval and Early Modern Culture* (Princeton University Press: Princeton, 1994), 343–6.

35 Harkness, *The Jewel House*. Mayerne does not appear at all in Yeo, *Notebooks, English Virtuosi, and Early Modern Science*. Charles Webster makes slight references to him in *The Great Instauration: Science, Medicine and Reform, 1626–1660* (Oxford: Peter Lang, 2002), 254, 273, and 317, although Webster does discuss the research into dyes of Drebbel, the Küfflers, Petty, Boyle, and Beale (at 388–389). Despite his importance for Hooke, Mayerne does not appear in, for instance, Matthew Hunter, *Wicked Intelligence: Visual Art and the Science of Experiment in Restoration London* (Chicago: University of Chicago Press, 2013). Trevor-Roper discusses the fortunes of Mayerne's papers in "Appendix C: Mayerne's Papers," *Europe's Physician,* 372–4.

36 Anne Geoffroy, "English Perceptions and Representations of Venetian Chromatic Variations," *E-rea* [online], 12.2 (2015): URL: http://erea.revues.org/4509; DOI: 10.4000/erea.4509.

English translations of these papers ordered by the Society, down to Mayerne's monograms (marking his own ideas or innovations), manicules, and marginalia. These papers were prized for Mayerne's studied techniques and majestic style that shaped the evanescent particulars of experimental practice into an enduring and regal body of scientific knowledge.

Mayerne lent stature to his manuscripts through their physical form. Sloane 3423, for instance, appears in a striking array of brilliant purple, orange, and red inks, which he was also producing himself in concert with his research on dyes. Mayerne's other manuscripts as well as his papers in the Royal Society include several ink recipes and discussions.[37] In Mayerne's practice the relationship between dye and ink was particularly close, since Mayerne often tested colors on paper.[38] Mayerne's colors suffused all of his records; in her chapter in this volume, Walker also notes Mayerne's use of colorful ink in his annotations in printed volumes in the Sloane collection. Thus, while Mayerne's experimental records were functional, as in the case of Samuel Hartlib's papers discussed by Carol Pal in this volume, they were a far cry from Hartlib's monotone, hurried notes. In his careful use of color and layout, Mayerne collects and memorializes his experimental practice both for immediate use and for long-term preservation. Decades later, fellows of the Royal Society would note the form, as well as the content, of Mayerne's papers.

This argument, that early Restoration gentlemen philosophers would have found the style of early Stuart experimentation of interest, might appear to parrot the arguments made by Shapin and Schaffer in *Leviathan and the Air-pump* concerning credibility and social status, but it differs in important respects. First, the disinterestedness granted by social status according to Shapin and Schaffer inherently depends on a denial of financial interest in the pursuit of knowledge. This was not the case for Mayerne nor for many of his fellow early Stuart experimenters. Early Stuart experimenters belonged to a notoriously corrupt profiteering court culture, and association with that

37 eg. Sloane 1512, 187v. "Pour faire l'encre rouge," with brasilwood and alum, "ils sera fort rouge et luisant & sanguin, et fort agreeable à voir."

38 For example, in his *Experimenta tinctoria,* a now lost volume transcribed by Robert Hooke in ClP/24/81, Mayerne experiments with making colors from poppies. He notes that "the liquor spread upon paper made" a very glorious purple, like that which comes from logwood ("la liquor estendue sur du papier a faict un pourpres tres glorieux, comme celuy qui vient de Logwood"). Another poppy color "was a dark red, which when laid on paper with a brush was violet and not at all red (La couleur a este dun rouge obscur laquelle couchée sur du papier avec un pinceau a este violette nullement rouge)."

culture was no guarantee of propriety or disinterest. My account of the personal nature of the experimental archive and the social networks it can reanimate serves to emphasize the role of courtly magnificence, social animus and rivalries in experimental practice rather than the qualities of the ideal gentleman-philosopher according to Shapin and Schaffer, namely, modesty and credibility. As a result of such differing ideals and mores, the aesthetics highlighted here differ too. In line with the resplendent fashions of the early Stuart court, Mayerne's experimental notes are colorful and dashing. By contrast, Shapin and Schaffer argue that the aesthetic Boyle aimed for, in his published engravings such as that of the air-pump, was one of unadorned "virtual witnessing," that is, an aesthetic that aims to erase its own existence as a visual representation, akin to Boyle's "professedly 'naked way of writing.'"[39]

More recently, Michael Hunter has emphasized how individuals such as John Evelyn forefronted the artistry of the Society.[40] It was the latter interest that spurred the Society's investigation into Mayerne's papers on color. In a society already attuned to reading symbolic and heraldic codes, color became highly politicized leading up to, during, and after the Civil War.[41] Mayerne's brightly hued courtly world was swept away by the duller tones of the Interregnum. In later memory, the former may have shone all the more brightly, since nostalgia so heavily tinged Restoration elite memories of the time before the troubles. As Edward Hyde, first Earl of Clarendon (1609–1674) wrote in his influential *History of the Rebellion*, the reign of King Charles before the long Parliament (1640–1660) enjoyed "the fullest measure of Felicity, that any People in any Age, for so long time together have been bless'd with; to the wonder, and envy of all the other parts of Christendom." The happiness of his reign supposedly surpassed that of either Elizabeth or James. The "Kingdoms we now lament, were alone look'd upon as the Garden of the World …" according to Hyde.[42]

39 Steven Shapin and Simon Schaffer do not mention archives in *Leviathan and the Air-pump: Hobbes, Boyle, and the Experimental Life* (Princeton: Princeton University Press, 1985), p. 66, discussed also in Steven Shapin, "Pump and Circumstance: Robert Boyle's Literary Technology," *Social Studies of Science* 14,4 (1984): 481–520.

40 Michael Hunter, *The Image of Restoration Science: The Frontispiece to Thomas Sprat's* History of the Royal Society *(1667)* (London: Routledge, 2017). Image production in the Royal Society has garnered great interest in recent years, notably in the current project, *Making Visible: The Visual and Graphic Practices of the Early Royal Society*, at the Centre for Research in the Arts, Social Sciences, and Humanities, Cambridge.

41 Sophie Chiari, "General Introduction: '*Chamelion* like' England," *E-rea* [online], 12.2 (2015), URL: http://erea.revues.org/4331.

42 Edward Hyde, *The History of the Rebellion and Civil Wars in England, Begun in the Year 1641,* Vol. 1, Part 1 (Oxford: Sheldonian Theater, 1707), 74–75.

Mayerne's papers brought back to life a lost early Stuart color world and a manner of courtly experimentation more generally to a generation eager to dress experimental philosophy in the majestic and enduring garb befitting its status.

Sloane 3423, *Experiments & operations en matiere de teincture faites par moy* [monogram] *1639*, a series of dated experiments Mayerne performed from 1639–1650 with the assistance of practitioners, Thomas Fletcher and his wife, as well as Mayerne's Flemish chambermaid Elisabeth, illustrates the extent, duration and social setting of Mayerne's quests. In 1639, Mayerne had moved to a small riverfront property in Chelsea that had been the old farmhouse on the much grander estate of the royal favorite and arbiter of fashion, George Villiers, the Duke of Buckingham (1592–1628). Buckingham's daughter, Mary Villiers, Duchess of Richmond and Lennox (1622–1685), at first received permission from Parliament to reside in the main estate in order to be treated by Mayerne. Buckingham House was then confiscated by Parliament in 1648 and granted to Bulstrode Whitelocke, the Commonwealth's Librarian and Commissioner of the Great Seal, who was friendly with Mayerne despite the latter's royal appointment.[43] From this elite western suburb, Mayerne surreptitiously investigated the lucrative techniques deployed in a very different social setting to the east of London by the Küffler brothers of Cologne.

Residents of Stratford-Langton, the Küffler brothers were associates and sons-in-law of Cornelis Drebbel (1572–1633), Chief Engineer of the Ordnance Office before his death. The Küfflers established a dyework for the famous scarlet dye (known as Bow-dye after Stratford-Bow) invented by Drebbel. Like other lucrative dyes Mayerne researched, such as calico, scarlet was a notoriously difficult dye to reproduce, especially for silk.[44] Variations of water supply and natural ingredients, proportions of mordant and cochineal, and various options for heating and timing of the operation made dyeing silk with cochineal "a classic example of the problem of controlling a dynamic system with many variables."[45] Of the four Küffler brothers (Abraham, Dr. Johann Sibbert, Aegidius or Gilles, and Jakob), the first three were involved in the scarlet dye business, and the first two were also inventors and chymists.[46]

43 "Key to Kip's View," *Survey of London: Vol. 4, Chelsea, Pt. II* (London: County Council, 1913), 18–27. Trevor-Roper, *Europe's Physician*, 420.

44 On the obstacles to achieving calico printing in England, see P. C. Floud, "The Origins of English Calico Printing," *Journal of the Society of Dyers and Colourists* 5 (1960): 275–281.

45 Valery Golikov, "The Technology of Silk Dyeing by Cochineal. II. The Experimental Investigation of the Influences of Types and Concentrations of Cations," *Dyes in History and Archaeology* 16/17 (2001): 10–20; 11–12.

46 Francis Mauritius Jaeger, *Cornelis Drebbel en zijne Tijdgenooten* (Groningen: Noordhoff, 1922), 50.

Mayerne's informants did not blush to query both Abraham and his brother, the physician Johann Sibbert, about their profits, as in:

> Kefl. dyes a piece of cloth for 25 lb; his brother said 16 lb with Cocheneel.
> The ordinary dyers dye a piece of cloth with powder of graine of kermes for 35 lb.
> He makes profit in every piece of cloath, 10 lb sterl.
> The pound of scarlet grains costs him 6 shill. To 8 for ye best.[47]

Mayerne proved a connoisseur of color, continually comparing his successes to the Küfflers' products, always with an eye to their market value, as in, "the scarlet being dried its color was very rich, and according to the merchant better and of a greater value than that of Keffler [Küffler]," and "A scarlet as beautiful as that of Keffler [Küffler], the comparison having been made."[48] One "incomparable crimson" Mayerne achieved "kept its luster" after the silk dried, and according to Fletcher, was worth 30 shillings for a pound of the dye alone.[49]

Dr. Küffler, or Keffler as Mayerne called him, figures centrally throughout Mayerne's writing on dyes.[50] Mayerne sought out informants who could follow his trail through London. He noted how Nicolas Briot (1579–1646), the alchemist and chief engraver to the Mint, had seen a number of glass retorts in the glass shop, where the glass-man informed him "that Keffler used 5 or 6 of them every week for his necessarys about the tincture."[51] The factor of a merchant who employed Küffler every year to dye several pieces of scarlet said that after Küffler "had dyed it as well as he could, he put something on the cloth that gave it that glorious yellow appearance so desired by everyone (... cette oeil glorieuse jaune tant recherché par tout le mond)."[52] As he typically did, Mayerne added his own speculation to this information, surmising that Küffler's additive was arsenic and offering as evidence the fact that gold or silver brocade

47 ClP/3i/30.

48 Sloane 3423, 1 and 9v. "Estant [Escarlate] seiche la couleur a esté riche, & au rapport des marchande meilleur et de plus grand prix que celle du Keffler " and "La couleur est venue suffisament haulte. Escarlatte aussi belle que celle du Keffler, comparaisan en ayant este faitte. Nacarat, coulur de feu [underlined with an NB in pencil]."

49 ClP/24/82 at # 79.

50 For instance, Mayerne refers to Küffler at least fifteen times throughout ClP/24/80, 81 and 82.

51 ClP/24/80/175. On Nicolas Briot, see Trevor-Roper, *Europe's Physician,* 63–4.

52 ClP/24/81 at #57.

touching the Küfflers' cloth would turn black. He noted three different ways to try adding arsenic.

The Küffler dyes suggested the commercial profits that could accrue if superior chymical learning were brought to bear on the craft world of dyes. Robert Boyle prized scarlet not as a desirable artisanal secret, but as an example of what individuals who were *not* artisans, like "Cornelius Drebble, who was not bred a dyer, nor other tradesman" could achieve.[53] Mayerne too considered Küffler's successes the result of a more philosophical approach ignored by the common sort of dyer. The scarlet dye was prepared with an innovative tin mordant that rendered cochineal dye redder than the traditional alum mordant. The mordant was also added to the cloth before the dye, which Mayerne believed was an unusual approach. Mayerne noted how Keffler told Mr. Briot "that the secret of his tincture consisted in the preparation of the stuff the which he boyled with some ingredient which changed not the colour but it remained white but by its preparation acquires that force that when you put it in the tinctures it drawes all the colour of the cocheneel in such manner that the water remaining white or rather a little reddish soe that you loose nothing of the tincture but all goes into the cloth."[54] While the "ordinary dyers beat the cochineel in powder and make it boyle in the liquor," "Fletcher [the expert dyer who assisted Mayerne] believes that it is better to draw all the tincture of the cochineel intire," and thus "dye the stuff prepared," "beleiving Keffler does soe." Mayerne approved of this manner of dyeing as "most philosophicall & proper."[55] Mayerne also appreciated Küffler's thriftiness. Rather than grinding his cochineal, Küffler used it whole. After drawing the "most glorious colour" for his cloth, he saved the water, adding "a little new cocheneel," and used it to dye stockings, sold for 7 shillings.[56]

53 Robert Boyle, "Usefulness of Natural Philosophy, II, 2," *Works of Boyle,* Vol. 6, 1668–71, Michael Hunter, ed. (London: Pickering & Chatto, 2000), 400.

54 ClP/24/80/175. The French academician Pierre-Joseph Macquer believed as late as 1768 that pre-mordanting silk for the scarlet dye was his own discovery and a signal example of how a superior knowledge of nature might improve the arts. Christine Lehman, "L'art de la teinture à l'Académie royale des sciences au XVIIIe siècle," *Methodos* 12 (2012), consulted on 31 January 2017: URL: http://methodos.revues.org/2874; DOI: 10.4000/methodos.2874. Evidently, common dyers were also pre-mordanting, eg Sloane 3292, item #4, "A Booke of Dyers good Receipts," for adding the "fixing liquor" before the pigment.

55 ClP/24/80/177. See also ClP/ 24/80/173, "… Fletcher beleives that Dr. Kefler boyles the cochineel as the Logwood and by the help of the spirits draws the tinctures, and is assured that he doth not proceed after the common manner…."

56 ClP/24/80/168.

Mayerne certainly felt that his chymical knowledge could trump the advice of experienced dyers. Both his sources of information and his chymical investigations of dyes were in advance of others in England at the time.[57] Yet, unlike Henry Power and other Fellows of the Royal Society, quoted above, he did not use his chymical approach to justify his craft research as epistemically elevated above profitable trades. Nor were his craft experiments merely tributary to his chymical research. Rather, Mayerne deployed his chymical knowledge in the pursuit and further development of valuable dyes.

## 4 Mayerne's Method

As Trevor-Roper has noted, Mayerne applied the same experimental approach to dyeing and other arts and crafts as he did to his medical and chymical studies. He would begin by collecting valuable intelligence, either directly from informants or indirectly through what we might call craft espionage, as well as from written sources. He often noted the date and address of the source on holograph artisanal papers or on the records of his oral interviews with practitioners. Drawing on his sources, he then speculated as to what other utensils, ingredients, and operations might be relevant. He continually re-tested a wide range of factors (water sources, a wide array of organic and inorganic dyes and mordants, different cloths, utensils made of different metals, and various additives ranging from metal plates to urine) in different combinations and proportions. As his informant Nicolas Briot wrote to him concerning "divers tinctures" of metals and their use in dyes, the "whole way lyes in the tryall of all."[58]

Mayerne called his experiments, "experiments" or "essays," and included dates and locations, notes of those who were present, speculations about what happened, general observations, "censures" of failures, and suggestions for future attempts. He amalgamated his findings into more general principles and systematic catalogs, such as a list of materials to be dyed and vessels to use, a catalog of woods still to be tried as pigments, and a bibliography of forty-four authors writing on color. Throughout his discussions of particular

57 Compare Leonard Trengove, "Chemistry at the Royal Society of London in the Eighteenth Century—IV. Dyes," *Annals of Science* 4 (1970): 331–353 and Giorgio Riello, "Asian Knowledge and the Development of Calico Printing in Europe in the Seventeenth and Eighteenth Centuries," *Journal of Global History* 5 (2010): 1–28.

58 ClP/24/80/172.

experiments, he referred to the printed works he included in his bibliography on color; these ranged from books of secrets, herbals, and alchemical works, to studies specifically devoted to inks and dyes and reference works such as dictionaries.[59]

Although Mayerne's approach moves from the particular to the general, it does not attempt to appear disinterested or to remove traces of the self in the process. Throughout, Mayerne indulged in commonplaces on ideal experimental behavior through which he reflected on failure or success and encouraged himself to persevere.[60] These moments of personal introspection also appear in Mayerne's casebooks, a practice that Trevor-Roper has referred to as the inclusion of "some apparently irrelevant verses in Spanish and Latin advising himself to avoid the company of false friends and rely only on his own virtue and divine support."[61] Mayerne also made his papers personal by noting his own ideas and discoveries with his possessive monogram (Fig. 2.2).

## 5 Mayerne in the Hartlib Papers

While Mayerne deployed his many informants to research the Küffler dye, Samuel Hartlib befriended the brothers, especially Johann Sibbert, and investigated their techniques more directly. Hartlib learned in 1636 that Küffler "hase also a special Art of dying of Scarlet for to save 50. lib. in a peece, as I take it."[62] An undated agreement between one of the Küffler brothers and Hartlib sets out

59 Sloane 3423, 36v-37, "Variae species quae tinctoribus supra Lanam, Sericum, filum &c. laborantibus usui esse possunt." Sloane 3423, 38v, "faist essayer les bois &c. suivant." ClP/3i/40, "Autheurs traitans de la Teincture & Couleurs." For references to works on the list, see Sloane 3423, 5 with a reference to "Plichto sur la teincture" and "les secrets de Birelli & autres;" ClP/3i/31, for a reference to the "illumineer buch;" ClP/81/unpaginated, *Experimenta tinctoria*, for a reference to Johann Rudolph Glauber's *Furni philosophici,* as well as "Alexis Piedemontois, Russelli, Fioraventi, Fallope, Birelli, Caneparius, de atramentis, Isabella cortesse & aultres qui ont escrit des livres de secrets."

60 eg. Sloane 3423, "Canis festinans caecos parit catulos" (3r); "Chi troppo s'assotiglia si scavezza" (7v); "Bené qui latuit, bené vixit" (8r); "Experientia rerum Magistra" (17v); "Per varios casus artem experientia fecit/exemplo monstrante viam" (20r); "Debile principium melior fortuna sequatur" (27r).

61 Hugh Trevor-Roper, "Harriot's Physician: Theodore de Mayerne," *Thomas Harriot, an Elizabethan Man of Science,* Robert Fox, ed. (New York: Routledge, 2017), 48–63 (on p. 57). See Scott-Warren, "Early Modern Book-keeping," for a comparable example of divine or ethical quotations in an account book.

62 Hartlib Papers Online (hereafter Hartli), [29/3/57B].

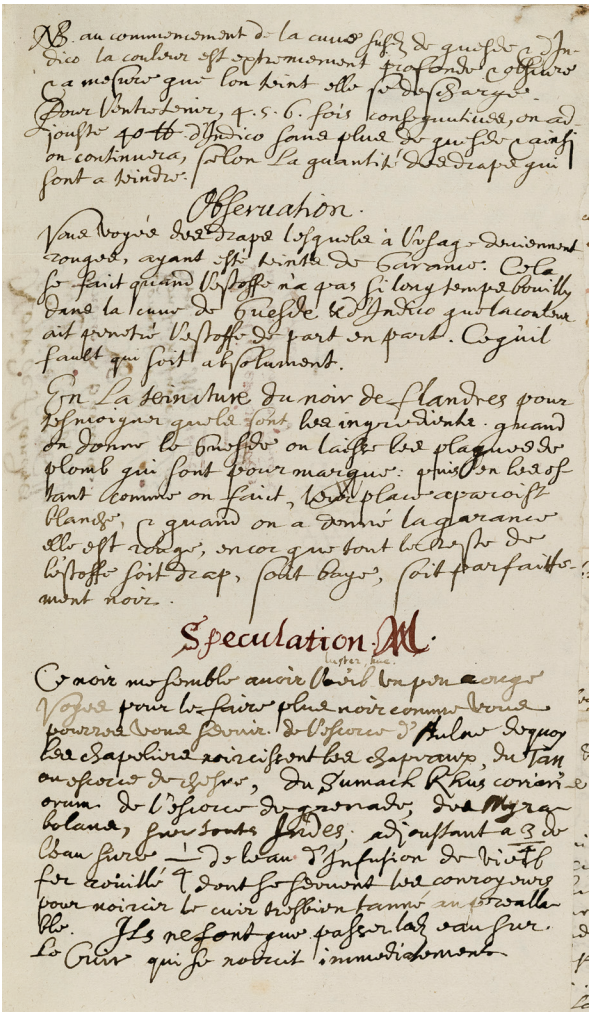

FIGURE 2.2 *Royal Society, ClP/3i/35. Mayerne typically recorded observations, speculations, and experiment. Not the possessive monogram next to Mayerne's speculation.*

terms for teaching Hartlib two of the secrets Drebbel passed on to the Küfflers, the scarlet dye and a self-regulating oven (as well as sundry of Küffler's own chymical techniques).[63] Twenty years later, still apparently pursuing the technique, Hartlib noted that Catherina Küffler, Drebbel's daughter and Dr. Küffler's wife, an "understanding Woman," also "know's the way" of perfecting the scarlet

63 Hartlib, [27/13/7A-B].

dye.[64] Ultimately, the Küfflers would lose control of the scarlet recipe, and the subsequent lowering of the price of scarlet was widely noted.[65] Fortunately, the Küfflers had expanded their repertoire. As Hartlib recorded in 1655, Küffler was also working on "an excellent approooved Way of colouring of furres in black, w*hi*ch may proove very gainful," as well as a way to "fix a greene colour" that he thought "would bee of equal valew with that of scarlet."[66]

Hartlib was also au courant with Mayerne's efforts. In 1639, when Mayerne was just beginning his scarlet dyeing experiments with Fletcher, Hartlib noted, "Dr Mayerne is trying experiments for dying without cutchenel by the herbes growing in England."[67] Hartlib might be referring to Mayerne's experiments with Mistress Fletcher for using safflower, which could produce a rosy pink (*incarnat*), pink, and scarlet.[68] Producing scarlet dye through local ingredients would significantly raise his profits.[69] Hartlib, who also possessed a number of medical receipts copied "ex Mayerni MSS," was also apprised later of Mayerne's experiments on fixing logwood, another South American dye.[70]

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64 Hartlib, 1656, [29/5/88B].

65 eg. Johann Joachim Becher, *Minera Arenaria Perpetua* (London: Pardoe, 1680), 55. "Quae jam in Hollandia circa scientias expiscandas technae adhibeantur, meum non est, heic loci exponere, notum est quibus technis Kifflero colorem suum scarletinum furati, & imitati sunt."

66 Hartlib, 1655, [29/5/16B]. According to what Ole Borch recorded, Küffler may have succeeded in developing these new dyes. Ole Borch, *Itinerarium 1660–1665*. II. Oct. 1661-May 1663 (London: Brill, 1983), 165–6. Johann Moriaen, Küffler's old business partner and now a septuagenarian, was still dying a black dye as well as a blue that could also be used as a green. Scarlet had become so cheap that Moriaen wasn't producing it anymore. On Moraien and Küffler, see John Young, *Faith, Medical Alchemy, and Natural Philosophy: Johann Moriaen, Reformed Intelligencer and the Hartlib Circle* (Brookfield, Vt.: Ashgate, 1998).

67 Hartlib, 1639, [30/4/9B].

68 eg. Sloane 3423. 24v-25v. cf. Joan Thirsk, who notes Hartlib's comment that Mayerne was seeking scarlet without cochineal, but dates the first proposal for safflower to 1663–4. Joan Thirsk, *Alternative Agriculture: A History from the Black Death to the Present Day* (Oxford: Oxford University Press, 1997), 131.

69 In his later *Faber Fortunae*, John Aubrey, who was also apprized of the dyeing experiments of Hunniades, suggested dyeing scarlet with safflower as a profitable project. Bodleian, MS Aubrey 26, 4r.

70 For the receipts: Hartlib, undated, [30/1/12A-14B]. Hartlib, 1650, [28/1/79A]. "One wrote a Leter of late to Mr Ash a Memb*er* of the C*ouncel* for Trade that hee had found out an infallible Experim*ent* for the fixing of Lockwood heretofore soe much forbidden. Dr Mayerne and Dr Corydon [probably Colladon] have likewise beene about it." 60/4/216A-228B: 225A-228B also appears to be transcribed from Mayerne manuscripts, although a cipher is used for his name.

Dr. Küffler, unsurprisingly, was no admirer of Dr. Mayerne. Referring to Mayerne's assistant, the Hungarian alchemist Johannes Bánfi Hunyadi, active in London from 1608–1646, Küffler informed Hartlib in 1656 that "Hans Hunniades [was] a very idiot Laborant and one that knew nothing at all, but only was cryed up by Dr. Mayerne, who was no chymist at all. The chiefe thing that was in him was his Art of enamelling or making of Artificial Stones or Jewels."[71] Much later, in his *Numismata,* John Evelyn, FRS, would praise "the Noble *Hunniades* Inventor of the *Scarlet-Bow Die,* since the loss of the antient *Purple*," perhaps reflecting the competition between Küffler and Mayerne/Hunyadi by attributing scarlet to the latter; some of Hunniades' recipes are included in the Mayerne papers now in the Royal Society.[72]

## 6 Lost Colors: Beale, Evelyn, and the Retrospective Meaning of Early Stuart Color Research

The improved scarlet Mayerne sought bore political overtones. As several of the sources Mayerne drew upon discussed, scarlet, the color of senatorial and judicial robes, frequently competed with the lost ancient purple dye extracted from the poison of eastern Mediterranean predatory shellfish. One such source was André de Nesmond, "The Robe or the Purple of Justice," written for the opening of the Parliament of Bordeaux in 1615. Nesmond related modern scarlet robes to ancient imperial purple, drawing on many ancient discussions of color, and discussing the significance of various shades of scarlet and purple.[73] Another was the 1619 work of the learned physician active in Venice, Pietro Maria Canepari, *De atramentis* (on inks), which also related Venetian scarlet to ancient purple. Mayerne himself considered one color extracted from a Scottish snail as the "analog of the purple of the ancients."[74]

71 Hartlib, [29/5/91B]. John Aubrey records many details of Hunyadi's dyes in his *Faber Fortunae*, Bodleian, MS Aubrey 26, including [4r], "Mr. hunniades, secret of making the Raven-black dye, with Vitriol of Iron" and [9v], "Mr. huniades can make a Dye not to be washed-out e.g. An Indian way of Dyeing."

72 John Evelyn, *Numismata, a Discourse of Medals, Antient and Modern* (London: Tooke, 1697), 280. See Webster, *Great Instauration,* 389, note 162. A recipe for purple calling for the "water of Hunyadi" appears in Mayerne's volume, *Experimenta tinctoria*, p. 63, copied by Hooke. ClP/24/82.

73 André de Nesmond, "La Robbe ou la Pourpre de Justice" *Remonstrances, ouvertures de Palais, et Arrestz prononcez en Robes Rouges* (Poictiers: Mesnier, 1617), 439–478. ClP/3i/40.

74 "Analogon purpurae antiquorum." ClP/24/81, on p. 6 of Mayerne's *Experimenta tinctoria.*

Restoring purple was a special interest for returning monarchy; Charles II himself asked Robert Boyle to discuss the ancient purple dye with him.[75] When the color was successfully recovered in the Oxford Philosophical Society, it was deployed to stain the Royal Society's motto, "nullius in verba."[76] Throughout the Interregnum, future Fellows of the Royal Society would reflect upon the lost vibrancy of the early Stuart court by reminiscing about past experimental research into colors and engaging in their own collaborative research. It seems to have been difficult for them to obtain, however, the range of resources Mayerne enjoyed.

Consider Canepari's *De atramentis* of 1619. In 1650, Benjamin Worsley told Samuel Hartlib that (future Fellow) Theodore Haak had a copy, and that the work was among the most "select" chymical books.[77] Finally, in 1658, Boyle sent Hartlib a copy of *De atramentis* from Worsley.[78] Hartlib passed the work on to others to read, including (future Fellow) John Beale (1608–1683) in Hereford and his own son-in-law, Frederick Clodius.[79] Beale praised the work's novelty and the clarity of its chymical discussions, and he immediately drew up a treatise of his own, *The Purple of the Ancients*, based upon it.[80] At Beale's request, Hartlib prefaced Beale's work with a dedicatory letter to Robert Boyle and to John Worthington.[81]

Beale highlighted the political resonances of color research and what was at stake in restoring an experimental culture of glorious inks and dyes. Beale hinted to Hartlib that, given the rapidly shifting political climate, the tract was sensitive.[82] In his preface (signed by Hartlib but composed by Beale), Beale

75 Boyle, *Colours* and *Cold*, 143. Charles II's name isn't given, but Boyle describes him as "his Majesty." Vera Keller, *Knowledge and the Public Interest* (New York: Cambridge University Press, 2015), 224–5.

76 Robert Theodore Gunther, "The Philosophical Society," *Early Science in Oxford*, (Oxford: Dawson, 1925), vol. 4, 230–1. For more on a swatch of purple William Cole sent to the Royal Society, see Hunter, *Wicked Intelligence*, 135–7.

77 Hartlib, [28/1/76B].

78 Hartlib, [29/7/8A].

79 Hartlib, [51/40B]. Hartlib to Boyle, 25 May 1658, Robert Boyle, *The Correspondence of Robert Boyle, Vol. 1, 1636–1661*, ed. Michael Hunter, Antonio Clericuzio and Lawrence Principe (London: Pickering & Chatto, 2001), 274–5.

80 Hartlib, [51/52A].

81 John Beale, *Purple of the Ancients,* in Hartlib, [51/8A-B and 10A-12B, 51/107A-144B]. Beale requests Hartlib to procure the "shelter" of Boyle and Worthington in Hartlib, [51/13A].

82 In a further letter of August 31, 1658, Beale asks to revise his writings on color to better fit Boyle's interests. Hartlib, [51/9B], "*You* will guesse by the following preface, That it hath something of importance to the present times."

asked the reader to forgive his sharp criticism of the "fickle fashions" of "our English Courte & Gentry," since he thereby endeavored to "repayre the ruines of Antiquity in that pointe, which restores us to the ornaments of Maiesty" and to invest us "with a more durable lustre of authority & honour" through the "powerfull precepts of the best philosophy."[83]

Beale disagreed with Canepari's claim that the Venetian senatorial scarlet was the lost ancient purple of the ancients. He did agree with Canepari's medical views of colors. He too was concerned both about the poisonous metallic ingredients of many inks and their affects when constantly respired. He also claimed that colors worked powerfully upon the passions; "colors are not without a forcible energy to rayse affections, & passions, to settle or to alter complexions & constitutions, & to compose or to endanger health."[84] Both the color and chemical content of ink directly affected the health and mental state of the reader, suggesting a very immediate way for old writings to have a new lease on life. Beale proved nostalgic for the colors of the past, noting that "The Lord Bacon, in his newe Atlantis, seemes to affect yellowe, as the fittest color of parchment" and that "Our ancient Manuscripts, the richest, especially such as are devotionall, & then chiefely, when they containe Songs or Oraysons to the Holy Virgine, are in the leading letters embellished with curious worke in beautifull coulors."[85]

Given how much time scholars spent viewing books, particular attention should be paid to the content and color of inks and paper used in printing, Beale urged. Black and white were especially poor choices. He pointed out that many cloth dyes could also be used for books; if scarlet "be dissolvd in the white of an Egge or in gumd water, you may painte, adorne bookes, or write with it."[86] Beale does not mention it, but printing in red had gained a particular significance in recent years, when several accounts of Charles I's execution evoked the spilling of royal blood through the use of red ink.[87] Beale concentrated instead on the medical benefits of scarlet printing. Scarlet ink would particularly aid the health, since cochineal had noted medical properties that might travel in fumes from the ink through the nostrils and the body.[88] Likewise, an

83 Hartlib, [51/12A-B].

84 John Beale, *Purple of the Ancients,* 7, in Hartlib, [51/127A-144B].

85 Ibid, 55–56.

86 John Beale, *Purple of the Ancients,* 46.

87 Helmer J. Helmers, *The Royalist Republic: Literature, Politics, and Religion in the Anglo-Dutch Public Sphere, 1639–1660* (Cambridge: Cambridge University Press, 2015), 136. See eg. Marcus Zuerius Boxhorn, *Metamorphosis Anglorum* (NA: NA, 1653).

88 Mayerne noted the medical benefits of cochineal in Wellcome MS 716, 93v, but he did not discuss it in his writings on color. This volume is currently ascribed to William Ruthven, but

ink "compounded of the best sacke & well-prepared Vitrioll" might "cheere our spirits, as if wee had a more refined, & spirituall way of drinking Wine all the time."[89] He requested the aid of Hartlib's son-in-law, the chymist Frederick Clodius, in developing a more salubrious printing ink.[90] And in another projected work, *A Garden of Pleasure*, he listed several *desiderata* for future research, including the "compounding of colors" in flower breeding, as well as a "search into *th*e powerfull operations effluxions & motions of colors."[91]

The communal reading of Canepari's *De atramentis* during the Interregnum illustrates the color research shared by future fellows of the Royal Society with Hartlib and others.[92] Hartlib wrote back to Beale with the comments of Worthington and of (future Fellow) William Croone (1633–1684).[93] He also arranged a correspondence on color between Beale and Boyle, who had probably begun the experiments on color that would appear in 1664 as *Experiments and Considerations touching Colours* in 1655–6.[94] Beale suggested that color was a formal shared research aim that Boyle shared with others; he refers to "the engagement upon colors" of "the learned club," apparently in reference to the so-called Oxford philosophical club in which Boyle participated.[95] Another

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it is in fact a Mayerne work with accounts of collaborations between Mayerne and William Ruthven's son, the physician Patrick Ruthven, Mayerne's neighbor and Van Dyke's father-in-law. On Ruthven, Trevor-Roper, *Europe's Physician,* 343 and R. Ian McCallum, "Patrick Ruthven, Alchemist and Physician," *Proceedings of the Society of Antiquaries of Scotland* 134 (2004): 471–490. Mayerne also dicusses Ruthven in his discourse on vipers, ClP/15i/50.

89 Beale, *Purple of the Ancients,* 52. In a letter to Hartlib, Beale reveals that he had lost his deceased brother's receipt for an ink composed of sack and vitriol. He never used it himself as an ink, but he and others had enjoyed drinking it. Hartlib, [51/13A].

90 Beale, *Purple of the Ancients,* 54.

91 Beale to Hartlib, undated, [25/6/3A-4B].

92 cf. Trengove, "Chemistry at the Royal Society of London," 346. "Natural philosophers in England paid little or no attention to ink-making until Boyle, prompted probably by the publication of Caneparius's book [in 1660], carried out some inconclusive experiments on it."

93 For Worthington and Croone, Hartlib, [51/52A].

94 Hartlib, [51/8A] and [52/61]. Beale responds to a query from Boyle on September 10, 1658. Hartlib, [51/15A-16B]. He further advocates for printing the Bible in green on September 22, 1658, Hartlib, [51/17A]. Boyle, *Colours* and *Cold,* XI. Beale reacts to Boyle's 1664 work on colors in a letter of 25 April 1665, in Robert Boyle, *The Correspondence of Robert Boyle, Vol. 2, 1662–5*, ed. Michael Hunter, Antonio Clericuzio and Lawrence Principe (London: Pickering & Chatto, 2001), 268–271.

95 Beale to Hartlib, May 21, 1658, Royal Society MSS, Boyle Letters 7.9 1A-2B, cited from Hartlib Papers Online. Beale mentioned the "learned club" again on April 9, 1658. Royal Society MSS, Boyle Letters 7.8 1A-3B, cited from Hartlib Papers Online.

participant, (future Fellow) Thomas Willis (1621–1675) of Christ Church, was also known to be writing his own treatise on color.[96]

In writing to Boyle, Beale took the opportunity to reflect back upon the early Stuart color world, a world with which Boyle was also familiar, but which took on a new significance from the viewpoint of a duller Interregnum palette. Beale described himself as a quondam "favorite" of both the provost at Eton, Sir Henry Wotton (1568–1639; Wotton was also provost when Boyle attended the school) and of the magnificent arbiter of fashion and political fortunes at court, George Villiers, the Duke of Buckingham (1592–1628).[97] He thus enjoyed a privileged position for observing the colors of the old court.

> R. Bacons new Atlantis is full of blewes & yellowes. Sir. H. Wotton perpetuated darke-greene with a black trimming to all his Servants, & lov'd to see Nic Oudart in such colors. I know some Courtiers, that stuck fast to gold upon greene. For some yeares before the Wars, soe many of the Court Nobility gave blew & yellow or orenge tawny for liveryes: That their groomes seem'd to me very generally to weare fooles coates. One Gentleman had a peculiar credite to entice K. James & K. Charles his eye, esp. for ornaments on horse-back: For some yeares I have recreated myself & others in scanning the humours of Court & Country in Whithall & Westminsterhall. Wee could see which favourites gave the Law of coulours, & who were their apes.... Some had a harmonious genius to sorte colours in fit ornaments....[98]

This glittering world of powerful fashion quickly faded, however. Fashions grew more and more muted, as the parti-colored early Stuart cloth gave way to an earthy red and then to a light grey in the Interregnum. As Beale continued,

96 Hartlib, 1656, [29/5/102A]. "Dr or Mr Willis a leading and prime man in the Philosophical Club at Ox*ford*. Hee hath written a Tr*eatise* De Fermentatione and of Colours much *com*mended by Mr Aubrey." Willis' color theories appeared in *Diatribae duae medico-philosophicae quarum prior agit de fermentatione ... altera de febribus* (London: Roycroft, 1659).

97 Mayling Stubbs, "John Beale, Philosophical Gardener of Herefordshire Part I. Prelude to the Royal Society (1608–1663)," *Annals of Science* 39 (1982): 463–489. On Buckingham, see Peck, *Consuming Splendor, passim* and Christiane Hille, *Visions of the Courtly Body: The Patronage of George Villiers, First Duke of Buckingham and the Triumph of Painting at the Stuart Court* (Berlin: Akademie, 2012).

98 Royal Society, RB/3/6/4 [accessed via Hartlib Papers Online].

> In garments three yeares difference makes a Monster. The fallowe or red marle color, which was called my Lord Protectors Colour, would have been scorned by a scavenger, as soone as the light-grey came in fashion.[99]

Beale's reflections on this world are full of criticism of its sartorial and sexual mores (eg, "Sir Francis Pyle was famous for his painted Coach, piedbald horses, oblique buildings & vnnaturall lusts"). They also express a sense of loss and frustration. Nicholas Oudart (?-1681), whom Wotton loved to see wearing dark green and who had introduced Beale to London instrument-makers in his youth, had, as the former amanuensis of Charles I, become particularly inaccessible to Beale. Beale remarked in 1659, "If it were now lawefull to hold any kind of intelligence with Nic Oudart, I would only aske him Sir H Wottons Art of dressing Mushrooms, & I hope that is not High Treasone."[100]

While critical of the use of colored cloth to attract political notice, Beale was proud of the strides made in early Stuart color research. He agreed neither with Scaliger nor with Cardano on the nature of colors. "Both of them," he said, had much to learn from Sir Henry Wotton's researches into color using glasses tinged various shades, which could be used to explore color combinations. Boyle would later publish his own experiments compounding colors through tinged glasses.[101]

Wotton engaged in his color research with Sir Edmund Bacon (1566–1649), who married his niece, and who was nephew to Sir Francis Bacon and brother to the noted painter, Sir Nathaniel Bacon. In a letter to Edmund Bacon, Wotton attributed the technique of testing colors upon glass to one "Francesco." This was most likely Mayerne's brother-in-law, Gian Francesco Biondi (1572–1644), who was also a contributor to the famous Mayerne manuscript, Sloane 2052, and whom Wotton knew from his days as ambassador to Venice. Wotton informed Edmund Bacon how "*Francesco* hath made a proof of that green which you sent me; against which he taketh this exception, That being tryed upon glass, (which he esteemeth the best of tryals) it is not translucent; arguing (as he saith) too much density of the matter, and consequently, less quickness

99 Royal Society, RB/3/6/4 [accessed via Hartlib Papers Online].

100 Nov. 15, 1659, Hartlib, [62/25/2A].

101 Boyle, *Colours and Cold*, 115–6. See Hartlib, 1656, [29/5/71B]. "An Experim*ent* to make Colours out of herbes as hee shewed mee a glasse of color made out of rue. Mr Boyle."

and spirit then in colours of more tenuity."[102] Wotton also admired Edmund Bacon's own color innovations, sending his protegé Oudart, for example, with flints to Bacon to be colored into agates by Bacon's process, praised by Wotton as a "miraculous invention."[103]

Beale was privy to the philosophical conversations of Wotton and Bacon, and he treasured the vanished colored world of Wotton's researches.[104] In a 1659/1660 tract on pearls, Beale fondly recalled how when he was "an Eton Scholar," researching oysters with Wotton, he had been given a large oyster whose "very beautifull mother of pearle" showed "all the colors of the rayne bowe, the grasse greene & bright purple interchanging, like those colors in changeable taffata."[105] Beale informed Hartlib that the "the Dutch man of Embden [Abraham van Linge], who glased the chappell of Ch*ri*st Church, complained that wee had lost *tha*t true ultramarine tincture, w*hi*ch S*i*r H.W. shewd him in a glasse, w*hi*ch is nowe in my custody."[106] The survival of van Linge's "popish" stained glass windows of Christ Church through the Interregnum was itself precarious.[107] Beale's preservation of Wotton's ultramarine glass, passed from Wotton to van Linge to Beale, represented a cherished surviving shard from a broken color world.

Beale himself mostly experimented with color through the even more transient medium of flowers. He transplanted tulips and other flowers to various soils in order to transform their colors, which he described in ethereal terms of the colored glass combinations used by Biondi and Wotton. He was able, for instance, to train one tulip "fro*m* her deepest purple to a fady blewe *tha*t hath a very small inclinatio*n* to a blush, as if a peach colord glasse & violet colord glasse

102 Ibid, 157. On Biondi and Wotton, see Trevor-Roper, *Europe's Physician*, 203, and on his contributions to Sloane 2052, Trevor-Roper, 341. Mayerne also recorded techniques of glass-painting. Sloane 1990, 85r, "Ars pingendi in vitro" and 86, "colores in vitro." See also Sloane 2052, 141, "Artifice pour faire les vitres de taffetas représentants celle de verre que sont aux églises."

103 *Letters of Sir Henry Wotton to Sir Edmund Bacon* (London: Printed, by R.W. for F.T., 1661), 130. "My servant Nicolas and I hope to send you some good Flints to be Agatized by your miraculous invention."

104 In a letter of January 18, 1658, John Beale fondly recalled the "phansicall discourse" he had overheard Sir Edmund Bacon share with Wotton. Hartlib, [51/57A].

105 John Beale, *Discourse On Pearl-Bearing Shellfish* in Hartlib, [25/17/1A-16B], here at [25/17/7A]. Beale goes on to recall ([25/17/15B]), how an oyster and other things might be petrified, as "Sir H Wotton hath shewed to all that saw his Study."

106 21 May 1658, Beale to Hartlib, [52/61B].

107 Julie Spraggen, *Puritan Iconoclasm during the English Civil War* (Woodbridge: Boydell, 2003), 240.

were ioynd together."[108] Extending his color research across the realms of art and nature, he found it a "gentile delight to observe, howe the same tinctures doe sort in *th*e severall receptacles of mettalls, iewells, feathers, silke, flowers &c."[109]

After the founding of the Royal Society, the research exchange on inks and dyes previously brokered by Hartlib continued. Notably, however, the Restoration marked an about course in Beale's views on the luxuriousness of color. While during the 1650's Beale had professed to prefer the multi-colored book to richly dyed cloth, in the Restoration, Beale defended luxurious dyes. He denied the Interregnum view that "silken Gentry" were not patriots, since, Beale contended, they added "luster to the nation," promoting emulation, ingenuity, and the improvement of the arts.[110]

Beale re-circulated his work on the purple dye, tried to republish Canepari's work (which was published in London in 1660 by John Martyn), and also circulated "a tract by his nephew Peter Smith on Flemish and French techniques for bleaching linen."[111] He offered the Society accounts of making parchment, vellum, and ink, and even donated to the Society a dozen sample pieces of parchment made by the process he recorded.[112] He wrote to Boyle in 1663 urging the improvement of "drapery" and the "dyers Arte."[113] In 1666, he also corresponded with Boyle about the best material form Boyle's published works should take.[114]

## 7 De Vaux and the Entrance of Mayerne's Papers to the Archive

Such were the current lines of color research, tenuously drawn forward from the vanished world of early Stuart experiment through the Interregnum

108 21 May 1658. Hartlib, [52/62B]. Nehemiah Grew would later discuss transplanting tulips for color changes. On Grew, Roos, "Saline Chymistry," 586.

109 Hartlib, [52/61B].

110 Beale to Boyle, 21 November 1663, Boyle, *Correspondence*, Vol. 2 (2001), 209.

111 Mayling Stubbs, "John Beale, Philosophical Gardener of Herefordshire Part II. The Improvement of Agriculture and Trade in the Royal Society (1663–1683)," *Annals of Science* 46 (1989): 323–363 (on p. 347). P. M. Canepari, *De atramentis cujuscunque generis* (London: Martyn, 1660).

112 John Beale, "The Art of making Parchment, Vellum, Glue etc." Royal Society, ClP/3i/18. Read to the Society on 25 May 1664. Beale records the techniques of Matthew Willes alias Coxe of Yeoville, who "makes the best Parchment in England. Challengeth the beste in the World." John Beale, "How to make good ink and how to make gunpowder." Royal Society, ClP/17/12.

113 Beale to Boyle, 21 November 1663, Boyle, *Correspondence*, Vol. 2 (2001), 208.

114 Yeo, *Notebooks,* 146.

by Beale, Boyle, and others, when De Vaux was elected to the Society (proposed as a member by John Wilkins) on May 24, 1665. He brought in his first Mayerne paper, on "worms bred in the teeth of men" at the very next meeting of the Society.[115] de Vaux's candidacy had been unusually contentious. He had been proposed as a member first in 1661 but was then "oppos'd & not admitted."[116] Mayerne's papers offered a means for de Vaux to prove his worth. The other Fellows were eager for more Mayerne papers, and he was requested to communicate to the Society, "what other considerable papers he had of Sir Theodore Mayerne for the purpose of the society," which he proceeded to do.[117] He did so, however, in a piecemeal fashion, continually illustrating his usefulness to the society by producing Mayerne manuscripts until shortly before his own death in 1694. Via de Vaux, the deceased Mayerne participated, as it were, in Royal Society meetings for nearly thirty years. He even, via de Vaux, had articles published in the *Philosophical Transactions* nearly forty years after his death.[118]

De Vaux's access to Mayerne manuscripts resurrected a world familiar to many Royal Society Fellows. Many Fellows shared old ties with Mayerne; Sir William Brouncker (1585–1645), the father of the Society's first present, had helped found the Distiller's Company with Mayerne in 1638.[119] The young Walter Charleton (1619–1707), elected to the Society in 1663, had most likely been Mayerne's assistant.[120] Prince Rupert of the Rhine (1619–1682) and

115 Thomas Birch, *The History of the Royal Society*, Vol. 2 (London: Millar, 1756), 42. May 3, 1665, "Sir Theodore de Vaux, knight was proposed candidate by Dr. Wilkins." 45. May 10, 1665, "Sir Theodore de Vaux was elected." 49. May 24, 1665, "Sir Theodore de Vaux was admitted."

116 Hunter, *The Royal Society and Its Fellows, 1660–1700*, 7 and 172.

117 Ibid, 52. May 31, 1665, "Sir Theodore de Vaux produced a Latin paper of Sir Theodore Mayerne, concerning worms bred in the teeth of men." Ibid, 60. On June 28, 1665, de Vaux presented a Mayerne paper on preserving timber from being worm eaten, and on preserving beef. "Which paper was ordered to be filed up." Royal Society, ClP/3i/24.

118 Theodore de Mayerne and Theodore de Vaux, "An Account of the Diseases of Doggs, and Several Receipts for the Cure of their Madness, and of those Bitten by them. Extracted from the Papers of Sir Theodore Mayern, and Communicated to the Royal Society," *Philosophical Transactions* 16 (1686): 408–410, and Theodore de Mayerne and Theodore de Vaux, "A Discourse of the Viper, and Some Other Poysons, Wrote by Sr. Theodore de Mayerne, after Discoursing with Mr. Pontaeus. Communicated by Sir Theodore de Vaux, M. D. and S. R. S," *Philosophical Transactions* 18 (1694): 162–166.

119 Webster, *Great Instauration*, 254.

120 Emily Booth, *"A subtle and mysterious machine": The Medical World of Walter Charleton (1619–1707)* (Dordrecht: Springer, 2005), 10.

Sir Nicholas Crisp (?–1666) were among Mayerne's personal informants.[121] Individually, Fellows also sought Mayerne manuscripts. Sir Robert Paston (1631–1683) acquired a Mayerne manuscript sometime before 1668.[122] Martin Lister, raised by Mayerne's friend and colleague, his uncle Sir Matthew Lister, later sought out Mayerne manuscripts in Paris in 1692.[123]

Mayerne's research had also been invoked from the early meetings of the Society. While the group was still meeting in Gresham College, Kenelm Digby would recall the delight he and Mayerne used to share within that very building, when together they observed Hunyadi's chymical precipitations that "designed" plants "more exactly" than "any Painter" could.[124] Just the previous week, Jonathan Goddard, who collected Hunyadi's chymical research (including into the color purple), read a paper to the fledgling group on the production of colors through the mixture of "liquors."[125] A living link to Mayerne's color world was restored when De Vaux successfully proposed Nicholas Oudart (what had been so out of reach to Beale in 1659) as a Fellow in 1667.

Mayerne's papers on color would have been highly desirable, as Fellows of the Royal Society sought and lacked access to materials on color. John Evelyn's early volume on mechanical trades is mostly empty; his entry for "dier" is blank, and "painter" has one and a half pages of recipes.[126] William Petty, the son of a clothier, is often cited as contributing importantly to dyeing as part of the History of Trades program. His 1662 "Apparatus to the History of the Common Practices of Dying" was included in Thomas Sprat's *History of the*

121 Trevor-Roper, *Europe's Physician,* 346 and 215.

122 Donald Dickson, "Thomas Henshaw and Sir Robert Paston's Pursuit of the Red Elixir: An early Collaboration between Fellows of the Royal Society," *Notes and Records of the Royal Society of London* 51,1 (1997): 57–76 (on pp. 61–2). Thanks to Michael Hunter for this reference.

123 Trevor-Roper, *Europe's Physician,* 373.

124 Kenelm Digby, *A discourse concerning the vegetation of plants. Spoken by Sir Kenelme Digby, at Gresham College, on the 23. of January, 1660. At a Meeting of the Society for promoting Philosophical Knowledge by Experiments* (London: Dakins, 1661), 77–78.

125 Jonathan Goddard, "A brief experimentall Account of the production of some Colours by mixture of severall liquors either having little or no colour or being of different colours from those produced." Read to the Royal Society on 16 January 1660/1. Royal Society, ClP/2/25. Special thanks to Sietske Fransen. For Hunyadi's research in a volume owned by Jonathan Goddard, see eg BL Sloane 1139, 170 to 171 verso.

126 British Library Additional MS 78339. On this volume, see Michael Hunter, "John Evelyn in the 1650s: A Virtuoso in Quest of a Role," *Science and the Shape of Orthodoxy: Intellectual Change in Late Seventeenth-Century Britain* (Woodbridge: Boydell, 1995), 67–98. A later collection, Additional MS 78340, is much fuller.

*Royal Society.*[127] Yet even Petty appeared to lack desired sources. As he confessed, "of Cummin-seed, Fenugreek-seed, Senna, and Agarick, I have as yet no satisfactory accompt."[128] He was not able to access any Indian information about calico, that "gainfull Mystery."[129] The materials used in Indian painting and dyeing remained on the Society's query list for the East Indies.[130]

Yet de Vaux did not immediately bring in Mayerne's papers on pigments. He first submitted Mayerne's papers on preserving timber and beef, tallow-chandling, and wax candles.[131] It was Thomas Povey who seems to have precipitated de Vaux's hunt for Mayerne's color research in particular, when, during the meeting of April 18, 1666, Povey discussed the painter John Streeter's technique for preventing glare upon his paintings.[132] Soon thereafter, De Vaux located a series on colors in Mayerne's papers. On May 23, 1666, he "produced some papers about coloration." When the Society received this file, it was ordered that de Vaux and seven other individuals, the "rest of the physicians of the Society" as well as Daniel Coxe, Robert Hooke and Mr. Oldenburg (or any two or more of them), form "a committee to consider of the said papers, and to cause them to be translated into English from the French, that so they might be the better digested afterwards." As Felicity Henderson has pointed out, this reference to digestion suggests a desire to make active use of the contents of the papers in the future.[133] The committee was to meet the next Monday at the home of Sir George Ent.

Strangely, however, Mayerne's name was not mentioned. Henry Oldenburg excitedly informed Robert Boyle that "Sir Theodore de Vaux produced some papers about coloration," which were "Drawn up by a very famous and curious physician from the mouth of the most knowing and experienced dyers of

127 Royal Society, ClP/3i/6. "An apparatus to the History of Common Practises in Dying," read to the Royal Society on 7 May 1662. Discussed in Theodore McCormick, *William Petty and the Ambitions of Political Arithmetic* (Oxford: Oxford University Press, 2010), 149, note 123. See also British Library MS Additional 72897, 1–37, with recipes in the Petty papers, partially in French, for scarlet, red crimson, crimson tawny, crimson violet, orange crimson, purple, and tawny.

128 Thomas Sprat, The *History of the Royal-Society of London* (London: Martyn, 1667), 294–5.

129 Hartlib, [71/9/1A].

130 Daniel Colwall, John Hoskins, and Henry Oldenburg, "Enquiries for the East Indies," RBO/1/50.

131 ClP/3i/24–26 on preserving wood, salting beef, making fire from coalballs, and tallow candles, respectively. On sugar and soap, see below.

132 Birch, *History,* Vol. 2, 84.

133 Felicity Henderson, "Faithful Interpreters? Translation Theory and Practice at the early Royal Society," *Notes and Records of the Royal Society* 67,2 (2013): 101–122.

Holland and England in his time," but he did not identify the physician.[134] Even though his distinctive monogram can be found all over his papers, nowhere is Mayerne's authorship noted in the surviving papers on color in the Royal Society. Such silence might be connected to the lawsuit in which Colladon and de Vaux were engaged from 1664 to 1680 regarding finances as well as the rightful ownership of Mayerne's papers. Their battle continued for so long that, after de Vaux had a two volume edition of Mayerne's medical cases printed in 1690 and 1696, the Colladons brought out a rival volume in 1700, drawn from their own cache of Mayerne manuscripts, and in which they lambasted de Vaux after his death.[135] While earlier Mayerne papers in the Royal Society were attributed to Mayerne (eg, the paper on worms bred in the teeth of men noted above), it is notable that Mayerne papers were not published in the *Philosophical Transactions* until after the conclusion of the lawsuit (in 1686 and 1694).

## 8 Digesting the Papers

Mayerne's papers on dyeing examined by the committee were originally enclosed in a paper wrapper, labeled on the front, "Sr. Tho. de Vaux/ several papers about dying/ See June 13. 66," and on the back, "These Papers about Dying were set here in one Parcel by a former Committee." When formerly filed up by Mayerne, the papers had been folded in thirds with a label on the exterior of each grouping.[136] Mayerne's more formal volumes now in the British Library, such as Sloane 3423, also have bound into them some original papers once folded and labeled in the same manner, ghosts of Mayerne's past archiving techniques.[137]

134 Birch, Vol. 2, 93. F. W. Gibbs identified Oldenburg's reference as Sloane 1990, another manuscript of Mayerne's on inks and dyes, but Oldenburg certainly referred to the newly identified cache of papers in Classified Papers 3i. F. W. Gibbs, "An account of a manuscript entitled 'saponis artificium,' " *Journal of the Society of Chemical Industry* 57,37 (1938): 877–8.

135 Theodore de Mayerne, *Praxeos mayernianae in morbis internis praecipue gravioribus & chronicis syntagma, ex adversariis, consiliis ac epistolis ejus, summâ curâ ac diligentiâ concinnatum* (London: Smith, 1690 and 1696). Theodore de Mayerne, *Opera Medica* (London: Browne, 1700).

136 For example, ClP/3i/31 is labelled on the exterior, "Fletcher 13 September 1639/ Escarlatte sur soye avec Safflor et Annatto./ Pourpe avec Long Cochenill & cognee d'huistres/ Tanné/ Aurange/ Speculation sur la teincture de la soye en Escarlatte avec Cochenille./ II."

137 Sloane 3423, 40v, labelled "Noirs avec bois violet pour teindre les peaux et chapeler francois … 1640" and Sloane 3423, 42, "Reiteration de l'operation sur la Cochenille Longue etc. faicte tres exactement a Chelsay par Mr. Fletcher 17 Januier 1640."

The committee set up to review the papers composed a thorough table of contents, lettered A-V (see Appendix), accounting for each sheet and assigning individual items to members of the committee for translation and examination (although Oldenburg and Colwall seemed not to have been burdened with any).[138] They gave each paper a title, sometimes drawing on Mayerne's own labels. The current file includes both original papers and some translations. Some papers seem to have been included by mistake, such as one on making bullets for an arquebus from [Gedéon] Chabray.[139] Many of the papers in the group deal with the Küffler scarlet. They include a list of 6 inventions "not previously practiced in England," dated to 1639, all pertaining to scarlet; "no man in this land hath the arte," notes Mayerne. "What he hath seen and heard of M. K" is apparently an informant's description of the Küffler dye works (Fig. 2.3).[140]

The translations of the papers assigned to de Vaux and to Ent now remain in ClP/3i/30 (see Appendix). de Vaux checked these translations with the original again; on June 13, 1666, "Sir George Ent brought in the translation of those papers communicated by Sir Theodore de Vaux about coloration, which had been committed to Sir George's care; and Sir Theodore de Vaux took them with him again, in order to compare them with the original book."[141] Yet the next year, the originals were out of de Vaux's hands again and apparently some were in the meantime lost. After a break of some time, perhaps due to the intervening Great Fire, on October 10, 1667, "Sir Theodore desiring, that the papers formerly brought in by him about coloration might be called for, and the members, who had undertaken the translation of them into English, spoken to about it, Mr. Oldenburg said, that some of those papers were already translated; but that those, which were committed to the care of Dr. Quatremain and Mr. Daniel Coxe, were not yet accounted for; and that Dr. Quatremain being since dead, those persons, who knew how his effects were disposed of, might be desired to inquire after that part of the said papers, which was referred to him."[142] Indeed, items listed in the index to the file, such as "Le Pape his

138 Michael Hunter notes this committee and its index in *Establishing the New Science: The Experience of the early Royal Society* (Woodbridge: Boydell, 1989), 95.

139 Included within ClP/3i/31. The illustrated instruments depict a perforated piece of cardboard, and indeed, such a perforated piece is included, unbound, within the volume of Classified Papers 3i. Chabray was Mayerne's amanuensis and assistant. Trevor-Roper, *Europe's Physician,* 401.

140 ClP/3i/30.

141 Birch, Vol. 2, 97.

142 Birch, Vol. 2, 199.

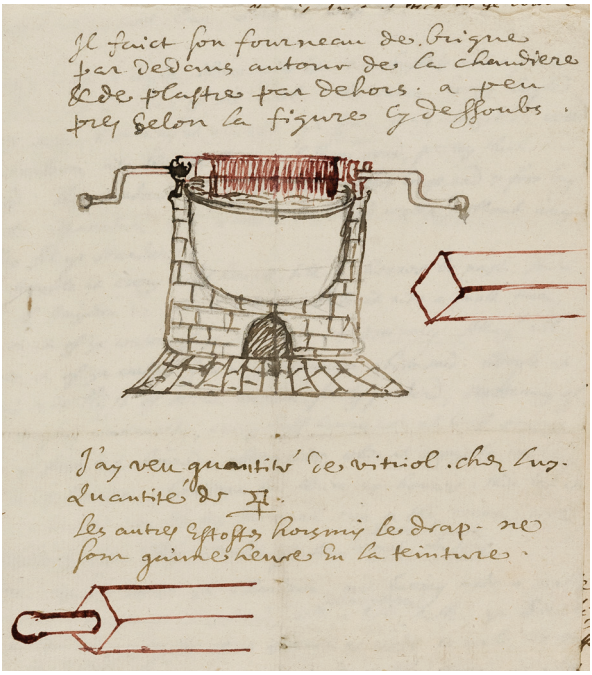


FIGURE 2.3 *Royal Society, ClP/3i/34. A report on scarlet dyeworks.*

paper," assigned to Dr. Quatremain, and "Dr. Cherevix propriò ore," assigned to Dr. Coxe, appear now to be lost.

Robert Hooke apparently also did not return the translations committed to him, or else he retrieved them from the Mayerne bundle at a later date. Further translations of Mayerne papers remain now among Hooke's papers, as Michael Hunter has pointed out to me. Classified Papers 24/80 include copies and translations of many items discussed by the 1666 dyeing committee.[143] As was the case for the translations remaining in ClP/3i/30, those by Hooke also paid close attention to the form of the original, retaining, for instance, Mayerne's monogram, manicules, and marginalia (Fig. 2.4). This was a far closer translation than was standard, according to Henderson's account of early Royal Society translations.

143 The relationship goes both ways; ClP/3i/30 also contains a brief resume of the contents of ClP/24/80. For instance, in ClP/31/30, "To dye Spanish skins red and yellow. Tincture of Stockings" is noted. The recipes for those items can be found at ClP/24/80/168.

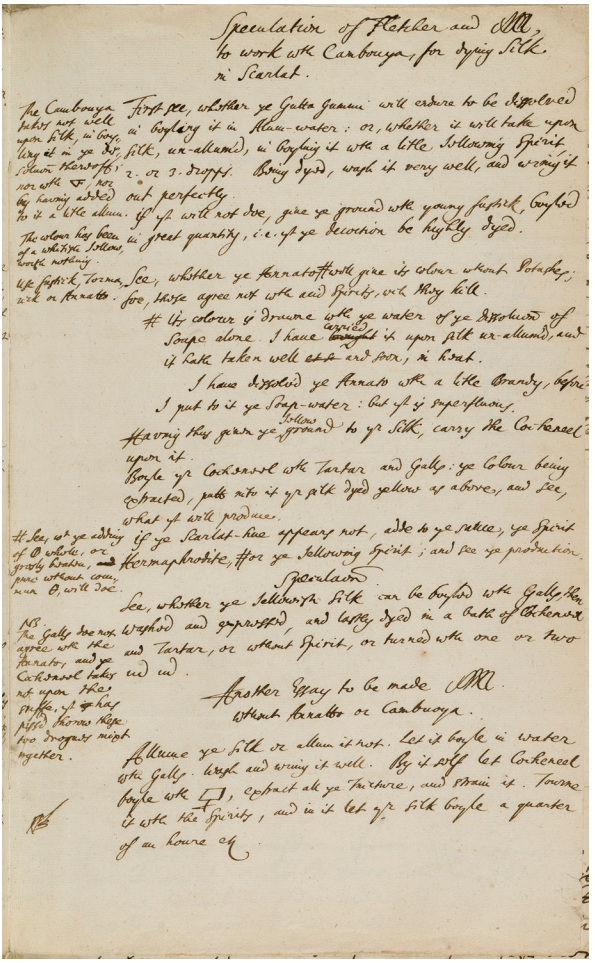

FIGURE 2.4 *Royal Society, ClP/3i/38. The English translation includes Mayerne's monogram, manicule, and marginal comments. In the original, the first paragraph was crossed out in purple ink, but no sign of the crossing out appears in the translation.*

## 9 De Vaux and Povey: Personal Rivalry and Archival Buildup

Given the bitter relations between de Vaux and the Colladons, it must have seemed quite a threat to de Vaux when Thomas Povey proposed that Jean Colladon be elected to the Society on April 2, 1668. Colladon was not elected.[144]

144 Birch, Vol. 2, 261. April 2, 1668. "Sir John Colladon was proposed candidate by Mr. Povey." Colladon was not elected. Michael Hunter, *The Royal Society and Its Fellows, 1660–1700,* 12 and 59.

Povey's promotion of Colladon might indicate that the two spurs of artistic research of Povey and de Vaux were competing within the Society. Povey too was nostalgic for a lost courtly connoisseurship, writing "lyrically of the lost collections of Charles I" in a 1667 report to the Royal Society.[145] We can only speculate about this competition, but Povey and De Vaux's various suggestions for recovering knowledge of artistic techniques do appear to follow hot on the heels of each other.

Povey had first discussed Streeter's new paint in April 1666. In May, de Vaux brought in the file of Mayerne papers on color, by far the largest cache of Mayerne papers he ever introduced at one time. In August, Povey brought in a trial of Streeter's paint, which was assigned to Dr. Charleton, Mayerne's former assistant, for further research.[146] The very next week, De Vaux brought in another Mayerne manuscript, "a paper of enlumineure, which was recommended to Mr. Evelyn to peruse, and to give the society an account of. He mentioned the art of enameling of Mr. Petitot, and promised to use his interest to procure an account of it for the society."[147] Mayerne had worked with Jean Petitot (1607–1691) in developing new red enamel paints that could depict flesh tones in miniature enamel portraiture. The Colladons, rather than the De Vaux, had access to Mayerne's collaboration with Petitot on enamel. de Vaux suggests here that he would attempt to obtain the technique directly from Petitot.[148] When the Society issued personal *desiderata* lists to its members, Sir Theodore de Vaux was ordered by the Society to fulfill only one *desideratum*: "Sr. Th. de Vaux. Promised to use his interest in procuring from Mr. Petitot the Art of Enamelling, for the Society. Aug. 22. 1666."[149] The same day, John Evelyn was assigned the *desideratum*: "Sr. Th. de Vaux paper of Enlumineur recommended to the perusal of Mr. Evelyn. Aug. 22. 1666."[150]

145 Peck, *Consuming Splendor,* 337.

146 Birch, Vol. 2, 107. Charleton's examination of Povey's technique was also on the *desiderata* list assigned to him by the Society. DM/5/72.

147 Birch, Vol. 2, 111. See Sloane 2052, 40r, "Enlumineure," from Edward Norgate. Trevor-Roper, *Europe's Physician,* 338, describes a Mayerne manuscript recording a " 'curious method of using enamel and colours in illumination,' 'as it is done in Limoges'.... This method, say the writers, 'is private to ourselves and must not be indulged.' " Trevor-Roper also described Mayerne's notes on Petitot's "secret" of enamel which is likewise "not to be divulged [ne doibt estre divulguée]."

148 Ibid, 344, for Mayerne's work with Petitot on enamel.

149 DM/5/74B.

150 DM/5/74A.

de Vaux's presentation of the method of illumination immediately then "gave occasion" for Povey to mention that the painters of his acquaintance, Lely, Cooper, and Streeter, would be not be "unwilling to communicate to them the several curiosities and varieties of painting." A committee of nine members was ordered, including both de Vaux and Povey, to consider "what particulars were fit to inquire into, and therupon to discourse with the said masters concerning the same."[151] This attempt to bring de Vaux and Povey together with others for an inquiry into painting techniques does not appear to have progressed.[152] On December 12, 1667 Povey again advised that a further enquiry might be made into "other sorts and ways of paint in oil, distemper or dry colourings … that it may not be said by the malicious, that you discourse and make flourishes, and subsist chiefly upon what is delivered to you by them, that lived before you." Could this be a reference to the Mayerne papers? Povey suggested that the Society collectively compose a single volume on the history and progress of painting, including all possible ways of coloration, among which painting would be "chief and sovereign," yet which would also include, in an appendix, "several sorts of vernice; browning; staining; graving; etching, and perhaps some other necessary curiosities not foreign to this great subject."[153]

The competition between Povey and the ghost of Mayerne as resuscitated by de Vaux seems to have continued for years. For instance, On July 17, 1679, "Mr. Povey promised to bring in a receipt of making very pleasant, wholesome and strong ale, and as good as any. Thereupon Sir Theodore de Vaux promised to bring in a dozen receipts, which had been experimented by Sir Theodore Mayerne for making of ale of several sorts."[154]

For three decades, de Vaux continually brought piecemeal Mayerniana to the attention of the society. At first, these were medical in nature, yet they quickly came to reflect Mayerne's interest in crafts. They thus informed the Society's History of Trades program at its height. Even as De Vaux brought in Mayerne's papers on crafts, he continued to bring in papers on medicine, chemistry, and natural history, and after the decline of the History of Trades program, these remained his main focus.[155] In a letter of 16 April, 1694 to Robert Southwell,

151 Birch, Vol. 2, 111.

152 Peck, *Consuming Splendor,* 338.

153 Birch, Vol. 2, 227–8. Thomas Povey, ClP/2/24, "An Account of a Secrett in the use of Painting In answere to the Commands of the Royal Societie," 17–18.

154 Birch, Vol. 3, 496.

155 On August 29, 1666, de Vaux brought in a paper from Mayerne on the "nature of crawfish; which was ordered to be copied, and filed up, after the copy had been perused by Sir George Ent for his animadversions upon it, and additions to it." Birch, Vol. 2, 113. In

de Vaux was still promising "curious cases from the Collections of Sir Theodore de Mayerne."[156] A new batch of Mayerne papers on poisons was quickly forthcoming. Three papers from Mayerne were read to the Society on 18 April 1694, the last of which was a paper on hydropholica "communicated to Hans Sloane by Thomas [sic] De Vaux."[157] Perhaps it was de Vaux who alerted Sloane to the significance of Mayerne's collections, leading to Sloane's purchase of so many volumes from the Colladon sale in 1712. In May 1694, the last month of de Vaux's life, de Vaux brought in Mayerne's recipe for viper wine and account of viper bites (printed in the *Philosophical Transactions*), Mayerne's "History of serpents in the East and the West Indies," and Mayerne's "History of serpents and crocodiles."[158] De Vaux died on 26 May 1694, concluding a thirty-year career of bringing Mayerne's papers to the Royal Society's attention.[159]

## 10 Mayerne and Hooke

Individuals Fellows related to Mayerne's papers differently; Hooke engaged with them particularly intensively. de Vaux was ordered to transmit several Mayerne papers directly to Hooke (who had also been a member of the committee examining the papers on dyes). At the meeting of October 10, 1667,

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the spring of 1667 he brought in papers on sugar, soap, salt, and coal-ball production. On March 20, 1669, 372, "Sir Theodore de Vaux produced out of Sir Theodore Mayerne's collection a paper dated June 17, 1647, containing an account of an accident, which happened to one Mr. John Stevenson, who swallowed a bodkin, and after keeping it six weeks in his stomach voided it by the anus. It was read, and ordered to be kept on the file." In March and July, 1668, he brough in recipes for sealing wax, and both a particular Mayerne receipt for copperas as well as another collection of papers "about chemistry, which he had in his hands from Sir Theodore Mayerne. It was ordered, that they should be referred to the committee for chemistry." Royal Society, ClP/11i/9. Birch, Vol. 2, 311. July 3, 1668. I have not as yet identified Mayerne's papers on chemistry. Michael Hunter describes the Royal Society's eight standing committees, including the chemical committee, as lasting from 1663–5 in *Establishing the New Science,* 73–121, and not as late as 1668. "Remedies that Theodore Mayerne prescribed (for his children and the rest of his Family) against the biting of a Dog or Cat" was read on 2 November 1687, and a paper on this topic was published in the *Philosophical Transactions* in 1686. Royal Society, RBO/9/10.

156 De Vaux to Sir Robert Southwell. Royal Society, LBO/12/111.

157 Royal Society, RBO/9/9. RBO/9/11. ClP/14i/38. ClP/15i/50.

158 Royal Society, ClP/15i/45, ClP/15i/46, and ClP/15i/49.

159 William Munk, *The Roll of the Royal College of Physicians of London* (London: Royal College of Physicians, 1878), 333.

De Vaux brought in several papers concerning sugar (in French) and soap, which were delivered to Haak and to Hooke for use in writing the history of sugar-works and the history of soap-making.[160] On May 13, 1680, Hooke "produced three papers delivered to him by Sir Theodore de Vaux, being some of Sir Theodore Mayerne's, containing some account of the mixture of metals. They were ordered to be transcribed and the papers to be returned to Sir Theodore."[161] A year later, on May 18, 1681, Hooke also "read a translation, which he had made of a paper of Sir Theodore Mayerne, brought in by Sir Theodore de Vaux, about a method of staining agates." De Vaux was once again desired "to communicate some others of his collections of Sir Theodore Mayerne's papers: which promised to do."[162]

Although they do not include any holograph Mayerne papers, by far the most extensive transcriptions, over one hundred pages, from Mayerne's archive can now be found among the papers of Robert Hooke. Classified Papers 24/80 contains many of the items collectively studied by the committee on dyeing (see Appendix). The first half of Classified Papers 24/81 includes transcriptions of additional papers not discussed by the committee. The second half of Classified Papers 24/81 contains a partial transcription of Sloane 3423, beginning "En presence de Fletcher 11 Septem. 1639 Experiments et operations en matiere de teincture faicte par moy."[163] This is followed by the partial transcription of a now lost 99-page Mayerne manuscript on dyes, *Experimenta tinctoria ... 21 May 1639* (Hooke includes the original pagination). Hooke begins the transcription with a note, "Here the book beginneth" and "again to be transcribed Nov. 24 1669."

In *Experimenta tinctoria*, Mayerne drew on many of the same informants whose original papers were studied by the committee on dyes, such as Mr. and Mrs. Fletcher, de Lanoy, and Peter van der Couter (whose file on calico studied by the committee on dyes has been lost). He also drew on figures known from other Mayerne manuscripts such as the Colladons, the painter Mark Anthony

160 Birch, Vol. 2, 199. For sugar, ClP/19/29, translated from French. Hooke apparently lost the paper on soap. See Archibald Clow and Nan L. Clow, *The Chemical Revolution: A Contribution to Social Technology* (London: Gordon and Breach [1952], 1992), 117. F. W. Gibbs, "An account of a manuscript entitled 'saponis artificium,'" *Journal of the Society of Chemical Industry* 57:37 (1938), 877–8.

161 Birch, Vol. 4, 37. I have not identified these papers.

162 Birch, Vol. 4, 87. ClP/3i/41.

163 While Hooke supplies the pagination from the manuscript he transcribes, this does not match the pagination of Sloane 3423, indicating that he might have been copying another transcription.

of Brussels, and Pierre Antoine Bourdin, Charles I's master of horse, who informed Mayerne of techniques for dyeing horse skin, manes and tails.[164] He also sought out individuals who could inform him about global dyeing practices and materials. From Sir Nicholas Crisp, a future Fellow of the Royal Society who established English trade (including in slaves) on the Gold Coast, he learned of a "red wood of Guinea" used in dyeing black.[165] In 1648, an unnamed English surgeon who had "lived long in Goa" informed him about Indian methods of dyeing with the lac insect. Mayerne learned more about this material in 1650 from Captain Methold, the deputy governor of the English East India Company, who gave him an Indian dyeing receipt calling for five ingredients (gum-lac, the bark called "Lodur," the salt called "Sunchura," lemon, and limewater [calcium hydroxide]). Mayerne returned to his previous notes on lac to add a cross-reference to Methold's account and also speculated at length about the Indian "Sunchura" salt.[166] Mayerne had long been particularly curious about Indian mordants, showing a piece of printed calico to the Dutch dyer Jan Davidszoon in 1639 and asking him to speculate about what mordant had been used.[167]

Hooke, like many other members of the Society, was also interested in calico, and this shows in his decision about what to transcribe from Mayerne's works. Although his transcriptions were partial, he noted the contents that he was omitting, and he attempted to capture the three-dimensional nature of Mayerne's original files. In his transcription of loose Mayerne files, Hooke attempted to record the folding and filing system of the original. For instance, as Hooke noted in one case, one file had originally been labeled "on the outside of the paper" with the monograms of Mayerne and of Jean Colladon and the subjects, "Coccinea. Chameleon." As Hooke also notes, it contained "in the same paper" other material, including a dyed swatch that remains in the file. In his transcription of Mayerne's bound volumes, Hooke also attempted to portray how the volume contained folded files bound within it. Hooke noted within brackets, "a little scedule inserted between the 28 &29 page," and "a small scedule inserted within the former scedule," and again, "a paper lying

164 ClP/24/81. On Bourdin, see Trevor-Roper, *Europe's Physician,* 106 and 326.

165 Ibid*,* 215. Hunter, *The Royal Society and Its Fellows,* 160. R. Porter, "The Crispe Family and the African Trade in the Seventeenth Century," *The Journal of African History* 9,1 (1968): 57–77. ClP/24/82.

166 ClP/24/82 at #57. "vide in sequentibus circa haec materia a capitaneo Methwell." Captain "Methwell" or "Methuel," as Mayerne refers to him, became deputy governor of the East India Company in 1650 and lived in India for more than fifteen years, Mayerne noted on the third page of the unpaginated Classified Papers 24/82. See also Sloane 3423, 32v-33r.

167 ClP/3i/37.

between the 70 & 71 pages conteind between these marks {}."[168] Notably, however, Hooke's transcriptions did not capture the array of beautifully colored inks Mayerne had employed, for instance, in Sloane 3423. Yet, halfway through *Experimenta tinctoria* (from page 29 to 43 out of 99), Hooke briefly did employ what is now a pale purple ink, perhaps drawn directly from his own experiments with Mayerne's research.

Hooke's transcription of *Experimenta tinctoria* continues in what is now Classified Papers 24/82. Hooke concluded his transcription of this work with the note, "Finished the 6th of December 1669 at 7 at night." He immediately began transcribing another lost Mayerne volume, originally of 32 pages, entitled *Tinctoria Belgica*, in which Mayerne collected the work of a number of Dutch dyers. Hooke followed this with the transcription of a fourth volume, a French recipe collection perhaps originally assembled by Caspar Tomann of Zurich ("S. Gaspar Thoman), *Precepts for dyeing many sorts of things* (Praeceptes pour teindre plusieurs sortes de choses)."[169]

These transcriptions indicate that Hooke returned to the Mayerne material he had previously explored along with the other members of the 1666 committee on dyeing again in 1669 when he was undertaking his own research into dyes. Hooke's research began around October 21, 1669, when he brought to the Society "a piece of stuff stained by a way of his own contrivance which he hoped to perfect." Again on November 11, "Mr. Hooke produced a piece of calico stained after the way contrived by himself."[170] He was desired to proceed

168 ClP/24/82.

169 On Tomann, see Arnold Lätt, "Schweizer in England im 17. Jahrhundert," *Zeitschrift für Schweizerische Geschichte* 11 (1931): 316–352, and William Poole, "Theodoricus Gravius (fl. 1600–1661): Some Biographical Notes on a German Chymist and Scribe Working in Seventeenth-century England," *Ambix* 56,3 (2009): 239–252 (at n. 20). Tomann originally came to England to study in Oxford in 1600 (having previously studied in Zürich, Genf and Montpellier), but settled permanently in London. A chymist, Tomann came into conflict with the College of Physicians; he defended himself by claiming to only practice among foreigners. Margaret Pelling, *Medical Conflicts in early modern London: Patronage, Physicians, and Irregular Practitioners, 1550–1640* (Oxford: Clarendon Press, 2003), 185. Tomann was in touch with many visitors to London, signing the album amicorum of Friedrich Rechlinger in Oxford in 1603 (Bodleian MS Douce 244, 9v), of Francis Segar in London in 1609 (with the alchemical tessera, "Viridis linea omnia gyrat," Huntington Library Ms. 743, 338), and of the "mysteriarch" Joachim Morsius in London in 1620 (Stadtbibliothek Lübeck, Ms. hist. 4° 25,2, 397v). Caspar Tomann communicated the panacea of Mayerne to Ole Worm in 1630. Ole Worm, *Breve fra og til Ole Worm: 1607–1636*, vol. I, (Copenhagen: Munksgaard, 1965), 214 and 236.

170 Birch, Vol. 2, 396 and 401.

in these attempts, and on December 9, he brought to the Society's meeting further specimens of "yellow, red, green, blue and purple colours."[171] Thus, Hooke was actively experimenting with dyes while he busily transcribed Mayerne's collections, perhaps reflected in his unusual and sudden adoption of purple ink in his transcription of Mayerne's *Experimenta tinctoria*. Evidently, he felt that he had progressed in his color production. On January 13, 1669/70, he "brought in two specimens of staining better than those produced by him before." Perhaps drawing from Mayerne's notions about pre-mordanting, for these superior specimens, Hooke had determined "that the preparing of the cloth or stuff to be stained was a main thing in this work…."[172]

## 11 Mayerne as a Source of Experimental Method

While Mayerne's techniques seemed particularly of interest to Hooke, Fellows of the Royal Society did not only consider Mayerne's papers as a source of raw information for the writing of the history of trades. They also considered its experimental literary technologies. Robert Moray had previously criticized the Society's "promiscuous way" of experimentation and suggested a more organized approach.[173] At the January 25, 1679/80 meeting, while the mixture of metals was being discussed, the question arose again of "the best method of prosecuting experiments;" "Sir Theodore de Vaux queried, whether it would be agreeable to the society to bring in some accounts, which he had of experiments made by Sir Theodore Mayerne, that the society might examine, which of them were considerable and fit to be again examined. Upon which the society desired, that he would produce such papers, and spoke of appointing some persons to examine them."[174]

On February 5, 1679/80, "The method of making experiments was also farther discoursed of," and again, "Sir Theodore de Vaux was desired to bring in such papers, as he should think fit, and order should be taken to have them fairly copied into a book by themselves, that they might be perused; and that the papers, after having been copied, should be safely delivered to him again."[175] As the fellows were considering more methodical ways of prosecuting experiments, they envisioned a "fairly copied" separate book

171 Ibid, 411.

172 Ibid, 414.

173 On the "promiscuous way," Birch, Vol. 2, 132.

174 Birch, Vol. 4, 6.

175 Birch, Vol. 4, 8.

of Mayerne's experiments that they might consider as an experimental agenda. At the meeting of May 25, 1680, those present considered again whether or not Mayerne's papers represented a true experimental method, particularly with reference to Hooke's translation of Mayerne's paper on staining agates.[176]

The original paper "about a method of staining agates" is now Classified Papers 3i/41, and like the dyeing papers, is also not currently identified as Mayerne's. Mayerne's paper records the technique of Sir Edmund Bacon for agatizing flints that Wotton had so admired. Bacon's technique had already been brought to the Society's attention in 1662 by Sir Thomas Browne, who called it a "peculiar art."[177] Were it not for Mayerne's account, this widely celebrated technique would have failed to survive the Interregnum.

Bacon's artistic legacy was notably precarious. For instance, Samuel Hartlib commended Bacon for having "made a most compleate Laboratory in his House there w*i*th all manner of furnaces" but blamed him "for not choosing a right heire to his knowledges and ingenuities wherin hee excelled … Hee made a curious George out of Stone or Pebble, w*hi*ch hee gave to K*ing* Charles, w*hi*ch was much admired for the artifice of it."[178] In his will of 1648, Bacon left his nephew several such artificial stones, including an "achate with Queen Elizabeth's picture in it." The "particular combination of gifts and conditions" of this will, "set by a man who moved in royalist circles during the civil wars" has been seen as "an effort to transmit … the values of monarchy and the Church of England."[179] Both Queen Elizabeth and Saint George were immensely popular subjects of carved "agate" (a term employed for any carved gem in the period). Saint George was worn for daily use by members of the Order of the Garter, and by Charles I, who legendarily handed off his carved onyx George on the scaffold.[180] In passing the agate to the next generation, Bacon attempted not only to transmit an imperiled royalist image, but the courtly art in which it was literally imbedded.

176 Birch, Vol. 4, 87–8.

177 Thomas Browne, "An Account of Island, alias Iceland, in the year MDCLXII," *Works*, Simon Wilkin, ed., vol. IV (London: Pickering, 1835), 254–6; 255.

178 Hartlib, [29/5/17A].

179 Margery Kingsley, "Family, Inheritance, and Clarendon's *History of the Rebellion*," in *The Age of Projects,* Maximillian E. Novak, ed. (Toronto: University of Toronto Press, 2008), 29–50, 34. There is an artificially dyed agate portrait of Queen Elizabeth in the Victoria and Albert Museum, 1603–1855.

180 Julia Kagan, *Gem Engraving in Britain from Antiquity to the Present* (Oxford: Archaeopress, 2010).

Mayerne recorded the results of an interview with Bacon about his "*secret merveilleux*." He recalled how Bacon was able to make the image "enter into the stone (*entrer … dans la pierre*);" in one stone, Bacon had made a butterfly appear, and in another a spider, by using a "spirit of salt" without fire and by painting the stone on both sides. Bacon used "common pebbles" or flints, which when polished were as transparent as agates and chalcedony. Mayerne offered his own speculation about what Bacon's liquor might have been, with a reminder to himself to try it with the "*eau des deux frères*" (sal armoniac and saltpeter). Bacon also informed Mayerne that he had painted stones with a solution of a metal that created a landscape the color of the most beautiful silver. Mayerne offered his own "*fantaisie*" for the agatizing process, marked with his monogram. On the verso, Mayerne recorded further details he had learned following his "conference" with Bacon, such as Bacon's belief that nitre was a "great secret," his use of a fatty cheese to control the spread of his acid, of light colors that float on the surface made from different metals such as gold, silver, and copper, and of oyster shells as brushes. He noted that it would take six or seven months for the colors to penetrate in the winter, and much less in the summer. Mayerne also included a recipe in Italian for painting on agates sent to him from Italy by Nicholas Lanier (1588–1666) and further information from Bacon concerning pastes and artificial stones that could also take an impression and were very beautiful when dried and polished.

At the Royal Society's meeting of May 25, 1680, those present "concluded that the ways mentioned in the paper were only conjectures, and not the result of experiments; and that there were other ways of opening the bodies of stones, so as that they might imbibe colours, than by means of spirit of nitre, which would rather corrode a stone than sink into it."[181] Later investigators on staining stones would in fact use a spirit of nitre as the solution and metals for colorants.[182] More significantly, those present at this meeting did not believe that Mayerne's method of speculation and "*fantaisie*" represented a technique to be followed. The list of attendees was not recorded for this meeting, so we cannot know who was of this opinion or whether, for instance, de Vaux was present. Some at the meeting did affirm other aspects of Mayerne's paper, such as the suitability of English flints for the process. Yet, despite this mixed reception for Mayerne's paper on agatization, it is worth noting that at the moment when fellows of the Royal Society

181 Birch, Vol. 4, 87–8.

182 William Lewis, *Commercium philosophico-technicum: or, The philosophical commerce of arts* (London: Willock, 1763), 438.

were reviewing the proper method of prosecuting experiments, they did so in light of the cache of Mayerne manuscripts from which they had been drawing, via de Vaux, for the past sixteen years. Mayerne's papers in the Royal Society archive were considered not only for their content but also for their form.

This point is particularly worth considering given that the Royal Society is so often cast as following a Baconian program. The Society's interest in archives and record-keeping has been seen as intimately tied to that program.[183] Yet, the fact that the Fellows of the Society considered Mayerne as a possible experimental model, even if at this meeting they ended up rejecting him, illustrates that they were not satisfied with Bacon alone. They were aware that the early Stuart period offered other examples of experimental method, and they were eager to investigate those alternatives. They did so by considering the papers that de Vaux had brought into their collections, not only as a register of Baconian particulars, but as examples of Mayernian method.

## 12 Conclusion

Mayerne's larger-than-life personality saturates his papers, evoking his wide-ranging curiosity and his cosmopolitan networks all up and down the social scale, and offering a model of courtly experimental technique. *Archival Afterlives* offers a useful lens through which to explore De Vaux's career of representing Mayerne in the Society, as it allows us to come to grips with the ways in which archives are deployed to transmit personalities, allowing long-dead figures to continue to play a role in the social lives of those who copied, translated, stole, analyzed, re-filed, and competed with the papers of figures past. Mayerne's papers offer a view of a vanished color world, filtered through the lens of the passage of time and of sociopolitical upheaval. They can serve as a biographical object, allowing Mayerne's personality, social network, and style to have an afterlife in informing the establishment of a new aesthetic and culture of experiment.

If, according to Shapin and Schaffer, Boyle's literary technologies were intended to drain experimental reportage of personal subjectivity and interpersonal conflict, Mayerne's papers suffuse the archive with personality. From

183 eg. Palmira Fontes da Costa, *The Singular and the Making of Knowledge at the Royal Society of London in the Eighteenth Century* (Newcastle: Cambridge Scholars Publishing, 2009), 7.

Mayerne's papers to the Royal Society's system of registering inventions, early modern scientific archival practice is very much about assigning credit, dating discovery, and defending personal fame and profit.[184] It therefore highlights a proprietary self, at the same time as it offers that proprietary self a mechanism for interacting with other selves. [185] Mayerne was highly interested in his research, both financially and in order to preserve credit for his ideas. His possessive monogram was far from an abnegation of the self, just as his majestic style was far from a showcase of diffidence. He pursued lucrative crafts during a period of early Stuart projecting that was notoriously corrupt. Furthermore, the story of how various later individuals, like de Vaux, Povey and Hooke, engaged with his papers is one of conflicting personalities, agendas, and interests.

The story of his papers' afterlives highlights the social animus driving the build-up of the Society's archive, in the contentious and competitive relationships between de Vaux, Povey, and the Colladons. When gentlemen philosophers gathered together to interrogate Mayerne's papers, they did not enter a trustworthy sphere of matters of fact evacuated of subjectivity and interest. Their cognizance of this informed techniques for both deploying and neutralizing interest. On the one hand, De Vaux was desired to use "his interest" in unearthing Petitot's account of enamels for the Society's archive. On the other, assigning papers and trials to multiple individuals for cross-examination, such as Charleton's examination of Povey's trial and the examination of Mayerne's papers by the members of the committee on dyes and by Evelyn, Haak, Hooke, and Sloane, offered a means to remove trust in individuals from the equation. Social skepticism shaped the bureaucratic techniques devised for digesting both Mayerne's archive and the many other papers brought in to the Society.

## Appendix

Surviving files in Classified Papers 3i and 24 referred to in this transcription are footnoted when possible. Sometimes the letters and/or numbers assigned by the committee remain visible on the document. In other cases, the identifications are not as certain, nor do they exhaust the surviving papers. Thus, the lack of a footnote does not indicate that a file has not survived.

184 On the system of registration, see Adrian Johns, *The Nature of the Book: Print and Knowledge in the Making* (Chicago: University of Chicago Press, 1998), 486.

185 Cf. Jason Scott-Warren, "Early Modern Bookkeeping," 155.

**Meeting Minutes for the Committee for Dyeing, Royal Society, ClP/3i/27**

May 28
Committee for dying met at Sir G. Ents

Sir G. Ent
Sr. Th. de Vaux
Mr. Hooke
Oldenburg
mr. Coxe
Mr. Colwall
Dr. Quatremain

a paper containing ~~all~~ the names of colors A. 1. sheet. M. Hook[186]
A receipt for dying of all sorts of colors. B. 1. sheet. M. Hook[187]
Questions for Mr. Fletcher concerning Dying C. 1 1/2 sheet. Sr G. Ent[188]
~~Mr. Fletcher's experiments: 2 sheets~~
Materials and Vessels used for dyeing. D. 1 1/2 sheet written. R. Hook
Sir Th. Vaux—Fletcher Tincture upon silk and wool with supel. n.1 two sheets and a loose paper[189]
Fletcher Stratford Bow n. 2. in 1. sheet Sr G. Ent.[190]
Fletcher of indigo. in. 2. sheets n. 3. Sr. G. Ent.[191]
Fletcher dictavit, 4 in 2 sheets. Dr. Quatremain[192]
Fletcher no. 5 in 2 sheets. Sr. G. Ent.[193]
Experiments made by Fletcher n. 6 in 2 sheets. Mr. Hook[194]

186 ClP/3i/29, "Colors."
187 ClP/3i/27 includes several recipes by Le Myre, Mr. Taylor, and Lannoy.
188 ClP/3i/30, "Questions for Mr. Fletcher." ClP/24/80/165, "Questions propounded unto Mr. Fletcher."
189 ClP/24/80/ unpaginated, "1. Fletcher 28 Jan. 1640 teincture sur soye & sur laine avec fusell.... 2. Extension de misteca. exaltation du violet. du long cochinelle. speculation novelle de [Mayerne] sur la fixation & exaltation du long cochenille &c."
190 ClP/ 24/80/172. "Dictavit Fletcher. From Stratford Bow.... All above written was told me by fletcher Ap. 20 1639."
191 ClP/24/80/178. "For Indico Tincture. Fletcher."
192 ClP/24/80/169. "17 May Mr. Fletcher Dictated. Indico."
193 [?] ClP/24/80/166–168, "Mr. Fletcher Aug 1 1639. Chelsay. Logwood."
194 ClP/24/80/unpaginated. "Articles that Mr. Fletcher gave me in writing April 12. 1639," containing six items.

Dr. Quatremain. Notes upon Keflers operacion nr. 7 in 1 sheet.
Dr. Quatremain. Peter van den Couter. Callico and other cotton stuffes, blews, n. 8 sheet 1.
Fletcher of Cochenille and safflor n. 9. sheet 1. Sir Th. de Vaux[195]
Fletcher of Cochenille and Turmerick Sir. G. Ent[196]
Fletcher of Scarlate n. 11. sheet 1[197]
Jean Davids of Scarlate n. 12. sheet 1. written.[198]
Grappenroot. n. 13. sheet 1.[199]
Black foxes. n. 14. Sheet 1/2.[200]
Memento of Fletcher . . . . . E. sheets 2. Sr The Vaux[201]
Black of Flanders by Lanoy. F. sheet 1.[202]
Flecher de Tincturis. G. sheet 1.
Lanoy, Waloon Dyer. H. sheet 2. Th. de Vaux[203]
Two Experiments. I. sheet 1. Sr Th. de Vaux.
Indico Fletcher K. 2 quarto pages. Sr Th. de Vaux[204]
What he hath seen and heard of M. K. (L. sheet 1/2)[205]

195 ClP/3i/31, "Escarlatte avec Safflor." "Fletcher, 13 September, 1639." ClP/24/80/176. "The tincture of Safflowre Tho. Fletcher." "To make the fair scarlet with safflower." ClP/24/80/ unpaginated. "9. Fletcher dictavet et dixit 24 Aug. 1639. St. Martin Long Cochineel translation de safflor."

196 ClP/24/80/171, "ex ipsius ore. 14 August 1639. Fletcher. To dye wool with cochineel ….Turmericke."

197 ClP/3i/30, "Fletcher, 13 Sept. 1639. Escarlatte sur soye avec Safflor & annatto. Pourpre avec Long Cochenill & cognee d'huistres. Tanné. Aurange. Speculations sur la teincture de la soy en Escarlatte avec Cochenille. 11." The English translation is atClP/3i/38, "Fletcher 13 Sept. 1639. Scarlat upon silk with safflor and Annatto. Pourple with long Cochineel, and oystershels. Tawne. Orenge. Speculation upon the dying of silk and scarlat, with Cocheneel."

198 ClP/3i/34, "Jan Davids tencturier de Harlem, Teincture d'escarlate aux Cochenille, Avec Graine en poudre. Gutta gumii. Calico Imprimé. fiol de boeuf. Essay des choses teignantes. 15 September 1639.12." The English translation is at ClP/3i/37.

199 ClP/3i/34, "Grapproot singulieur, 20 Sepember 1639. 13."

200 ClP/3i/39, "Renards noirs."

201 ClP/24/81, "memento comme fletcher rougit."

202 ClP/3i/34, "Noir de Flandres" by "Mr. de Lanoy son teincturier à Londre. 4 May 1646. F." Lanoy's address is given inside as "southwarke, en Montague close."

203 ClP/3i/27, "Verdbrun avec Logwood de Mr. Lannoy. 1650." ClP/24/81/188v, "Mr. Lanoy Tincturier wallon en South wark. 17 1647." According to ClP/24/81, this was a Pierre de Lannoy.

204 ClP/24/80/169. "17 May Mr. Fletcher Dictated. Indico."

205 ClP/3i/35, "Ce que jay veu & appris de la bouche de M. K."

Four papers of ink. M.[206]
A Receipt to fix a cuve of Indigo N. sheet 1/2. M. Hook
Briot of metalline Colours. O. sheet 1/2 Sr G. Ent[207]
Articles of inventions not yet published. P. sheet 1/2.[208]
Le pape his paper. Q. sheet 1. Dr. quatremain
To take away all kinds of spots and to prevent moths. R. sheet 1/2 Sr The Vaux[209]
Opus of Fletcher 9 May 1639 S. sheets 2. Sr. G Ent[210]
Quaerenda. T. pag. 1.[211]
Experiments made upon ye tincture of Scarlate after Keflers way. Sheet. 1. U[212]
Dr. Cherevix propriò ore. sheets 3. all in one book. V. Mr. Coxe

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