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Nina Rattner Gelbart, *Minerva's French Sisters: Women of Science in Enlightenment France*. New Haven, CT: Yale University Press, 2021. ix + 340pp. Notes and index. \$40.00 U.S. (hb). ISBN 9780300252569; \$23.27 US (eb). ISBN 9780300258431.

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In his 1769 *Histoire littéraire des femmes françaises*, abbé de la Porte set out to “show what a woman is capable of in the path of knowledge, once she sets herself above the prejudice that forbids her to develop her mind and perfect her reason.”[1] His multi-volume survey consisted of pithy biographical sketches that highlighted the literary and scientific achievements of women since the medieval era. Nina Rattner Gelbart’s illuminating collective biography delves much deeper into the lives, intellectual milieux, and struggles of a half a dozen female scientists in Enlightenment France: mathematician Élisabeth Ferrand (chapter one), astronomer Nicole Lepaute (chapter two), botanists Jeanne Barret and Madeleine-Françoise Basseporte (chapter three), anatomist Marie-Marguerite Bihéron (chapter four), and chemist Marie-Geneviève-Charlotte Thiroux d’Arconville (chapter five). In this way, Gelbart’s approach resembles and continues the story of Carol Pal’s important study on the seventeenth-century “republic of women” anchored at the court of the Bohemian royal family at The Hague.[2] Although these French scientists were mostly unaware of one another, varied in their religious persuasions and social backgrounds, and worked in various fields during different decades spanning from the 1730s to the early nineteenth century, Gelbart frames them as part of the sisterhood of the now celebrated Émilie du Châtelet, to whom Voltaire once referred as the French “Minerva.” Unlike du Châtelet, these *femmes savantes* are lesser-known historiographical landmarks, and Gelbart seeks to present them as part of a coherent whole so that we may better appreciate their contribution to the century’s scientific learning.

Gelbart tells “tales of lives lived whole,” situating these women’s achievements within their broader cultural and social worlds (p. 13). Because the bulk of their correspondence and scientific work has been lost either through neglect or deliberate disposal, this book adopts a perspective more akin to ethnography than the conventional approach to the life of the mind. It consists of studying the work of these women chiefly through what men had to say about them in newspapers, letters, memoirs, and scientific treatises. The pitfalls of this oblique approach are obvious to Gelbart, and she deftly sifts through the misunderstandings and bias inherent in such material. Fortunately, many of the men who populate this book worked alongside these female protagonists, making their testimony more reliable than that of a total outsider.

Chapter one examines the “celebrated Mademoiselle Ferrand,” (p. 37) a Paris-based mathematician whose interests in Newtonian physics preceded du Châtelet’s research in this area by almost a decade. Unmarried, Ferrand lived most of her life with Madame la Comtesse de Vassé, and was described as her “intimate partner,” though the precise nature of the relationship remains unknown (p. 16). Ferrand’s intellectual companions included lesser-known writers (such as the medievalist Jean-Baptiste de Lacurne de Sainte-Palaye and polymath Louis-Jean Lévêque de Pouilly), the worker bees of the Enlightenment (the indefatigable Louis de Jaucourt who wrote nearly a quarter of all articles in the *Encyclopédie*), as well as the crests of philosophical foam in the figures of Helvétius, Mably, and Turgot. It was with the empiricist Condillac that she formed the closest bond borne from her trenchant criticism of his *Essai sur l’origine des connoissances humaines* (1746). Although the correspondence between Condillac and Ferrand has disappeared, Gelbart reconstructs their 1742-52 collaboration by retrieving discussions of Ferrand found in Condillac’s writings to others. The philosophe explicitly praised Ferrand’s intellect and friendship in the prefatory remarks of his *Traité des Sensations* (1754), noting her insistence on evaluating each of the five senses separately to better ascertain from where our ideas are ultimately derived. Although some critics like Raynal questioned the importance of Ferrand in shaping the *Traité*, her association with Condillac endured into the final quarter of the century.

Condillac openly acknowledged the critical assistance he had received from Ferrand, and so too did the astronomer Jérôme Lalande praise Nicole Lepaute’s mathematical acumen in both private and public writings. Gelbart charts the LePaute-Lalande collaboration and her independent labors in the second chapter, and we encounter a woman of exceptional abilities who constantly operated in the shadow of her husband, Jean-André, who was becoming one of the better-known *horlogers* in the 1750s. Lalande attempted to highlight the importance of LePaute’s contributions, notably her pendulum oscillation tables found in the *Traité d’horlogerie* (1755), where only Jean-André appeared as author. Lalande also recalled their 1759-74 collaborative project of the useful *Connaissance des temps* almanac, and how instrumental Lepaute’s assistance was in the calculation of the return of Halley’s Comet in 1759 and of the solar transit of Venus in the 1760s. Her reputation was sufficiently established to lead to her election to the Académie de Béziers in 1761. Lepaute also struck out on her own, publishing a short pamphlet on the 1764 eclipse of the sun which she presented to Louis XV himself. Her work garnered praise but was also shamelessly plagiarized.

The burgeoning science of botany is the focus of the third chapter, where Gelbart examines the lives and careers of Jeanne Barret and Madeleine-Françoise Basseporte. Barret entered the household of naturalist Philibert Commerson as a housekeeper in the fall of 1764. She undoubtedly received instruction in botany there, and likely also attended public lectures at the nearby Jardin du Roi where Commerson went daily. Barret accompanied her employer on the famous Bougainville expedition from 1767 to 1773 where she disguised herself as a male valet known as “Jean Baré.” Despite her best efforts, her sexual identity was eventually discovered, and naval regulations meant that the couple had to disembark in late 1768 on Isle de France (present-day Mauritius) east of Madagascar. Due to a lack of evidence, Gelbart speculates on Barret’s activities on Isle de France for the following years where Commerson set out on a number of botanical excursions. Though no record of their collaboration can be found, Gelbart reasonably contends that Barret undoubtedly contributed to Commerson’s inventory of approximately 30,000 specimens, of which 10 percent were not yet known to Europe. We fortunately have more evidence for the career of the elder Basseporte, whom Barret surely would have met at the Jardin du Roi where the former had been working since the middle of the 1730s in botanical illustration

and where her drawings embodied the Enlightenment objective to both *plaire* and *instruire*. First trained by artist Claude Abriet, who unabashedly passed off her work as his own, and then under the exacting tutelage of Bernard de Jussieu, she would go on to illustrate Abbé Pluche's work of natural theology and popular science, *Le Spectacle de la Nature*, in the 1730s. Her ability to paint scientifically accurate and aesthetically beautiful renderings of plants drew praise from *académiciens*, well-known men of letters from Franklin to Rousseau, as well as Louis XV himself. Unlike the labor of most of the women in this volume, Basseporte's contributions have been carefully preserved in the holdings of the Muséum nationale d'Histoire naturelle.

Just as Basseporte excelled in rendering the exactitude of plants, so too did her pupil, Marie-Marguerite Biheron, become known for her precise wax models of human anatomy during the second half of the eighteenth century. Biheron trained with Basseporte in the 1730s and 1740s, and the two would develop a deep friendship until the latter's death in 1780. Biheron first drew wide public attention in the summer of 1759 when she presented her work to the Académie des Sciences, although her reputation had been already established among Parisian scientific networks that included Denis Diderot, anatomist Sauveur-François Morand, and Franklin's translator, Thomas-François Dalibard. Clearly Biheron was a part of the Christian *Aufklärung* or Enlightened Catholicism emerging in the middle of the century—a historiographical connection Gelbart does not make—as she saw the complexity of the inner workings of the human body as empirical proof of God's providential hand.^[3] To produce her lifelike “models of the greatest perfection” as the *Mémoires secrets* put it in 1763, she patiently combined wax, oils, silk, various resins, soap, and other unidentified additives (p. 180). Audiences and periodicals raved about her work as superior to any that had come before, and the public would enjoy her anatomical sculptures in both Paris and London during the 1760s and 1770s. Like Basseporte, Biheron sought simultaneously to entertain and educate through her models, which were admired by medical students and practitioners as well as the general public. Despite Morand's continual support of Biheron, the medical establishment likely saw her as a rival and sought to curb her influence, notably by preventing her pieces from being included in the Cabinet du Roi.

Gelbart's final chapter focuses on the life of amateur chemist and anatomist, Madame Thiroux d'Arconville. Alain Corbin and Robert Mauzi identified long ago the importance of her moral philosophy and experiments on decomposition.^[4] Gelbart contributes to this historiographical conversation by painting a much richer tableau of her scientific network, obstacles, and legacy. Like Barret, Basseporte, and Biheron, d'Arconville frequented the Jardin du Roi, where she took classes and met Enlightenment figures such as Diderot, Jussieu, and Malesherbes. Meeting Pierre-Joseph Macquer opened up the new field of chemistry for d'Arconville, and she approached the study of matter in an empirically rigorous manner that was framed by the eighteenth-century objective to “render all the substances that compose the universe useful to mankind” (p. 227). Her reading and experiments provided the necessary knowledge for her to translate Alexander Monro's *Anatomy of the Human Bones* and Peter Shaw's *Chemical Lectures* in 1759. Accompanying the original text were lengthy introductions—her preface to Shaw's work is nearly 100 pages long—that demonstrate her erudition and conceptualization of chemistry as a science in constant effervescence and reassessment. She shared the problems she uncovered in Shaw's conclusions and invited her readers to try to replicate his findings on their own. During the 1760s, she transitioned from translator to author and published a diverse body of work over the next two decades ranging from an influential treatise on friendship to a number of historical essays. Her 1766 volume on putrefaction was the result of hundreds of careful experiments conducted within her very simple laboratory, consisting mostly of household items where she concluded that

exposure to air caused decay. At the end of her *Essai*, she embodied one of the longstanding ideals of the Republic of Letters by admiringly placing the advancement of knowledge above her own reputation. She conceded the superiority of David Macbride's recent contention that putrefaction is delayed if carbon dioxide can remain trapped, although both d'Arconville and Macbride were later superseded by modern germ theory. Unlike other female scientists in this book, d'Arconville survived into the early Napoleonic period and would go on to adopt a decidedly anti-philosophe position. She celebrated the Enlightenment spirit of skepticism and rigorous criticism in the realm of science but saw the tumult of the Revolution (she lost close friends to the blade of the guillotine) as damning proof that this perspective was destructive when applied to the social and political order.

Minerva's French Sisters is a fine and eminently readable addition to the literature on female scientists in the French Enlightenment. Akin to Madeleine-Françoise Basseporte's botanical paintings, Gelbart's vibrant prose both instructs and pleases. She carefully uncovers the complex layers of these women's lives, achievements, and struggles while situating their trajectories within a particular set of relationships, institutions, and physical spaces that span from the salons of Paris to the shores of far-flung French colonies.

Throughout her chapters, Gelbart cites the work of previous scholars, such as Laurence Bongie's classic article on the Ferrand-Condillac partnership, so her contention at the outset that these women have, up until only recently, been "erased from the record" does not reflect the very research upon which she builds her study (p. 4).^[5] And despite her elegant writing, there are some puzzling passages. In discussing a midcentury revival of the Jansenist *convulsionnaires*, Gelbart adopts the polemics of the philosophe rather than the measured tone of the historian or anthropologist of religion in dismissing these events as "weird gatherings" and "cultish frenzies." (p. 178) Referring to Louis XV's moniker of "le Bien-Aimé," (p. 200) Gelbart considers this a "sarcastic" term of endearment, but sarcasm would have been rather far from the minds of most who originally conferred this sobriquet on the king in 1744 in the wake of his recovery from illness while in Metz during the War of the Austrian Succession.

Although chapters can be read independently, making this book very useful in the classroom setting, there are two interrelated *files conducteurs* which undergird the book's coherence. First, we learn that in an era where the institutionalization of scientific knowledge was still in development, women of great tenacity could carve out a distinctive audience and contribute to intellectual life. Gelbart's careful reconstruction of the salon of Élisabeth Ferrand, for example, revives an older understanding of this space as both elite leisure and a serious intellectual venue.^[6] Second, we also discover that the Enlightenment was not as categorically chauvinistic as conventional interpretations suggest, as some men (such as Condillac, Lalande, Jussieu and Morand) willingly assisted these women in their pursuits while others actively opposed their recognition (Alexis Clairaut) or attempted to steal their work (Claude Abriet and Charles Denos).

As mentioned at the outset, this book is ethnographically inflected, and thus also serves as a *cas d'école* in how to exercise reasonable speculation where the evidence simply runs out. This is why there is a steady march of adverbs such as "unlikely," "unsurprisingly," "surely," and "probably" across the narrative, which may unsettle more positivist readers. But, as Gelbart aptly reminds us, "hard facts are not all we need. We also wonder, wander, ponder, speculate...borrowing devices from other genres, including fiction" (p. 13). Such scaffolding is necessary to connect

disparate documentary evidence into a compelling and powerful story about women of science during the French Enlightenment.

NOTES

[1] Cited in Julie Candler Hayes, “Sex and Gender, Feeling and Thinking: Imagining Women as Intellectuals,” in *The Cambridge Companion to the French Enlightenment*, ed., Daniel Brewer (New York: Cambridge University Press, 2014), p. 91.

[2] Carol Pal, *Republic of Women: Rethinking the Republic of Letters in the Seventeenth Century* (New York: Cambridge University Press, 2012).

[3] Jeffrey Burson, “The Catholic Enlightenment in France from the *Fin de Siècle* Crisis of Consciousness to the Revolution, 1650-1789,” in *A Companion to the Catholic Enlightenment in Europe*, ed., Ulrich Lehner and Michael Printy (Leiden: Brill, 2010), pp. 63-125.

[4] Alain Corbin, *The Foul and The Fragrant: Odor and the French Social Imagination* (Cambridge, MA: Harvard University Press, 1986), p. 19.

[5] Laurence Bongie, “A New Condillac Letter and the Genesis of the *Traité des sensations*,” *Journal of the History of Philosophy* 16 (1978): 83-94.

[6] The work most damaging to the understanding of the salon as a serious intellectual venue remains Antoine Lilti, *Le monde des salons: Sociabilité et mondanité à Paris au XVIII^e siècle* (Paris: Fayard, 2005).

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