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Masculine Knowledge, the Public Good, and the Scientific Household of Réaumur

by Mary Terrall*

ABSTRACT

In the Royal Academy of Sciences of Paris (founded 1666), expressions of a masculine culture of science echoed contemporary language used to articulate the aristocracy's value to crown and state—even though the academy was not an aristocratic institution as such. In the eighteenth century, the pursuit of science became a new form of manly service to the crown, often described in terms of useful knowledge and benefit to the public good [*le bien public*]. This article explores the connection of academic scientific knowledge to the domestic spaces where it was made and, in particular, to the household of R.-A. Ferchault de Réaumur, an exemplary academician. Although Réaumur had neither wife nor children, a complex net of affective ties, some of them familial, linked the members of the household, which accommodated women (the artist Hélène Dumoustier and her female relatives) as well as men (a series of assistants, many of whom eventually entered the academy). As head of this dynamic household, Réaumur produced not only scientific results but also future academicians.

Like virtually all Old Regime institutions, the Paris Royal Academy of Sciences was a bastion of male privilege, organized hierarchically to mirror the social and political structures in which it was embedded. As we would expect, the exclusion of women from the membership rolls did not have to be formally stipulated. As the academy and its governing ministers established modes of customary practices and intellectual style, prevailing notions of masculinity reinforced assumptions about who would be doing scientific work. Perhaps more to the point, these ideals worked to enhance the status of academicians living in a society based on rank and privilege. The academy operated as a small cog in the mushrooming apparatus of the absolutist French state, designed by the royal minister Jean-Baptiste Colbert in the 1660s. The early history of the institution, and the scientific work done under its auspices, unspooled in tandem with the consolidation of Louis XIV's power and the concomitant changes in the values and functions associated with nobility. This larger story about the fluctuating fortunes of the aristocracy, continuing beyond the reign of the Sun King and through the eighteenth century, lies well beyond the scope of this essay.¹ It is worth noting,

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¹ The literature is vast, but see esp. Jay Smith, *The Culture of Merit* (Ann Arbor, Mich., 1995); and the essays in Smith, ed., *The French Nobility in the Eighteenth Century: Reassessments and New Approaches* (University Park, Pa., 2006).

however, that expressions of the masculine culture of science in the academy often echoed language being used contemporaneously to define the nature and shifting valences of the aristocracy's relations to crown and state—especially the language of zealous service, social utility, the cultivation of talents, and reward for merit. When they argued for the economic and patriotic value of scientific knowledge, academicians were deploying a rhetoric that evoked aristocratic values of merit and service, even though their institution was not aristocratic as such. The pursuit of the sciences in this context became a new form of service to the crown, explicitly formulated to further “the public good” [*le bien public*].

In 1699, three decades after its founding, Louis XIV invited the academy to exchange its rooms in the royal library for “incomparably more commodious and more magnificent” quarters in the Louvre. Every Wednesday and Saturday afternoon, the anointed men of science gathered in these luxurious surroundings, seated according to academic status and seniority, to listen to their colleagues read papers on recent work and reports from distant correspondents. And twice a year they opened their sanctum to visitors who filled the galleries around the meeting room, “where the public could judge with its own eyes the form and utility of these meetings.”²

Unlike nearby scientific institutions, such as the Royal Botanical Garden and the Paris Observatory, where specialists and technicians worked (and often resided) on site, the Royal Academy of Sciences was a venue for the presentation, discussion, certification, and publication of knowledge that had been made elsewhere. In particular, the results read to the assembled group in the Louvre could not have been produced without facilities and other resources located in and around the homes of academicians.³ In these studies, laboratories, collections, and gardens, people who never set foot in the meeting room worked alongside academicians. Some of these people were themselves future academicians; others were artists, artisans, gardeners, medical students, or family members. The exclusive, and de facto masculine, academy thus depended on many kinds of personal, patronage, and intellectual relations that tied the institution to the places around the city (and sometimes beyond) where men and women with a variety of skills and aspirations worked alongside each other.

A great deal of scholarly attention has been devoted to Parisian salons as sites of philosophical and literary production frequented by both men and women. Originally the room where a hostess received her guests, the salon has come to designate quasi-institutionalized gatherings, each with its own local culture and rules, where intellectual and artistic matters were discussed alongside gossip and news. Some years ago, in my work on science in and around the Paris Royal Academy of Sciences, I explored the gendered distinction between participants and spectators. At times,

² *Le mercure galant* (1699), quoted in Ernest Maindron, *L'Académie des Sciences* (Paris, 1888), 28–9. For anecdotal evidence about everyday behavior of academicians at meetings, see Irène Passeron, “Une séance à l'Académie au XVIIIe siècle,” in *Histoire et mémoire de l'Académie des sciences: Guide de recherches* (Paris, 1996), 339–50. All translations from the original French are my own.

³ For a similar point about the early Royal Society, see Steven Shapin, “The House of Experiment in Seventeenth-Century England,” *Isis* 79 (1988): 373–404. Alix Cooper argues that domestic venues for science in the early modern period were superseded by the new scientific institutions starting in the late seventeenth century; my point here is that these institutions depended crucially on all kinds of work done in the home. See Cooper, “Homes and Households,” in *Cambridge History of Science*, vol. 3, *Early Modern Science*, ed. Katharine Park and Lorraine Daston (Cambridge, 2006), 224–37. For another example, from a very different cultural setting, of the connection between technical know-how, knowledge production, and the home, see Eugenia Lean, “Recipes for Men: Manufacturing Makeup and the Politics of Production in 1910s China,” in this volume.

feminized (though not by any means exclusively female) audiences played a crucial role in validating masculine science, and in enhancing the visibility and reputation of men of science.⁴ The interest and attention of elite female readers, interlocutors, and spectators enhanced the status of science, at a time when its practitioners were carving out a privileged niche for themselves by pushing the masculine values of utility and productivity.⁵ I associated the making of scientific knowledge with the homosocial space of the academy and situated important aspects of its reception in the less formal and mixed-gender salons, where women played a key role in managing sociability and intellectual exchange among their guests. Revisiting some of these issues in this essay, I complicate the salon-academy binary by paying attention to the making, rather than the representing and consuming, of scientific knowledge, and by recuperating the venues where experiments and calculations were performed, texts were written, and drawings were made. This means looking into the homes of academicians, where they worked when they were not attending meetings of the institution that gave them their scientific identity. By extending our understanding of the domestic to include studies, cabinets, and laboratories as well as drawing rooms, we may also be able to uncover ties that bound the people in these spaces to each other, as well as to the academy. Household dynamics contrasted with the homosociality and ritualized formality of the academy's proceedings, and this contrast will illuminate some nuances in contemporary understandings of the masculinity of science. In the more formal institutional setting—whether in the semiweekly meetings or in the pages of official publications—the aristocratically inflected values of service and utility colored the public, and masculine, face of science. At home, the organization of scientific work varied enormously depending on financial resources and family situation, as well as on personal proclivities and on subject matter.

Here I investigate the household of a consummate academician, René-Antoine Ferchault de Réaumur, whose career spanned the better part of half a century.⁶ A closer look at how he organized his home life around scientific work will point up some of the ways that masculine academic ideals played out in a domestic setting and will show in turn how the intellectual and interpersonal dynamics of the home fed back into the life of the institution. Réaumur worked on an impressive range of subjects over the years, from the locomotion of shellfish to regeneration in crayfish; from the strength of rope and spider silk to the management of forests; from thermometer design to processes for manufacturing steel, paper, and porcelain; from bees and their eminently useful wax to aphids, mayflies, and any number of other insects; and on to the artificial incubation of birds' eggs and taxidermy techniques. He hailed from the lower nobility in the Vendée region; though not enormously wealthy, he could nevertheless rely on his lands and his investments to provide a comfortable income.

⁴ Mary Terrall, "Heroic Narratives of Quest and Discovery," *Configurations* 6 (1998): 223–42; Terrall, "Gendered Spaces, Gendered Audiences: Inside and Outside the Paris Academy of Sciences," *Configurations* 3 (1995): 207–32; Terrall, "Salon, Academy, Boudoir: Generation and Desire in Maupertuis's Science of Life," *Isis* 87 (1996): 217–29. For female readers as spectators, see Terrall, "Fashionable Readers of Natural Philosophy," in *Books and the Sciences in History*, ed. Nick Jardine and Marina Frasca-Spada (Cambridge, 2000), 239–54.

⁵ Terrall, "Gendered Spaces" (cit. n. 4), 214.

⁶ For Réaumur's biography, see Jean Torlais, *Réaumur: Un esprit encyclopédique en dehors de l'Encyclopédie* (Paris, 1936); on his natural history, see Mary Terrall, *Catching Nature in the Act: Réaumur and the Practice of Natural History in the Eighteenth Century* (Chicago, 2014).

He maintained experimental facilities at home and gradually expanded his household to accommodate collections, equipment, and people (residents and visitors). Most of the scholarship on making natural knowledge in the home focuses on family groupings. Wives, daughters, and sisters assist in astronomical observations; women distill and compound medicines in their kitchens to treat their families and their tenants; sons might be trained to follow in their fathers' footsteps.⁷ In eighteenth-century Paris, well-established scientific families like the Cassinis and the Geoffroys and the Jussieus filled the roster of the academy with generations of astronomers, chemist-apothecaries, and botanists. Réaumur presents an interesting case because he explicitly chose a life of science as an alternative to fulfilling his default role as noble *paterfamilias*. When he moved to the capital as a young man, first to pursue his studies and then to seek election to the Academy of Sciences, he ceded his place as head of the family to his younger brother, who married and lived on the ancestral property in Poitou. Even after his brother died prematurely, leaving no children, Réaumur remained a bachelor—though he took over the management of his estates and spent six weeks in the manor house every year during academic vacations. Scientific pursuits took the place of marriage and the production of progeny, so that the family line was extinguished with his death. Before turning to the evolution of his household, with its constantly shifting cast of characters performing a variety of scientific work, let us look more closely at the gendered resonances of science in the academy, where Réaumur was a central figure.

USEFUL KNOWLEDGE

The rhetoric of useful knowledge, a central trope of academic discourse, marked science as masculine and justified the elite standing of the institution in the political landscape of the absolutist administrative state. As an arm of the state, and in the service of a mercantilist economic ideology, the academy functioned as both arbiter and creator of knowledge that was supposed to disseminate outward (and downward) and into the practices of entrepreneurs, navigators, doctors, colonists, and eventually, mediated by local gentry or parish priests, even artisans and farmers. This diffusionist ideal reflected the paternalist hierarchy inherent in the privileged institution and represented a particular notion of masculine knowledge. The academy's role as a reservoir of technological expertise available to the crown is a familiar story.⁸ Without rehearsing the specifics of technical consulting by academicians (in such areas as waterworks, navigation and shipbuilding, dyeing, steel production, evaluation of inventions, and forest management), for present purposes I simply point out that the language of utility marked science as a patriotic and masculine endeavor, to

⁷ Lynette Hunter and Sarah Hutton, eds., *Women, Science, and Medicine, 1500–1700: Mothers and Sisters of the Royal Society* (Stroud, 1997); Londa Schiebinger, "Maria Winkelmann at the Berlin Academy of Sciences: A Turning Point for Women in Science," *Isis* 78 (1987): 174–200; Deborah Harkness, "Managing an Experimental Household: The Dees of Mortlake and the Practice of Natural Philosophy," *Isis* 88 (1997): 247–62; Monika Mommertz, "The Invisible Economy of Science: A New Approach to the History of Gender and Astronomy at the Eighteenth-Century Berlin Academy of Sciences," in *Men, Women, and the Birthing of Modern Science*, ed. Judith Zinsser (DeKalb, Ill., 2005), 159–78.

⁸ Roger Hahn, *The Anatomy of a Scientific Institution: The Paris Academy of Sciences, 1666–1803* (Berkeley and Los Angeles, 1971); Robin Briggs, "The Académie royale des sciences and the Pursuit of Utility," *Past & Present* 131 (1991): 38–88.

be distinguished from the “frivolous” or “amusing” pastimes of the effeminate and unproductive rich. At the academy, the rhetoric of utility was especially in evidence on public occasions and in print, central to the institution’s *raison d’être* and the self-presentation of many members—even though the papers that filled the pages of the annual *Mémoires* did not necessarily translate directly into practical applications.⁹ At the inaugural public assembly, in 1699, the meeting room in the Louvre was packed with spectators, including “a small number of ladies” who chose to watch the proceedings from discreetly screened balconies. The Abbé Jean-Paul Bignon, scion of a powerful noble family and the architect of the renewed academy, presided.¹⁰ In his speech to the gallery, Bignon used unmistakably gendered language to contrast the sciences to the domain of the royal literary academy, the Académie française. In this equally exclusive learned body, poets and rhetoricians dealt in “the art of speech with all its pleasing ornaments,” while the sciences “aspired only to the truth.” Bignon warned the spectators that they might be in for some dry and unadorned discourse, since “it sufficed for the academy [of sciences] that the truth be useful and that it did not need to be pleasing.”¹¹ His audience would have recognized the gendering of artful speech and pleasure as feminine—the Académie française was generally regarded as intimately connected to the feminized world of Parisian salons. The contrast to the sciences pointed up the masculinity of truth and utility.¹²

Bignon imagined a revitalized academy that would serve the state while engaging the interest of an elite public and worked to realize his vision of the kind of knowledge appropriate for the academy, and the kind of man an academician should be.¹³ After about 1710, Réaumur served as his right-hand man, as a new recruit to the mathematics class of the academy. Over the course of a long career, Réaumur exemplified, in his research and in the conduct of his scientific life, Bignon’s ideal academician, eschewing theory for a profusion of experimental and observational projects, many of them geared toward economic or technological utility. This contemporary assessment of his character and his devotion to solving problems frames the scientific work in terms of aristocratic service: “Zealous for the public good, [M. de Réaumur] has willingly devoted his talents to objects, small in appearance, but which are directed to perfecting the mechanical arts, or to anticipating social needs. The means of making a new dye, of increasing the fertility of fields, of preserving woollens from moth infestations, of keeping eggs fresh for three or four months—such are the objects of

⁹ For a contemporary panegyric on the usefulness of the sciences, including the “abstract sciences,” see Bernard le Bovier de Fontenelle, “Préface sur l’utilité des mathématiques et de la physique et sur les travaux de l’Académie des Sciences,” in Fontenelle, *Oeuvres complètes*, ed. A. Niderst, 9 vols. (Paris, 1994), 6:35–50.

¹⁰ On Bignon’s family background, and his engagement with the administration of the academy over many decades, see David Sturdy, *Science and Social Status: The Members of the Académie des Sciences, 1666–1750* (Woodbridge, Conn., 1995), 222–6 and 367–74.

¹¹ *Mercure galant* (cit. n. 2).

¹² On the female audience for science, see Erica Harth, *Cartesian Women: Versions and Subversions of Rational Discourse in the Old Regime* (Ithaca, N.Y., 1992). Note that Bignon did not intend the gendered contrast to disparage the work of the Académie française, whose members, of course, were all men.

¹³ Bignon did not conceive or implement this vision single-handedly. He worked closely with the minister Maurepas, and the perpetual secretary Fontenelle, as well as with Réaumur and other academicians. For a similarly gendered vision of scientific identity in twentieth-century psychology, see Alexandra Rutherford, “Maintaining Masculinity in Mid-Twentieth-Century American Psychology: Edwin Boring, Scientific Eminence, and the ‘Woman Problem,’” in this volume.

his curiosity and of his work [*travail*].”¹⁴ This zeal to benefit the public, an idealized and selfless devotion to useful work, implied nobility as well as manliness.

Réaumur’s academic coming-of-age coincided with the revival of the academy’s encyclopedic project to describe and improve “the arts and trades,” and Bignon assigned him responsibility for this long-delayed work. A few years later he was asked to supervise a survey of the kingdom’s natural resources and industries at the behest of the Duc d’Orléans, regent of France during Louis XV’s minority.¹⁵ Although the *Description des Arts et Métiers* was not completed in Réaumur’s lifetime, he produced a steady stream of scientific papers based on material collected for that project and for the regent’s survey. He rose rapidly in the ranks at the academy, promoted to a pensioned position after only three years in an entry-level slot, and soon thereafter served as director for the first of many terms.¹⁶ In 1722, a generous supplementary pension, earmarked for expenses associated with his scientific work, singled out his work on forest management and metallurgy, as well as his contributions to the collective *Description des arts*.¹⁷ Frequently presenting his work in the public assemblies, he was very much in the public eye. In this context he articulated his own vision of the utility of the sciences, and the special connection between what he called “the curious and the useful.” “People often rush too easily to divide knowledge into the curious and the useful,” Réaumur argued in his treatise on steel. “This distinction is not as easy or as certain as we might think, especially in this matter [the properties of iron and steel]. The useful, when considered properly, always has something of the curious about it, and it is rare that the curious when followed carefully, does not lead to the useful.”¹⁸ He maintained this position in all areas of natural history and experimental physics, where applications might be less obvious than for methods of steel production. “Those who see the natural history of insects as nothing but curious diversions, and who would gladly put it into the ranks of frivolous amusements, do not know enough about its scope; we have sufficiently proved that there are few areas of research from which we can anticipate so many actual uses [*utilités réelles*] as research on insects.”¹⁹ Further, he pointed out that a narrow search for utility could be counterproductive: “We would like first of all something useful, and we do not recognize that we must be brought to it by degrees; is it not fortunate that curious observations can lead us there?”²⁰ In these methodological ruminations, Réaumur was deflecting curiosity toward the useful and away from frivolity. Although he did not explicitly label this curious-useful nexus as masculine, I would argue that we can read it as such, since he

¹⁴ “Idée des progrès de la philosophie en France,” *Mercur de France*, December 1754, 7–30, on 23–4.

¹⁵ On the *Description des arts et métiers*, see Charles Gillispie, *Science and Polity in France at the End of the Old Regime* (Princeton, N.J., 1980), 344–57; Geraldine Sheridan, “Recording Technology in France: The *Description des arts*, Methodological Innovation and Lost Opportunities at the Turn of the Eighteenth Century,” *Cult. Soc. Hist.* 5 (2008): 329–54. The documents generated by the “regent’s survey” have been published in full: C. Demeulenaere-Douyère and D. Sturdy, eds., *L’Enquête du Régent, 1716–1718: Sciences, techniques et politique dans la France pré-industrielle* (Turnhout, 2008).

¹⁶ Réaumur entered the academy as Varignon’s “student” in 1708; his accelerated election to a pension three years later skipped over the intermediate “associate” step.

¹⁷ The official decree establishing the pension and its justification is reproduced in “Brevet de pension de Réaumur,” *Archives historiques de la Saintonge et de l’Aunis* 15 (1887): 23–4.

¹⁸ Réaumur, *L’Art de convertir le fer forgé en acier, et l’art de faire d’adoucir le fer fondu* (Paris, 1722), iii–iv.

¹⁹ Réaumur, *Mémoires pour servir à l’histoire des insectes*, 6 vols. (Paris, 1734–42), 4:vii–viii. This comes in a discussion of the cochineal and kermes insects, used in medical remedies and in textile dyes.

²⁰ *Ibid.*, ix.

laid it out in opposition to the “frivolous amusements” and “diversions” in the passage just quoted. These value-laden terms can plausibly be interpreted as feminized, in the context of contemporary usage.

IDEAL AND REALITY

If the academy were to be useful to the crown and to society, its members would have to be productive. Ensuring that academicians did actually work was a challenge from the early days of the institution. Sometime in the 1720s, Réaumur drafted a document justifying the academy’s usefulness to the crown and arguing that lack of material resources was constricting scientific effort and output.²¹ Though the recommendations were not put into practice, the document articulated a vision of what men of science should do and how they should be rewarded. For our purposes, it is particularly revealing for the specific ways that Réaumur used gendered categories to express his ideal. As encouragement to take their obligations seriously, he argued, academicians needed sufficient financial means to devote themselves fully to scientific work. The crown could optimize its interests by rewarding academicians so that they would not need to find additional remunerative work. (The first two levels on the academic ladder came with no stipend [*pension*] at all.) “Is it fair that someone who applies himself to research important to the welfare of the state cannot hope to achieve some degree of fortune? The soldier, the magistrate, the merchant can expect recompense for their work; only the savant has no expectations [for reward] from his work.”²² Why not model the pursuit of scientific knowledge on those other masculine occupations that contribute to the kingdom’s security and prosperity, while bestowing honorable status on the loyal subjects who sit in the academy? In actuality, regardless of the honor and status conferred by membership, most academicians had other appointments or occupations: if they did not have personal fortunes, they were physicians, apothecaries, lecturers, hydrographers, engineers, or administrators.

Réaumur wanted his colleagues to be able to throw themselves into their scientific work as single-mindedly as he did himself, but he recognized that this would be impracticable without a change in the reward system. More than half his *confrères* could not afford to treat the sciences as more than “amusements”—and amusements or diversions, as we have seen, could easily devolve into effeminacy. “What works can we expect from savants constrained to pass their days on the streets of Paris when they should be [at home] working in their studies? Is a man who arrives home tired and distracted in any state to work at something that demands his full effort? Will he spend his nights doing experiments?” In short, under the existing system, very few had the option of pursuing their experiments or calculations while “living at that level of material comfort that puts the mind at rest and in a condition to give itself over to useful research.”²³ This plea for more substantial support suggested that the stipend structure should be designed to free academicians to be more manly by using their relative

²¹ Réaumur, “Réflexions sur l’utilité dont l’Académie des sciences pourroit être au Royaume, si le Royaume luy donnoit les Secours dont elle a besoin,” in Ernest Maindron, *L’Académie des sciences* (Paris, 1888), 103–10. Original in Archives de l’Académie des sciences (hereafter AAS), dossier Réaumur.

²² Réaumur, “Réflexions” (cit. n. 21), 107.

²³ *Ibid.*, 106. The document argued that only a “small number” of the forty-eight regular members were actually “workers [*travailleurs*]”; the institution was not working up to its potential.

freedom not for leisure or amusements but for useful work, to be accomplished in their comfortable homes. They would be able to live not like the idle aristocrats of old, but like “soldiers, magistrates, merchants”—men of different estates making themselves useful to the crown and its subjects.

In this improved academy, Réaumur envisioned a kind of paternalistic oversight imposed on scientific workers by the state, with the institution as the mediating authority. “In order that the entire academy should work for the public good, it would be appropriate to give every academician a task every year, relative to his subject and his level of support.”²⁴ Botanists could experiment with forest preservation; chemists could work on improving domestic production of saltpeter or finding new methods for refining metals; and so on. This vision took for granted the hierarchical patronage and status economy, with pensions dispensed by royal largesse to reward service. At the same time, he imagined the increase in scientific productivity that might follow from a more explicit link between tasks and remuneration. What kind of man would the academician be in such a system? Or, shifting the question slightly: what kind of manly occupation was science in the Old Regime? For our purposes—exploring the gendered conceptions and values attached to the sciences in this period—the analogies used by Réaumur in this document are illuminating. He compared the ideal academician to soldiers (probably meaning officers) and magistrates—because these eminently masculine professions served not only the crown, but the “public good.”

A SCIENTIFIC HOUSEHOLD

Réaumur, unlike those of his colleagues who had to take up multiple posts to make ends meet, had sufficient financial resources to devote himself fully to his scientific work. Over the course of the roughly fifty years of his working life, he lived in at least five different houses in and around Paris, in addition to the estate in Poitou where he spent six weeks every autumn. The size and composition of the household fluctuated, and available sources do not allow a precise accounting of these fluctuations over his whole career. Nevertheless, a good deal about the residents and the places where they lived and worked can be pieced together. Although Réaumur had neither wife nor children, a complex net of affective ties, some of them familial, linked the members of the household; at any given time some of these people were engaged in various kinds of scientific work. For most of his first two decades in Paris, Réaumur shared a home with his close friend and fellow countryman Pierre Jarosson, an upwardly mobile barrister whose growing wealth allowed him to purchase the honorific office of *secrétaire du roi*.²⁵ Not a man of science himself, Jarosson was nevertheless involved in Réaumur’s experimental trials on iron smelting and steel production; he invested in a manufacturing venture that put these methods into practice, briefly producing ornamental cast-iron objects for the Paris luxury market.²⁶ Jarosson’s widowed mother and

²⁴ *Ibid.*, 109.

²⁵ Jarosson owned property in Paris and shares in the Compagnie des Indes, and he eventually bought a large estate in the Maine region. In middle age, he married the wealthy daughter of an academician, Marie Madeleine Fantel de Lagny. Jarosson’s financial holdings are listed in his marriage contract from 1742: Archives nationales, Minutier central, ET/CXV/533. Réaumur and Jarosson named each other legal executors in their wills; near the end of his life, Réaumur inherited his friend’s provincial property.

²⁶ On the iron enterprise, see Daniel Bontemps and Catherine Prade, “Un magasin parisien d’ouvrages en fonte de fer ornée au XVIIIe siècle: Une réussite méconnue de Réaumur,” *Bull. Soc. Hist. Paris l’Île-de-France* 118 (1991): 215–61.

a family of her cousins became intimate members of Réaumur's circle as well. One of these distant cousins was Hélène Dumoustier, the artist who illustrated nearly all of Réaumur's voluminous writings on the natural history of insects.²⁷ She, her mother, and two of her sisters visited frequently and ultimately lived as part of the extended household for many years.

The Paris home he shared with Jarosson could not accommodate laboratory equipment or extra people, so Réaumur rented a country house in the village of Charenton, not far upriver from the city and easily accessible on horseback, or even on foot. He used this property as a retreat from urban life, but also as a workplace. Outbuildings housed furnaces and other equipment for chemical and metallurgical experiments; the garden, pond, riverbank, and nearby forests supplied material for natural history observations. Guests visited the glass-fronted beehives and collected insects on promenades in the neighboring forest at Vincennes. Until Réaumur moved to a larger house in the city, most of his scientific investigations were pursued in and around the Charenton establishment, and even after the household expanded, its members traveled regularly back and forth between city and country houses.²⁸ In 1728, intensifying the domestic resources devoted to natural history and other pursuits, he leased a large aristocratic townhouse, the Hôtel d'Uzès, located only a few minutes' walk from the academy's meeting room in the Louvre palace.²⁹ The several buildings of the Hôtel d'Uzès were arranged around two courtyards, with enough space to accommodate scientific instruments and equipment, an expanding natural history collection, a library, and a "menagerie" of living insects. The added space meant that Réaumur could lodge not only servants and occasional guests but a shifting set of assistants, artists, and companions as well.

A vignette drawn to illustrate Réaumur's natural history of insects by Philippe Simonneau, one of the academy's most prolific artists, depicts an idealized view of this work space, packed with observations and experiments in progress (see fig. 1). Simonneau had no doubt spent time at both town and country residences while making his drawings; this image combines elements of country garden and townhouse workroom, giving a kind of visual extract or overview of investigations that must have taken place in different seasons, and in different locations. A few butterfly specimens lie flattened on the table, but the rest of the insects portrayed here are alive. Chrysalises hang from a frame; caterpillars crawl on the table and hang on the twigs of a branch, ready to pupate; on the right-hand wall, rows of glass jars of eggs and caterpillars fill the shelves. The interior space of the room merges seamlessly with the highly engineered garden, where we can spot a small tank set into the ground, with dragonflies hovering over it, a glass-fronted beehive, a hothouse, a large spiderweb, and a geometric array of some sort of nest or trap in the left foreground. The butterflies crossing freely from inside to outside suggest the dynamic interplay between nature and the controlled spaces of workroom and garden.

²⁷ Hélène Dumoustier's paternal aunt was married to Pierre Jarosson's maternal uncle.

²⁸ On experiments and observations pursued at Charenton by members of the household, see Mary Terrall, "Frogs on the Mantelpiece: The Practice of Observation in Daily Life," in *Histories of Scientific Observation*, ed. Lorraine Daston and Elizabeth Lunbeck (Chicago, 2011), 185–205.

²⁹ The Hôtel d'Uzès had been built for the Marquise de Rambouillet, the famous seventeenth-century *précieuse* hostess. On this house and its occupants, see Terrall, *Catching Nature in the Act* (cit. n. 6), chap. 3. On the architecture, see Jean-Pierre Babelon, "L'Hôtel de Rambouillet," *Paris et Ile-de-France: Mémoires publiés par la Fédération des sociétés historiques et archéologiques de Paris et de L'Île-de-France* 11 (1960): 313–49.

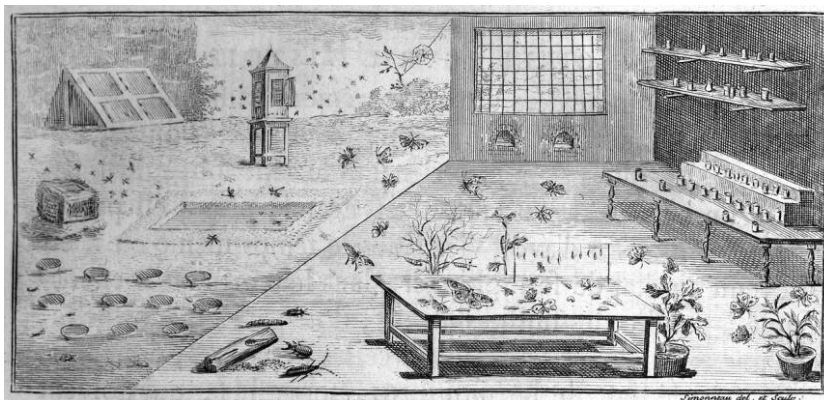


Figure 1. Philippe Simonneau, title vignette for Réaumur, *Mémoires . . . insectes* (cit. n. 19), vol. 1.

The representation of all this activity has been cleansed of people, masking the human activity that made possible the intensive examination of insect lives. In putting the people back into the picture, I am sketching out a different (if imaginary) composite image that will open up the life of the household to our retrospective view. My goal here is not so much to retrieve the contributions of invisible technicians as to situate the scientific work, destined ultimately for presentation to the academy, to visitors, and to readers around the world, in the highly articulated social and physical space that was Réaumur’s household.³⁰ I use this term to include the occupants of the residence and others who came to work there as well as the architectural space of the houses, surrounding gardens, and outbuildings. The boundaries of this unit were elastic and accommodating, as residents came and went between city and country houses, and as visitors and assistants moved in and out of the laboratory, the library, and the collections. Réaumur himself functioned as the patriarch of the whole operation, but he was a patriarch without any immediate family—no wife, no children, no siblings. As he opened his home to a series of assistants—mostly young men in the early stages of their careers—he built, intentionally or not, a sort of scientific family, whose offspring recognized the formative role played by his tutelage and patronage. Emotional connections forged in this setting, like family ties, lasted long after individuals had moved on, sometimes forming the basis of lifelong friendships and collaborations.

The daily details of the roles played by the characters in my story remain elusive, but clues emerge from a variety of sources: passing references in correspondence and published scientific papers, eulogies delivered years later by the academy’s secretary, manuscript laboratory notes, illustrations, and inventories. The density of interpersonal interaction, conversation, and collaboration can only be inferred from the faint traces left in these documents. The first of Réaumur’s assistants was Henri Pitot, who came to Paris from Languedoc as a youth of twenty-three, eager to study mathematics.

³⁰ Steven Shapin develops the useful notion of “invisible technicians” in Shapin, *A Social History of Truth: Civility and Science in Seventeenth-Century England* (Chicago, 1994), chap. 8. On the invisibility of women’s work in astronomy, see Mommertz, “Invisible Economy of Science” (cit. n. 7).

Introduced to Réaumur by a female relative, Pitot found himself with a patron and a mentor; the older man “took pleasure in encouraging young people whose talents he recognized” and supervised Pitot’s scientific and philosophical reading for the next few years.³¹ At this point, in the early 1720s, Réaumur’s household was still small; his research questions derived primarily from the academic projects promoted by Bignon, especially the *Description des arts et métiers*. He was also responsible for the chemistry laboratory maintained by the academy, which was probably identical to the one at his house in Charenton. Pitot’s first “useful” assignment—as his eulogist called it—was as assistant in this laboratory, with a modest stipend from the academy; this served as the next phase of his induction into experimental science. In practice this meant working with his mentor on “a great many investigations and experiments on cast iron, on porcelain, on different kinds of varnish [for metals], and in preparing a large collection of material for the *Histoire des arts*.”³² Soon Pitot was appointed to an opening as adjunct at the academy, again through Réaumur’s patronage. While assiduously fulfilling a multitude of academic responsibilities, Pitot continued to work with Réaumur off and on for the next ten years, when he was finally elected to a pensioned slot at the academy.³³

Pitot was the first of several future academicians who were, in varying degrees, supported by Réaumur while working in his laboratory. Jean-Antoine Nollet was the second. Already known as an adept enameler and scientific instrument maker, he had previously worked on electrical experiments with Réaumur’s friend and fellow academician Charles François Dufay. Nollet took over Pitot’s role in the Charenton laboratory, and, as the academy’s secretary later recalled, “it was in this excellent school, which has supplied the academy with several of its most illustrious members, that [Nollet] completed his training.”³⁴ In the 1730s, the main scientific preoccupations of the household were insects and thermometers. Though Pitot and Nollet did not live in the house, they were often in the laboratory in Charenton and in the various workrooms where the insects and the collections were kept in town.³⁵ Both men were intensely involved in Réaumur’s early work on thermometry, and they each built numerous instruments following Réaumur’s protocols.³⁶ As part of an extensive research

³¹ Jean-Paul Grandjean de Fouchy, “Eloge de M. Pitot,” *Histoire de l’Académie Royale des Sciences* (hereafter *HARS*), 1771, 145.

³² *Ibid.*, 147. Réaumur was working on making porcelain from glass in 1723, using “my large furnace at Charenton,” probably with Pitot’s assistance. Réaumur, “Notes on the manufacture of porcelain and glass, ca. 1722,” Getty Research Institute; for other metallurgical experiments, manuscript notes in Biblioteca Laurenziana, Florence, MS Ashburnham 1804.

³³ Réaumur interceded on Pitot’s behalf with the royal minister Maurepas, trying to get him a teaching post, noting that his protégé had been working for the academy for years without any monetary reward. Réaumur to Maurepas, 6 November 1732, Bibliothèque de Genève, MS Trembley 5.

³⁴ Grandjean de Fouchy, “Eloge de M. l’Abbé Nollet,” *HARS*, 1770, 122.

³⁵ It is not always possible to determine exactly who was in residence at a given time. Pitot, who lived nearby, was making thermometers from Réaumur’s design at least from 1730; Nollet took over soon thereafter, but they may well have been in the laboratory together for some experiments.

³⁶ C. Messier, “Mémoire sur le froid extraordinaire que l’on ressentit à Paris . . . au commencement de cette année 1776,” *Mémoires de l’Académie Royale des Sciences* (hereafter *MARS*), 1776, 1–155 (transcription of label on a thermometer made by Pitot in 1730 on 140). On the early history of Réaumur’s thermometer, see Jean-François Gauvin, “The Instrument That Never Was: Inventing, Manufacturing, and Branding Réaumur’s Thermometer during the Enlightenment,” *Ann. Sci.* 69 (2011): 514–49, on 22n80. Pitot’s intervention in experiments mentioned in Réaumur, “Essais sur le volume qui résulte de ceux de deux liqueurs mêlées ensemble,” *MARS*, 1733, 167–8. Nollet discusses working with Réaumur on thermometry in J.-A. Nollet, *Leçons de physique expérimentale*, 6 vols. (Paris, 1743–8), 4:407–11.

TOM. IV. XIV. LEÇON. PL. 3.

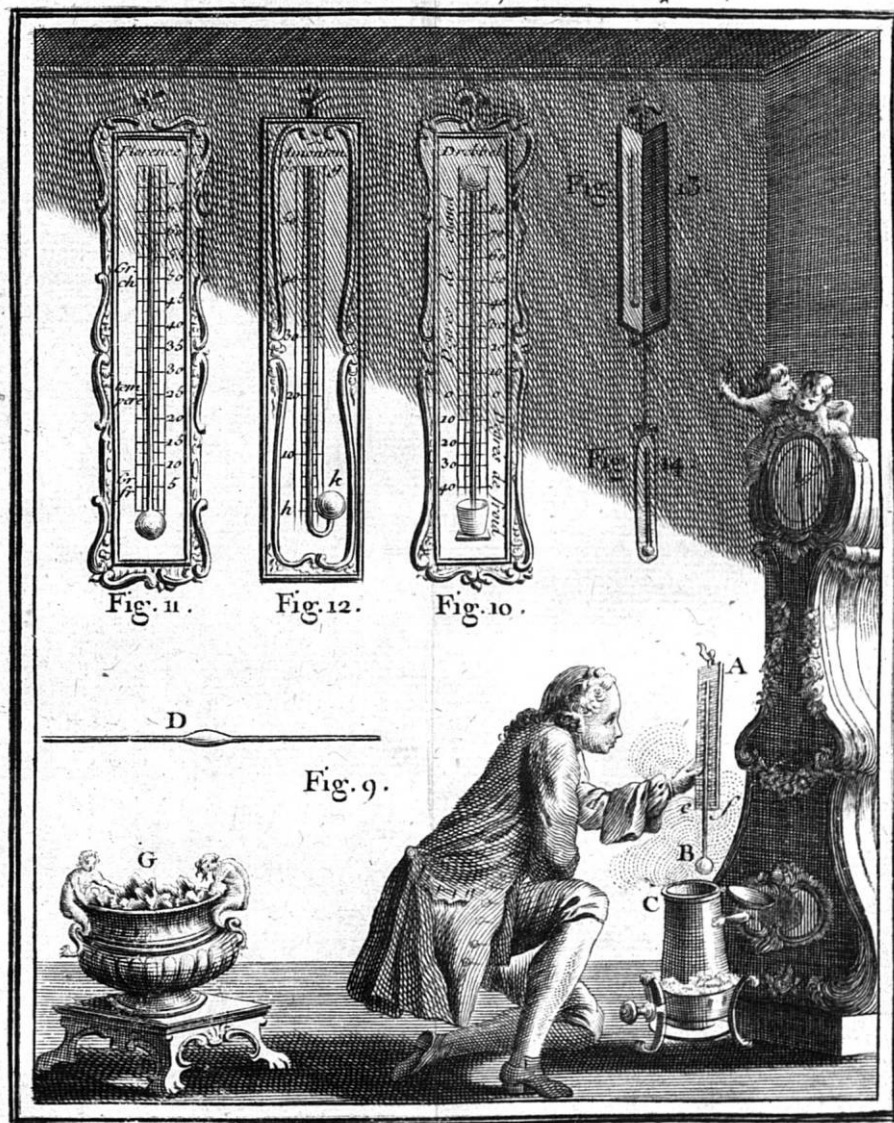


Figure 2. Nollet observing boiling temperature of liquid with instruments and apparatus similar to what he would have used in Réaumur's laboratory. Nollet, *Leçons de physique expérimentale* (cit. n. 36), vol. 4, lesson 14, pl. 3.

program on temperature and heat capacity, Pitot and Nollet helped with experiments on the expansibility of different kinds of alcohol and measurements on melting ice (see fig. 2). Nollet took charge of the jars of living insects, as well as the instruments in the laboratory. At times the insects became the subject of physical experiments, when he put caterpillars in the receiver of the air pump to investigate transpiration or

measured the freezing temperature of the caterpillar's internal fluids.³⁷ He was also available to show visitors around the collections.³⁸

Two other young men moved into the Hôtel d'Uzès while Pitot was calibrating thermometers in Charenton: a medical student by the name of Baron and a neophyte artist called Regnaudin. Baron had particular responsibility for feeding and keeping track of the denizens of the insect menagerie, replenishing the jars and boxes as necessary.³⁹ He stayed for a year or two, before moving to a provincial town to start his medical practice, after which he continued to send boxes of insects by post to Paris. Very little is known about Regnaudin, the illustrator, apart from the fact that he was trained to draw insects, learning to use a loupe and a microscope as well as pen and ink. Before he was in residence, Réaumur had employed the academy's regular illustrators but found it increasingly difficult, without an artist on call, to document the elusive habits and transformations of the many kinds of insects living on his shelves and in his garden. Simonneau, who drew the idealized work space represented in figure 1, had as much work as he could handle making the engravings for the academy's publications, and he could not be available at Réaumur's convenience. As benefactor and patron, the naturalist could be the master of Regnaudin's time, especially since he was living on the premises. Though inexperienced when he arrived, he soon became accomplished at his task, illustrating academic papers on thermometry and insects. But before his patron's ambitions for him could be fully realized, the young artist died unexpectedly.⁴⁰

Meanwhile, Hélène Dumoustier had taken up drawing—she later recalled that her interest had been sparked by watching artists at work in the house—and she was soon recording the mechanisms and maneuvers of the insects that were to fill the pages of Réaumur's books for the next decade.⁴¹ Dumoustier and her family had come into the Hôtel d'Uzès, where they kept their own apartment and servants, through their family connection with Jarosson and his mother, but once she took on the role of resident artist, Hélène was often working alongside the men, and she was well known to everyone who spent time in the collections, the laboratory, or the library. Her sisters do not seem to have participated in this scientific work, though all the women routinely traveled back and forth to Charenton and went along on the annual journey to Réaumur's estates, where the pursuit of natural history continued unabated. In later years, when asked in what capacity she had lived in Réaumur's house for so many years, Dumoustier replied “as a friend occupying an apartment that her mother rented.” After

³⁷ “Expériences à faire faire par l'Abbe Nollet,” AAS, Fonds Réaumur, dossier 47, fol. 46. For the freezing temperature of insects, see Réaumur, “Expériences sur les différents degrés de froid qu'on peut produire en mêlant de la glace avec différents sels,” *MARS*, 1734, 187. See also Réaumur, *Mémoires . . . insectes*, (cit. n. 19), 3:178, for Nollet's participation in experiments with clothes moths.

³⁸ Jean-François Séguier was shown around the collections in the Hôtel d'Uzès and the laboratory in Charenton by Nollet in 1733: Séguier, “Fragments de quelques notes que je fis en voyageant en France,” Bibliothèque municipale de Nîmes, MS 129.

³⁹ “M. Baron lived with me in Paris, and even took care of my insect menageries.” Réaumur, *Mémoires . . . insectes* (cit. n. 19), 1:51. Regnaudin may have been related to Réaumur, based on his surname, but I have found no solid evidence for a blood relationship, nor have I identified first names for either of these men.

⁴⁰ Réaumur mentions the death of Regnaudin, without naming him, in *Mémoires . . . insectes* (cit. n. 19), 1:54. Regnaudin's drawings were engraved to illustrate two of Réaumur's papers printed in 1732 for the 1730 volume of the academy's journal. “Memoire des desseins faits par le Sr. Regnaudin,” 22 October 1731, AAS, Fonds Lavoisier, 1065 ac 1731.

⁴¹ Dumoustier's recollection in “Interrogatoire,” 22 November 1759, Archives nationales, Y 13951.

the death of her mother in 1743, she and her sisters continued to occupy their rooms “as friends and companions keeping their home [*ménage*] distinct and separate . . . at their own expense, just as their mother had done.”⁴² She very likely was exaggerating the family’s independence; they seem to have lived modestly on income from small investments. Although she downplayed this fact when asked about it later, records in the academy’s archives show that Dumoustier was paid for her drawings from 1736 to 1747, at the same rate commanded by the professional artist Simonneau.⁴³

Hélène Dumoustier’s engagement with natural history did not stop with her drawings, nor was she simply carrying out instructions. Her constant presence around the house and on outings into the countryside and forest gave her the opportunity to see and collect things for herself. Like the others, she came and went, observing and manipulating her tiny subjects as well as drawing them. This should not surprise us, given that both natural history and physics investigations were materially integrated into the life of the household. Réaumur attributed numerous observations to her, in his private notes and in print; he made a point of acknowledging her crucial role in many investigations, when she noticed details and spotted unusual phenomena no one else had seen.⁴⁴ In print, the artist-observer was never explicitly named, at her own insistence, though she appeared from time to time, rendered anonymous by asterisks, as in this example: “While Mlle. *** was drawing one of these caterpillars, very near to the time of its metamorphosis, she observed that several drops of water emerged from different places on its skin. The next day, I observed the same caterpillar, and I saw it make a little move that I have not yet seen made by any other.”⁴⁵ The two observations on subsequent days, by different people, blend into the narrative description of the metamorphosis unfolding on the worktable. The artist was clearly working on her own, unsupervised, and reported her noteworthy observation later. Réaumur took her testimony about ephemeral phenomena like the liquid emitted by the caterpillar to be entirely creditable—it did not need confirmation from a more authoritative witness. When such explicit references make it into the final text, we can assume that they represent only the tip of the iceberg, so to speak, from which we can extrapolate to a much larger mass of daily observations of all kinds.

At other times, we catch sight of sustained collaborative projects, as when they devised techniques for paralyzing and counting and sorting bees while investigating the seasonal cycle of the beehive. In this case, Réaumur took the opportunity, still without naming his artist, to point out the intimate connection between drawing and observing, and to acknowledge the value of Dumoustier’s observations over the long term: “I had with me a person who loves natural history, and who has supplied me with observations recorded in the preceding volumes, and in addition to observations, very perfect drawings; a person who knows as much as I do about bees of different sexes since she has made drawings of them. She and I, we set out to examine them, to sort them, so to speak, one by one, with more care than one gives to sorting coffee beans.”⁴⁶ Eventually they found the queen and determined that she was the only one

⁴² Ibid.

⁴³ The total amount paid over eleven years was 8,000 *livres*. AAS, Fonds Lavoisier, comptabilité, 1066, 1068, 1069 ac.

⁴⁴ On Dumoustier and her family, see Terrall, *Catching Nature in the Act* (cit. n. 6), chap. 3.

⁴⁵ Réaumur, *Mémoires . . . insectes* (cit. n. 19), 2:75; on Dumoustier’s refusal to be named in print, 1:55.

⁴⁶ Ibid., 5:545.

in the hive. Note that Réaumur's judicious use of pronouns here makes Dumoustier's presence obvious, although still anonymous. Réaumur also trusted her with keeping the work going when his other (masculine) obligations interfered. The bees lived in the garden at Charenton, where the observers were trying to see the mechanics of copulation. After a certain amount of trouble, they finally got bees to mate in a glass jar: "After observing these proceedings, and having seen them repeated for more than two hours, I was obliged to leave my two bees and the country house to go to Paris, where one of our academy meetings called me. But several people whom I left at my house, and one in particular, whose eyes I trust as much as my own, did not cease observing what was happening for the rest of the afternoon, and upon my return they gave me an account of all they had seen."⁴⁷

Hélène Dumoustier was a fixture in the house over many years, working primarily in and around the insect collection. She was well known to the string of assistants, collaborators, and visitors who stayed for shorter periods, and developed lasting friendships with many of them. The assistants made the same kind of cameo appearances in Réaumur's texts, though unlike the artist, they were often named.

In 1740, Réaumur gave up the Charenton house and consolidated his research and his collections into one site, another elegant house just outside the city walls in the Faubourg Saint-Antoine. The Dumoustier family moved with him; Pierre Jarosson, too, was part of the entourage and lived in the new house until his marriage in 1742. The move out of the city ushered in a new period in the life of the household, with the rapid expansion of the museum of preserved specimens and the laboratory associated with it.⁴⁸ Réaumur was still working on the natural history of insects when he moved, but his focus shifted more and more to birds. With large numbers of dried and pickled specimens arriving daily, much of the attention of various assistants was taken up by problems of preservation and presentation. At the same time, the flock of poultry and other birds kept in the yard provided material for a raft of other work, especially the eminently utilitarian study of artificial incubation of chicken eggs and the preservation of eggs. And every autumn most of the house's residents would pack up collecting jars, microscopes, and books for the ten-day carriage journey to the manor house in Poitou.

Of the men who worked in and around Réaumur's collection in the 1740s, three went on to pensioned positions at the academy. Jean-Etienne Guettard came to Réaumur's attention while pursuing his botanical and medical studies. He was in Charenton in the spring of 1740, when the household was occupied with observing the mating habits of frogs, and shortly thereafter he moved into the house in Faubourg Saint-Antoine, where he lived for four or five years. Guettard was brought in as an all-around naturalist, working indoors on the collection in the winter months, and outdoors in the field whenever possible. "The season of botanizing and gathering insects has arrived, and for several months M. Guettard . . . has done nothing but traverse the countryside in our vicinity," his patron wrote to a correspondent interested in the collection.⁴⁹ In 1741, Guettard came along to Poitou and was dispatched to the coast

⁴⁷ *Ibid.*, 504.

⁴⁸ Terrall, *Catching Nature in the Act* (cit. n. 6), chap. 6.

⁴⁹ Réaumur to Louis Bourguet, 29 July 1741, Bibliothèque publique et universitaire, Neufchâtel, MS 1278.

where he spent several weeks on his own, cutting up sea anemones and sea stars to see if they could regenerate.⁵⁰ Other times, he accompanied Réaumur and Dumoustier to the shore. Réaumur documented one such excursion in notes appended to Dumoustier's drawing of a colony of tiny sea stars: "An observation that M. Guettard made yesterday, and that I repeated today, convinced us both that each of these little stars is an animal. Some stars have eight arms, others six or seven, others fewer, and Mlle. Dumoustier found one which only had three."⁵¹ Such passing comments offer fleeting glimpses of the kind of intensely focused but sociable investigation that would have been routine for this little group, out on the rocky shore inspecting the tide pools for unusual specimens.

In 1743, Guettard was elected to the botanical class of the academy. He continued to live with Réaumur for two more years as he pursued his own botanical research, while providing occasional observations and specimens to his patron.⁵² He was replaced in the "laboratory" and collections by François David Hérissant, a young physician recommended to Réaumur for his manual dexterity and his expertise at dissection.⁵³ Hérissant did not live at the house; there was probably no room for him anyway, as the collections had expanded to take up the entire second floor of the house, and everyone except Réaumur occupied apartments in other buildings on the property. He spent his time in the laboratory, working on methods of preservation for the natural history specimens, and in the poultry yard, where he studied digestion in birds. Hérissant got a place in the academy after five years of working for Réaumur. By this time he had also established a medical practice, serving as Réaumur's personal physician, and eventually he took up lodgings in a building owned by an elderly widowed cousin of his patron.⁵⁴

For the last eight years of Réaumur's life, his natural history collection, by this time filled with hundreds of birds from all over the world, was managed by Mathurin Jacques Brisson, supported as Pitot had been years before by a modest stipend from the academy. Brisson was the nephew of Réaumur's sister-in-law, thus a relative by marriage; he grew up near the estate in Poitou and came looking for a post after abandoning his clerical career.⁵⁵ In 1749, he moved into Réaumur's household, where he became a crucial player in all the ongoing projects, indoors in the laboratory and collection and outdoors in the poultry yard. He continued Hérissant's work on taxidermy and used the collection as the raw material for two major taxonomic works, one on quadrupeds and one on birds. He also made thermometers, distributed them to Réaumur's correspondents, and lent his youthful eyes to microscopic observations. Brisson

⁵⁰ For Guettard's biography, see Condorcet, "Eloge de M. Guettard," *HARS*, 1786, 47–62. Guettard appears in Réaumur's observation notes on frogs, "Grenouilles," 8 April 1740, AAS, Fonds Réaumur, dossier 35. For his experiments on sea creatures on the Atlantic coast, see Guettard to Réaumur, 27 September 1741, AAS, dossier Guettard. His manuscript inventory of Réaumur's collection is in Bibliothèque centrale du Muséum d'histoire naturelle (Paris), MS 1929 (iii).

⁵¹ Bibliothèque centrale du Muséum d'histoire naturelle (Paris), MS 972, fol. 141.

⁵² Guettard wrote from one of Réaumur's properties near La Rochelle, with observations of zoophytes: Guettard to Réaumur, 12 July 1745, AAS, dossier Guettard.

⁵³ "Eloge de M. Hérissant," *HARS*, 1773, 118–34.

⁵⁴ For Hérissant's work on preparing specimens, see Réaumur, "Moyens d'empêcher l'évaporation des liquides spiritueuses, dans lesquelles on veut conserver des productions de la nature," *MARS*, 1746, 507.

⁵⁵ See Arthur Birembaut, "Les liens de famille entre Réaumur et Brisson," in *La vie et l'oeuvre de Réaumur*, ed. P. Grassé (Paris, 1962), 168–70.

was elected to the academy only after the death of his patron, on the strength of his systematic work on ornithology.⁵⁶

In his eulogy of Guettard, three decades after Réaumur's death, Condorcet memorialized the nexus of intellectual, patronage, and affective elements at play in the scientific household where a string of young men found their scientific bearings.

M. de Réaumur undertook immense projects in the sciences and the arts which he could not have done alone; he sought to attach to himself young men whose burgeoning talents still needed support. They helped him in his work, succeeded in learning under his gaze, found in his books, in his collections, in his laboratory the kind of aid that is still so often not available to hardworking, but poor and obscure, young people, even in the midst of so many institutions designed to favor the sciences. Then, released after several years, they came into the world with a name that was already known, and saved by useful connections from those dangers that often block entry into a career in the sciences. Most of these students subsequently entered the academy, and all retained for M. de Réaumur a tender and permanent appreciation that proves both that he chose them well and that he knew how to avoid with them the kind of superior attitude that his age, his long researches, and a confirmed reputation might have given him. M. Brisson is the only one of these students of Réaumur who is left to us. In learned societies, we like to remember these filiations that make our talents more dear to us by linking them to the memory of those we have lost.⁵⁷

The nostalgic tone here is of course appropriate to the eulogy genre. For his own polemical purposes, Condorcet oversimplified the distinction between the aristocratic master and his “poor and obscure” students, but he did capture the formative experience for these men of working with the “books, collections, and laboratory” in Réaumur's various residences. And in reminding his colleagues of the “filiations” linking the academicians of the 1780s to previous generations, Condorcet was also memorializing a kind of family connection that linked those who came to the academy by this particular route to each other, suggesting that we might view them as a band of brothers, passing in turn under the tutelage of a benevolent paternal figure.

CONCLUSION

Réaumur's aristocratic status, and the resources he commanded, made possible the combination of hierarchical and companionate relations that structured his household and its ties to the academy (and other royal institutions). His various homes—with space for experiments, accommodations, collections, gardens, and so on—were sites for making knowledge and for making scientists. Overseeing and managing all that went on there, Réaumur played a number of overlapping masculine roles: mentor and father figure, patron, employer, landlord, and host. Assistants came and went; in many cases, as we have seen, these young men parlayed their work for Réaumur into other positions, especially in the academy. Affective and professional ties developed in the course of the day-to-day operation of taking care of insects, operating microscopes and air pumps, reading and calibrating thermometers, and preserving and arranging specimens. This work carried over into correspondence, collaboration, and friendship after the men had moved on to other domestic situations. The women in the household

⁵⁶ M. J. Brisson, *Le règne animal divisé en IX classes, ou méthode contenant la division générale des animaux* (Paris, 1756); Brisson, *Ornithologie, ou méthode contenant la division des oiseaux en ordres, sections, genres, especes & leurs variétés*, 6 vols. (Paris, 1760).

⁵⁷ Condorcet, “Eloge de M. Guettard” (cit. n. 50), 49–50.

maintained their independence to some degree, but they were also part of the social and scientific life that filled most rooms of the houses they occupied. Certainly the work of H el ene Dumoustier was essential to the whole operation, as R eumur recognized, especially for her drawings but also for her observations. She occupied a peculiar position, as part of a family of women embedded in an otherwise masculine domain tightly linked to the Paris Academy of Sciences, while contributing (unlike her sisters or her relative Jarosson) to the scientific work permeating the house.

Much of the scientific activity of R eumur's household fell into the category of the kind of useful knowledge that he promoted throughout his career in the academy. Usually, results generated in this amended version of an extended-family setting then passed through the academy on the way to a wider public, whether in the public sessions or in print. Ties formed in the house and laboratory persisted through several intellectual generations, as R eumur became godfather to Pitot's son Ren e, and Nollet, on his retirement from a prestigious position at the College de Navarre, arranged for Brisson (a generation younger) to take over his appointment as professor of experimental physics. Nollet kept in his possession a thermometer made with his patron in 1732 and passed it down in his will to Brisson, who claimed it was still accurate in the 1770s.⁵⁸

As for H el ene Dumoustier, she was revealed as R eumur's universal legatee when his will was discovered in a locked cupboard after his death. In this document, the richest single source for understanding their relations, he acknowledged his debt accrued over her long years of illustrating and observing. If his assistants had inherited his intellectual legacy, carrying on their experimental science in the academy and elsewhere, Dumoustier was supposed to inherit some real property. As it happened, though, the will was contested by distant cousins, who dragged the case through the courts for years. She spent her last years with her one surviving sister, living comfortably but modestly on her investments. At the end of her life, the one material memento of her time as a scientific illustrator remaining in her possession was a terracotta portrait bust of R eumur that had greeted visitors to the house in Faubourg Saint-Antoine years earlier (see fig. 3). In her last will and testament, she left this bust to H erissant, "as a mark of my friendship; . . . he deserves it for the attachment that he had for [M. de R eumur], and that he continues to have for his memory."⁵⁹

Nollet's thermometer and the portrait bust bequeathed by Dumoustier to H erissant represent, in material form, some of the myriad ties permeating and enlivening the living and work space of the household. These were ties of affection, certainly, as well as intellectual debts and collaborations that linked the home to the academy, where innumerable observations, measurements, techniques, and instruments were presented in the spirit of serving the public good and contributing to the mission of the institution. That mission was a masculine endeavor, not only because members were men, but also inasmuch as the double-barreled ideal of utility and public service was itself gendered male. The ideal also drew on language associated with aristocratic merit, as we have seen. As a member of the lesser nobility who chose not to continue his hereditary lineage in the usual way, R eumur acted out his aristocratic values in the context

⁵⁸ On this thermometer, see Jean-Antoine Nollet, *L'art des exp eriences*, 3 vols. (Paris, 1770), 3:182. See also Gauvin, "Instrument That Never Was" (cit. n. 36).

⁵⁹ "Testament de Mlle. Dumoustier de Marsilly," Archives Nationales, Minutier central, ET/CXV/774. H erissant left the bust to the Paris Academy of Sciences in his will; it is now in the Louvre.



Figure 3. Jean Baptiste Lemoyne, portrait bust of Réaumur. Inherited by Hélène Dumoustier, passed on to F. D. Hérisant, and bequeathed by him to the Paris Academy of Sciences. Musée du Louvre. Copyright RMN-Grand Palais/Art Resource, New York.

of his scientific career, at the academy and in his own home. Most of his projects, from early work on the kingdom's natural resources and steel manufacturing to his final treatise on poultry cultivation, incorporated explicitly utilitarian elements. From the story of the elaborate household operation, another aspect of the ideal of meritorious service to the state comes into focus, as we recognize, with Condorcet, that Réaumur was producing not only scientific results but also future academicians. He reproduced himself, or versions of himself, in his intellectual offspring. The household—where people from different families with different aspirations lived and worked together—provided the conditions for this peculiar form of asexual reproduction.

The activities and interactions of the people who spent time working in Réaumur's household left only imperfect traces in the historical record, making the domestic scene rather more invisible to us than it would have been for contemporaries. The infrastructure of the home—laboratory, study, collection, but also kitchen, bedrooms, and rooms where guests were entertained—was inextricably linked to the academy, and indeed the institution depended on these links. In Réaumur's case, the household was not a family as such, though various sorts of family connections came into play. Because of the scale of the operation and the shifting personnel, this example is quite complex; other households would no doubt repay study and would enrich our picture of how science was made, and how it was gendered. Only some of these would resonate with the kind of aristocratic values I have explored here. If we are to appreciate the diverse meanings of masculinity for the sciences in the Old Regime, we need to think about family ties, social status, friendships, institutions, domestic arrangements, and state patronage and investigate the interlinking of these categories and contexts.