

Women on the Edge in Early Modern Europe

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3. Chemistry, Medicine, and Beauty on the Edge: Marie Meurdrac

Sarah Gordon

Abstract

Marie Meurdrac (1610–1680) was a self-taught chemist who published an early chemistry textbook. Unique in seventeenth-century France, Meurdrac had her own laboratory where she conducted experiments, taught private courses to women, and wrote *La Chymie charitable et facile, en faveur des dames*. The little-studied manual addresses a wide range of topics, from technical distillation to cosmetics. This chapter argues that the textbook is as much a treatise on the education of women as it is a treatise on chemical principles and processes. Meurdrac's powerful preface advocates for equality in education, and she discusses her own learning process and chemical experiments. Her voice is heard: giving voice to the otherwise voiceless women of science in this period.

Keywords: women in science; education; chemistry

From laudanum to lipstick, housewife and self-taught chemist Marie Meurdrac (1610–1680) taught French women practical chemical recipes along with organic chemistry principles and procedures. With her chemistry textbook, Meurdrac openly challenged societal norms. Her goal was to give women access to science. This chapter argues that Marie Meurdrac situates herself on the edge of the early modern scientific community because, as she suggests, both her gender and her chosen scientific discipline are on the edge of science.¹ The analysis below demonstrates how Meurdrac's

¹ Even until the twentieth century, women laboratory scientists still found themselves in male-dominated disciplines, despite the much later case of Marie Curie, as the survey of female scientists in Abir-Am and Outram, *Uneasy Careers and Intimate Lives*, demonstrates.

work is disruptive, crossing the lines of gender roles, generic conventions, academic traditions, and scientific norms. Throughout the seventeenth century, relatively few European women found themselves even on the outskirts of science, especially in the fields of chemistry and medicine.² Those women who did attempt to insert themselves within the male scientific circles were often criticized or even mocked, as represented in seventeenth-century French literature, theatre, and philosophy. Very few women studied chemistry, medicine, natural philosophy, biology, or other related sciences formally, if at all, and the few who did were mostly unknown, self-taught practitioners. At least one self-taught female chemist, Meurdrac, decided on her own that women needed a textbook covering chemistry principles and practical applications, writing one of the first chemistry textbooks, and the first by a female author.³ Because even bourgeois and aristocratic women were not included in formal scientific education at university, Meurdrac explains that she endeavoured to provide accessible written knowledge and informal hands-on training in chemistry, botany, pharmacology, and medicine, as well as in cosmetics. Only a few studies in the history of science and medicine mention her work and do not focus on her preface, which addresses gender equality and scientific education for women. This chapter fills that gap in the scholarship.

There were spaces for women's learning in the seventeenth century, of course, but Marie Meurdrac wanted to make the laboratory a space for women as well. She was not content to remain in the female space of what would become the enlightened intellectual women's *salons* of Paris, debating philosophical and literary topics with other eloquent, self-educated women. For her, actions spoke louder than words. Her textbook reveals she was not only learned in natural philosophy, but also interested in

2 Jean-Pierre Poirier, *Histoire des femmes de science en France*, includes Meurdrac as a significant figure in his survey of the history of women in science in Ancien Régime France. Eric Sartori's *Histoire des femmes scientifiques* views her as influential in the 'vulgarization' of chemistry and pharmacy. On the other side of the Channel, several women made significant contributions in science and philosophy to the Royal Society and beyond, as demonstrated in *Women, Science and Medicine 1500–1700*, particularly in Hunter's chapter, 'Women and Domestic Medicine', which is concerned with what Hunter calls 'lady experimenters' and women's domestic medicine, focusing on a trend of women publishing in this area in the 1650s in England.

3 Being an autodidact in this period meant extensive experimentation and invention, in addition to reliance on existing traditions (Hunter, 'Sisters of the Royal Society'). In seventeenth-century Britain, noblewomen Margaret Cavendish (1623–1673) and Anne Conway (1631–1679) were also autodidacts, and, as according to Parageau's research, 'Without any method or sustained pedagogical guidance, they had to invent their own conception and practice of science' ('Auto Didacticism and the Construction of Scientific Discourse in Early Modern England', 4).

hands-on experimentalism. Simply put, she was not afraid to get her hands dirty, to experiment, to install laboratory equipment, and to work with open flames and volatile chemicals. It would have been extremely rare in mid-seventeenth-century Europe for a female to have her own laboratory, with expensive specialist equipment for laboratory experimentation and pharmaceutical composition.⁴ Contrary to what one might perhaps expect in this period, Meurdrac was not an assistant to a male scientist, as were many other women in the eighteenth century and beyond who worked in male-run laboratories, or assisted their husbands.⁵ In her preface, she describes that in the private space of her home laboratory, she discreetly taught private courses in chemistry, botanical distillation, and chemical medicine, because such courses were not available to women in a formal academic setting. Like scientists working in medical chemistry today, her goal was to isolate medicinal agents in plants, to analyse new compounds, and to create pharmaceuticals. Meurdrac's textbook reveals that she used her personal laboratory to teach herself, to teach others, to codify the processes of distillation, and remarkably, to record the results of original and reproduced chemical experiments. In addition, she had a charity apothecary practice, in which she advised others on medicines and their indications, even prescribing them and providing them for those living in poverty, all the while recording the medicines' efficacy.

Published in Paris first in 1656, Meurdrac's *La Chymie charitable et facile en faveur des dames*, or literally translated, 'Charitable and Easy Chemistry, Especially for Women', was a treatise on chemistry that covered equipment, techniques, chemical properties of various substances both vegetable and mineral, and finally, detailed recipes for cosmetics and medical remedies. The title is often translated into English as 'Useful and Easy Chemistry, for the Benefit of Ladies'. Though the text includes practical instruction written with detailed steps and clear language, it is far from easy, and it is much more than a mere recipe collection, and represents one of the first textbooks in chemistry. It is nearly impossible to definitively label the

4 In one of the few technical studies of Meurdrac, Solsana-Pairó, 'Los instrumentos de vidrio de Nicaise Le Fèvre y Marie Meurdrac', provides a useful overview and historical context of the types of glassware that would have been used by Meurdrac, Le Fèvre, and their contemporaries.

5 See Rayner-Canham and Rayner-Canham, *Women in Chemistry*, 13–25, for a discussion of the roles of chemistry assistants and female chemist assistants of the Paris salon culture. Wiesner-Hanks, *Women and Gender in Early Modern Europe*, 168, suggests that women who were wives or relatives of scientists (such as astronomers) also made their own observations and findings of their own; her study does not cover Meurdrac, but does deal with gender and power in science in this period.

genre of Meurdrac's work. In one sense, it is as much a treatise on equitable education for women as it is a treatise on chemistry.

Meurdrac's epistolary preface appears to be proactively responding to contemporary views of women in education and patriarchal scientific professions, continuing the debate raised since the Middle Ages in the ongoing literary and philosophical *Querelle des Femmes* phenomenon.⁶ Meurdrac's remark situates her on one side of this centuries-long literary war of the sexes. She was truly an exception, because

If the definition of what is to be an educated woman is to be a woman educated like a man, then by definition there would be very few educated women in early modern Europe. Thus, any history of women's education following such guidelines will be a history of exceptional women, those women who, in spite of institutional impediments, attained an educational training similar to that of a man's.⁷

Limited education for women and gender bias continued to be ubiquitous in the educational discourse of the seventeenth century. Even in Rousseau's later *Emile: A Treatise on Education* (1762), part fictional novel, part philosophical treatise, published decades after Meurdrac's textbook was circulating, the French Enlightenment philosopher still claimed that women could not understand abstract concepts. Furthermore, Rousseau suggests that women did not have a mind for their own scientific research, and could only really act as assistants to male researchers:

The quest for abstract and speculative truths, principles, and axioms in the sciences, for everything that tends to generalize ideas, is not within the competence of women. All their studies ought to be related to practice. It is for them to apply the principles man has found, and to make the observations, which lead man to the establishment of principles. Regarding what is not immediately connected with their duties, all the reflections of women ought to be directed to the study of men or to the pleasing kinds of knowledge that have only taste as their aim; for, as regards works of genius, they are out of the reach of women. [...] Nor do

6 The *Querelle des Femmes* was a pre-feminist phenomenon dating approximately from the end of the fifteenth century through the seventeenth century in Europe. In this period, a number of literary and philosophical texts in French and Latin, many by women, debated the superiority of the sexes, raised questions of nature versus nurture, and called into question established views on gender.

7 Whitehead, *Women's Education in Early Modern Europe*, x.

women have sufficient precision and attention to succeed at the exact sciences.⁸

Rousseau's gender discrimination was normalized in Meurdrac's day; in particular, the notion that women were considered more pragmatic, less theoretical, and less exact in their thinking.⁹ Meurdrac's prefatory letter explicitly attacks this normalized sexist view of women's aptitudes in science, and the text provides examples of the observations, principles, and practical knowledge she gained through her independent scientific research.

Rousseau's *Émile* situates women as would-be assistants to men, as those who merely make observations or carry out practical hands-on work. Certainly, many French female chemists did start or continue their careers acting as educated assistants or trained technicians in laboratories, such as the later examples of Mary Anne Paulze Lavoisier (born in 1719),¹⁰ or Claudine Picardet (born 1735, mostly a translator of scientific texts); however, this was not the case years earlier for the fiercely independent Meurdrac. Moreover, contrary to Rousseau's condemnations of women's minds as limited to the practical and the imprecise, Meurdrac includes theories and principles in her text as well, noting that it is without the help of any male counterpart.

Meurdrac was not the only woman in mid-seventeenth-century Europe to advocate for the education of women, of course. In the Netherlands, Anna Maria van Schurman (1607–1678) published *Whether a Christian Woman Should Be Educated* (1638) and *The Learned Maid, Or Whether A Maid May Be A Scholar, A Logick Exercise* (1659).¹¹ Parisian novelist Marie de Gournay (1565–1645), an associate of essayist Michel de Montaigne, penned *Égalité des Hommes et des Femmes* (1622) (*Equality of Men and Women*), arguing that women's achievements would be equal to men's if they were given equal education, and Meurdrac echoes this argument in her own preface. Moreover, though focusing more on the arts, humanities, and languages, these two roughly contemporary treatises mention the scientific education of women, both practical and theoretical.

8 Rousseau, *Émile*, 386–387.

9 The biographies of seventeenth-century women by Natalie Zemon Davis also stand in stark opposition to Rousseau's contemporary condemnation of women's roles and minds.

10 Poirier, *Lavoisier: Chemist, Biologist, Economist*, covers the role of the later eighteenth-century chemist and economist Antoine-Laurent Lavoisier's wife as an influential figure in science in her own right.

11 Most of her extant publications and correspondence with contemporaries have been edited and translated by Joyce Irwin, in Schurman, *Whether a Christian Woman Should Be Educated*.

Greater socio-cultural context to Meurdrac's work may be found in seventeenth-century French theatre. For instance, Molière's play, *Les Femmes savantes*, performed in Paris in 1672, when Meurdrac's *Chymie* was still being reprinted posthumously in new editions and translations, still depicts education for women—and especially female autodidacts—in a negative light.¹² It is highly derisive of female philosophers and scientists, it cautions against exaggerated *préciosité*,¹³ and is echoed later in Rousseau's treatise on education. Molière's social satire mocks many groups, and here he ridicules *les femmes précieuses*, a stereotype of a group of increasingly educated intellectual women in France, of which Marie Meurdrac no doubt would have been considered an example in the eyes of Molière's audience. Chemistry is represented in this play as part of a charlatan alchemy practice, or at best, as a burgeoning pseudo-learned tradition. Such negative dramatic and literary representations of learned women or women scientists provide evidence of the oppressive context in which Meurdrac indeed was bravely going out on a limb in publishing a volume of chemical and medical education for women.

The frontispiece in the early French printed editions refers to the author as 'Demoiselle M. M.', highlighting her gender. Very few biographical details are known for Meurdrac. Daughter of a rural notary and registrar, Marie Meurdrac was an upper-middle-class woman who lived in the suburbs of Paris (Mandres). She was married to Henri de Vibrac, an upper-middle-class military man, who was a high-ranking artillery commander in the guard unit of Charles de Valois, Duke of Angoulême. She was a close friend to the influential intellectual Comtesse de Guiche. Meurdrac's sister, Madame de La Guette, was also an educated author, and had her *Mémoire* published in 1681.¹⁴ Already positioned on the edge, as the only scientist in the family, Meurdrac

12 The cursory study in Bishop and DeLoach, 'Marie Meurdrac', suggests there is literary-historical value in reading Meurdrac, as it may in turn shed light on Molière's theatrical portrayal of educated women in this period.

13 Though it resists definition, French *préciosité* was in part a literary trend and a social phenomenon in seventeenth- and eighteenth-century France, a term used to describe upper-class female intellectuals and authors who valued wit, erudition, education, and sentiment. For a more thorough characterization of the salons and the *précieuses* who inhabited their female space, see, for example: Beasley, *Salons, History, and the Creation of Seventeenth-Century France*.

14 Further biographical details of Meurdrac's life and home are given in a historical survey on French women in science by Poirier, *Histoire des femmes de science en France, 170–176*. Lougee also lists Marie Meurdrac in the biographical background on the Meurdrac family. Lougee, "Reason for the Public to Admire Her", has investigated the truths and fictions in her sister's memoir and the historical record and issues of social identity and justice (13–30). Recent scholarship has focused more on the sister Madame de La Guette's memoirs than on Meurdrac's science; see, for example: Gréle, 'Les Mémoires de Madame de La Guette', among others.

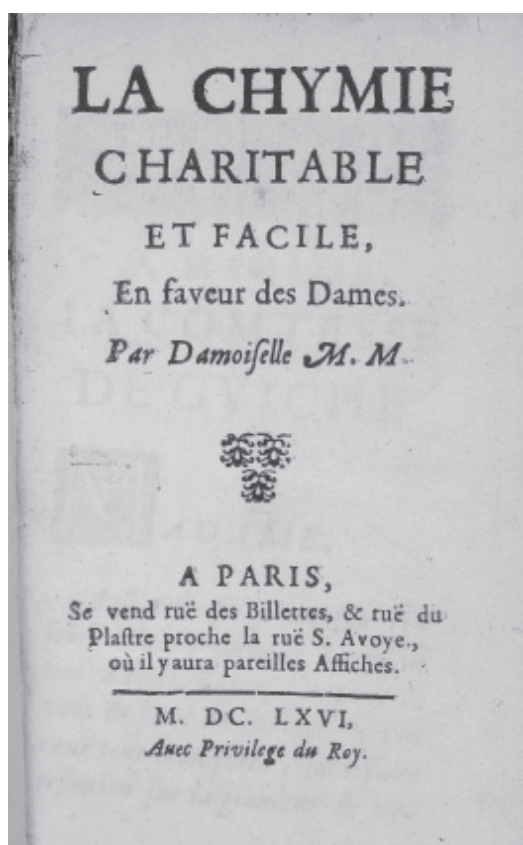


Figure 3.1: Title page of the 1666 reprint of *La Chymie charitable et facile*, featuring the Privilège du Roi. Image courtesy of the Science History Institute (Philadelphia, PA).

was a non-conformist, a self-proclaimed chemist and botanist trying to get her foot in the door of the medical and scientific community so that other women could enter, too. Again, Meurdrac had her own laboratory, a unique female space for science, on the edge of the scientific community. Incredibly, it appears that she owned and operated her own furnace, which would have been very costly and would have required formal written permission from the authorities.

The book appears to have an aristocratic female patron, as it is dedicated to the Comtesse de Guiche, and one of the praise poems mentions her. Moreover, legitimacy is given to its contents and usefulness as it has received approval from both the medical school in Paris and from the Crown (signified by its being stamped with the official Privilège du Roi) by the second edition (Figure 3.1). It is not known to what extent the Comtesse de Guiche acted as a patroness or commissioned experiments, or whether she may have funded any of Meurdrac's chemical equipment, supplies for experiments, students, or other scientific endeavours, but it is reasonable to assume she provided both financial and moral support. Certainly, de Guiche built a community of educated, audacious women around her, and promoted

scientific education among women and publications aimed at autodidact women, whether aristocrats or upper-middle class.

Andréolle and Molinari discuss the growing relationship between women and science education in the seventeenth century, using the slightly later works of English natural philosophers Margaret Cavendish (1661–1717) and Anne Conway (1631–1679) as examples. Meurdrac would have been writing in this same context, in which most women did not have a formal education in the sciences, but instead a few female autodidacts, with indirect access to scientific knowledge,

wrote treatises of natural philosophy revealing clear knowledge of the scientific theories of their time. [...] As autodidacts, both women could only glean fragments of knowledge, which they then tried to reassemble in dialogic and eclectic works.¹⁵

This same fragmentary approach to scientific knowledge is clear in the nature of Meurdrac's work, which is very much a compilation of practical instruction, theoretical knowledge, and laboratory detail.

Seventeenth-Century Chemistry

In Meurdrac's view of natural philosophy, chemistry forms the basis for all human physiology and medicine. The numerous plant and mineral-based remedies she includes are varied, and more detailed, than those in medical commonplace books or household receipt books of the fifteenth and sixteenth centuries that would have been circulating in her time. Many of the available common ingredients, however, were much the same as in these manuals (including cinnamon, nutmeg, pepper, ginger, rosemary, hyssop, sage, egg, and dozens of others).

In publishing *La Chymie charitable*, Meurdrac intended it as a chemistry manual for an upper-middle-class female audience. As the examples discussed show, the manual ranges from technical distillation practices to medicinal botany and cosmetics. Her writing is highly technical, and this study shows how her approach is different from other roughly contemporary manuals (including cookbooks and printed household manuals) by men.

¹⁵ Andréolle and Molinari, *Women and Science*, xiii. Other historians have also studied the growing numbers of women making contributions to scientific fields in the seventeenth century, notably several in Zinsser, *Men, Women, and the Birthing of Modern Science*.

She states that she is concerned with the safety and education of women who might be engaging in chemistry, distillation, or medicine at home without training.

With her treatise focusing on chemistry and pharmacy, combined with other topics of special interest to women, Meurdrac was not only on the margins of the scientific community, but chemistry itself was also a discipline on the margins in early seventeenth-century Europe.¹⁶ Chemistry was not yet considered its own discipline, but was often either subsumed under other sciences or crafts (such as botany, medicine, or metallurgy) or often considered merely practical knowledge. It was taught privately rather than at university in France. Chemistry was somewhat controversial in the early to mid seventeenth century, and posed a perceived threat to natural philosophy in France and beyond. The Faculté de Médecine in Paris still opposed teaching chemistry as an official subject in the medical school when the first edition of *La Chymie charitable* appeared; however, in the second edition, published in Lyon in 1680, the book received the printed approval of doctors from the medical school. Meurdrac also admits that some of her medical recipes came from the Faculté de Médecine (thereby perhaps unwittingly lending authority to her work and linking herself to this community). Not yet a fully independent university science in the mid-seventeenth century, chemistry was taught in Paris in the botanical gardens of the Jardin du Roi (after 1640),¹⁷ and to some extent in the facilities of the French Master Apothecaries (founded in 1629), with courses that were mostly botanical and medical in nature. Meurdrac's work appears to be steeped in this botanical tradition as well. Historian Jean-Pierre Poirier judges that 'Marie possessed a real competency of an apothecary'.¹⁸

Chemistry was thus perceived as a tradecraft and burgeoning science, of practical use for physicians, apothecaries, and other practitioners in the early

¹⁶ Meurdrac was of course not the only woman on the margins of the scientific community at this time; Davis, in her *Women on the Margins*, paints a picture of many women on the margins of the artisanal-commercial domain in roughly the same period, stepping outside of traditional roles, including in entomology and education. See also Rayner-Canham and Frenette, 'Some French Women Chemists', for brief biographies of Meurdrac, and other little-studied, later French women chemists following in the trail blazed by Meurdrac.

¹⁷ See Clericuzio, 'Teaching Chemistry and Chemistry Textbooks in France', for a portrait of chemistry teaching in this period in Paris, including the chemical education provided through the Jardin du Roi, and male-authored chemical textbooks and courses.

¹⁸ Poirier, *Histoire des femmes de science en France*, 172. 'Marie possède une réelle compétence d'apothicaire'. All translations are my own.

seventeenth century.¹⁹ While in the twenty-first century, of course, medicinal chemistry is regarded as a major—and by nature multidisciplinary—field of research, it was seen as a lesser, impure science in Meurdrac's time. Theorems and laws of chemistry were only beginning to be introduced, and were still criticized by natural philosophers until the mid to late seventeenth century. Around 1650–1680, chemistry and chemical compounds were beginning to be accepted by some natural philosophers and those working in the sciences as the foundations of nature itself. As interest in chemistry as a legitimate science grew, so too did the demand for textbooks on the subject. During this time, chemistry primers may have been used more for practice than for theoretical education, for example by apothecaries and physicians for distilling plants and mixing medicines, or by metallurgists as a hands-on guide to the properties of metals. There was no set course in chemistry available in public institutions, and no set chemistry curriculum. Another of Meurdrac's significant contributions to education was pedagogical, and she suggests which practical and theoretical topics should be included in a future curriculum.

Contemporary male-authored chemistry textbooks and treatises include the influential *Tyrocinium chymicum* (1610, 1615) by Jean Béguin; the *Traicté de la Chymie* (1660), by Nicolas Le Fevre;²⁰ and the medically-oriented, widely circulated *Le Cours de Chymie* (1660, 1675) by Nicolas Lemery (contemporary with later editions of Meurdrac and influential in the field of chemistry and chemistry education later).²¹ Like these later texts written by men, Meurdrac's also included a laboratory manual of materials and techniques, as well as a list of chemical terms and symbols. Meurdrac's chapters are organized in a similar fashion to that of Béguin's Latin text (but it does not appear to be a direct source), beginning with operations, and continuing with the distillation and use of various vegetable and mineral products.

Being the first female chemist to publish such a textbook is not the only thing that qualifies Meurdrac as cutting edge, however. She not only explains necessary instrumentation for isolating substances and chemical compounds, but also details the processes of the purification, synthesis, testing,

19 Space does not allow for a complete history of chemistry in this period. See: Baudet, *Histoire de la chimie*, for a more complete list and discussion of Meurdrac's male contemporaries. Baudet lists Meurdrac on page 86.

20 From 1751, the work was published as *Cours de Chymie*, and modern editions have used this title.

21 For a more complete overview of the history of French chemistry textbooks and primers preceding and following Meurdrac, see: Clericuzio, 'Teaching Chemistry and Chemistry Textbooks in France'.

analysis, and identification of compounds and products. The rudimentary textbook is thus looking forward to the skills of organic chemists and medicinal chemists today. Writing from the margins of the scientific community, Meurdrac not only provided some of the first accessible scientific education for women, but also made useful contributions to the fields of chemistry and medicine, such as revealing for the first time some of the physical dangers of mercury poisoning and other observations that look forward to the field of toxicology. She also helped refine existing techniques, such as the *bain marie*. Moreover, Meurdrac's contribution includes making explicit connections between chemical compositions, physiology, and medicines, explaining many properties of each substance as well as potential medical indications for different substances.

Minds Have No Gender

Decreeing boldly on the second page of her preface that 'minds have no sex',²² Meurdrac demonstrates that she is aware of her own marginalized position, and of her need to justify her decision to publish and to educate. It is possible that she is remarkably forward thinking in redefining the very notion of gender in this statement. She appears aware that she is defying societal expectations for her gender. Meurdrac's textbook crosses the boundaries of scientific education in the mid 1600s and takes a feminist point of view in claiming that women and men can be equally good chemists, and that women need to have access to chemistry and related scientific fields. The textbook was groundbreaking, but like its female author, still remained on the margins of the scientific community, because, after all, in the view of the seventeenth-century scientific establishment, it was merely a textbook of chemistry for women specifically, 'in favour of women'.²³ Tosi's brief study has deemed this a feminist position, and indeed Meurdrac may have been a feminist before her time.²⁴ In her preface, Meurdrac is also celebrating difference, and attempting to redefine gender roles and notions of gender. But above all, her preface speaks to her position as female scientist doing science for and with other women. Lynette Hunter has suggested that women

22 'les esprits n'ont point de sexe'.

23 'en faveur des dames'. The translation of this subtitle invites ambiguity in its interpretation, implying either sexist gender bias or feminist gender advocacy, it can be translated with varying nuances: in favour of women, for the benefit of women, especially for women, or on behalf of women.

24 Tosi, *La Chymie charitable et facile*, 531. 'l'auteur se signale par une prise de position féministe'.

may have had different social practices and indeed different scientific practices in this period.²⁵

The printed chemical compendium is over 330 pages long. Meurdrac's preface speaks volumes about women on the edge of the scientific community, as she justifies her project in chemistry education.²⁶ The preface is a little-studied but powerful, trailblazing discourse on both gender and science. First, the female chemist begins with the genesis of her publication project, explaining that it was purely for her own edification and even enjoyment but that she hoped to share it with others in wider distribution:

When I began this little treatise, it was for my satisfaction alone, and for the purpose of not losing the memory of the knowledge I have acquired through lengthy work and through various often-repeated experiments. I cannot conceal that upon seeing it completed better than I could have dared to hope, I was tempted to publish it: but if I had reasons for bringing it to light, I also had reasons for first keeping it hidden and for not exposing it to general criticism.²⁷

She is careful to avoid the criticism of the patriarchal scientific community. She makes several arguments for the validity of her publication, from different angles, anticipating the objections of her male detractors. Meurdrac claims she delayed publication for about two years, struggling with an internal debate about the limitations traditionally placed on her gender, while she considered the potential ramifications of publishing a textbook as a woman:

²⁵ Hunter, 'Women and Science in the Sixteenth and Seventeenth Centuries', 123, explains this difference: 'men and women practised science in the same places and with roughly the same equipment up until the middle of the seventeenth century. However, they practised science for different reasons, leading them to communicate in different ways, and these different rhetorics have had a long-term impact on access to scientific power and to the legitimation of particular methodologies and various kinds of scientific knowledge'.

²⁶ A published translation of this passage appears in the brief biography of Meurdrac in the broad survey of female chemists by Rayner-Canham and Rayner-Canham, *Women in Chemistry*, which refers to her as, 'one of the last women of alchemy', 9. Note that her name is misspelled as 'Meudrac' in that publication.

²⁷ Meurdrac, *La Chymie charitable et facile*, 2. 'Quand j'ay commence ce petit Traité, ç'a esté pour ma seule satisfaction, & pour ne pas perdre la memoire des conoissances que je me suis acquises par un long travail, & par diverses experiences plusieurs fois reïterées. Je ne puis celer que le voyant achevé mieux que je n'eusse osé esperer, j'ai esté tentée de le publier : mais si j'avois des raisons pour le metre en lumiere, j'en avois pour le tenir caché, & ne le pas exposer à la censure generale'.

I remained undecided in the combat for almost two years: I objected to myself that it was not the profession of a lady to teach; that she should remain in silence, listen and learn, without bearing witness to her knowledge: that it is above her station to offer a work to the public and that her reputation is not ordinarily enhanced by doing so, because men always mistrust and blame the products that come from a woman's mind. Furthermore, perhaps such secrets should not be divulged; and that in the end, maybe, in of my way of writing, there could well be things that need to be revised.²⁸

After her disclaimers and defence of her work as a woman, Meurdrac then argues for the recognition of the equality of women, lamenting that with the same formal education and support, women's achievements would equal those of men. Though she is a self-made intellectual, she argues for increased availability of more formal academic education of women and support of their scientific research. Meurdrac notices that some educated or self-educated women studying and writing in other fields (mostly in the humanities) and professions have been successful and are as competent as their male counterparts:

I flattered myself on the other hand that I am not the first woman to have sent something to press; that minds have no sex, and that if the minds of women were cultivated like those of men, and that if as much time and effort were used to instruct women, their minds would be equal; that our century has seen women born who, in prose, poetry, languages, philosophy, and even the government of the state, are in no way inferior in their competence and talent to men.²⁹

28 Meurdrac, *La Chymie charitable et facile*, 2. 'Dans ce combat je suis demeurée près de deux ans irresoluë : je m'objectois à moy-mesme que ce n'estoit pas la profession d'une femme d'enseigner; qu'elle doit demeurer dans le silence, écouter & apprendre, sans tesmoigner qu'elle sçait : qu'il est au dessus d'elle de donner un Ouvrage au public, & que cette reputation n'est pas ordinaire avantageuse, puisque les hommes méprisent & blasment toujours les productions qui partent de l'esprit d'une femme. D'ailleurs, que les secrets ne se veulent pas divulguer, & qu'enfin il se trouveroit, peut-estre, dans ma maniere d'écrire bien des choses à reprendre'.

29 Meurdrac, *La Chymie charitable et facile*, 2. 'Je me flattois d'un autre costé de ce que je ne suis pas la premiere qui ait mis quelque chose sous la Presse; que les Esprits n'ont point de sexe, & que si ceux des femmes estoient cultives comme ceux des hommes, & que l'on employast autant de temps & de dépense à les instruire, ils pourroient les égaler: que nostre siecle a veu naistre des femmes qui pour la Prose, la Poësie, les Langues, la Philosophie, & le gouvernement mesme de l'Estat, ne cedent en rien à la suffisance, & à la capacité des hommes'.

She is thus aware that her century is a time for change and opportunity for women in many different academic fields and professions (and in fact, between Meurdrac's time and the Revolution, there was a window of increased activity and publishing opportunity for female scientists and writers). Her sister was one of these published writers, with her memoir. Marie goes on to justify the publication of the medical section of the book, alluding to concepts of public health, preventative medicine, and women's health:

Moreover, this work is useful, because it contains many infallible remedies for the cure of illnesses, for the maintenance of health, and several rare secrets for the ladies; not only to preserve but also to increase the advantages that they have received from Nature; it is a curious work, it teaches faithfully and clearly how to practice them with ease; and it would be a sin against Charity to hide the knowledge that God has given me, that may benefit the whole world. That is the sole motive that made me resolve to let this book leave my hands.³⁰

Interestingly, in her discussion on her thought process pondering whether or not to publish, she does not mention any encouragement by male or female colleagues or students—though she does dedicate her work to the Comtesse de Guiche, and the book is published with praise poems by well-known supporters, both male and female, lending it some social status and legitimacy. She appears to be fully self-motivated in her unusually daring educational enterprise.

Meurdrac's foreword reveals that she was an experimentalist, who followed the new trends and guidelines of what was eventually to grow into the modern experimental scientific method. She devotes part of her textbook to the responsibilities and best practices of a scientist. She expresses her wish to share her observations from the laboratory, and her desire that her medicines become a benefit to the public. Her respect for the new scientific method, and her views on gender equality in education, extend beyond the preface as recurring themes in the primer itself.

30 Meurdrac, *La Chymie charitable et facile*, 3. 'De plus, que cet Ouvrage est utile, qu'il contient quantité de remedes infallibles pour la guerison des maladies, pour la conservation de la santé, & plusieurs rares secrets en faveur des Dames; non seulement pour conserver, mais aussi pour augmenter les avantages qu'elles ont receus de la Nature; qu'il est curieux, qu'il enseigne fidèlement & familièrement à les pratiquer avec facilité, & que se seroit pecher contre la Charité de cacher les connoissances que Die m'a données, qui peuvent profiter à tout le monde. C'est le seul motif qui m'a fait resoudre à laisser sortir ce Livre de mes mains'.

Later in the foreword text, Meurdrac offers a defence of chemistry, and distinguishes it from other arts or sciences. Meurdrac tries to demonstrate that chemistry for her is a discipline, distinct from older, less scientific and less respectable arts, such as alchemy or home remedy for lay healers. Just as French chemist Jean Béguin had done a few decades prior, she contributes her own thoughts on the nature of the field of chemistry, expanding on prior work such as his. She then makes an important move to distinguish herself from the less credible alchemists of centuries past, declaring that she will intentionally omit chemical operations related to gold and silver, saying that she knows nothing of them and cannot attest to their veracity (potentially also, gold and silver may have been too expensive for her middle-class female students to use for their own experiments or home remedies). Her refusal of such alchemical operation lends legitimacy to her publication. Meurdrac attempts to disassociate herself from what she views as a lesser art. In one of the few brief existing scholarly studies on Meurdrac, Feinstein situates her in the company of lesser-known male figures in alchemy.³¹

Pinkus's comprehensive study of alchemy unpacks the ambiguous terms 'alchemy' and 'chemistry' over time, summarizing approaches to this problematic term thus:

Scholars of alchemy tend to take up one of a number of possible positions toward their subject: Either alchemy is pre-modern chemistry; or it is a spiritual, ritualistic discourse or set of theories; it is a form of medico-pharmacological manipulation of elements; or it is some combination of the above. The problem of how to distinguish alchemy from (a prehistory of) chemistry is intimately bound up with the teleological view of the history of science as a progressive accretion of knowledge. As early as the seventeenth century, scientists who could not utterly dismiss the contribution of the alchemists favored the adoption of the word *chymistry* to suggest a summation of both 'old' and 'new' ideas.³²

Meurdrac's work is indeed medico-pharmacological to some extent, but it is neither spiritual nor ritualistic in nature, and has much more in common with early modern textbooks than it does with medieval alchemy manuals. It may, however, be somewhat anachronistic for scholars to attempt to completely disassociate the notions alchemy and chemistry in this period.

³¹ Feinstein, 'Chemistry by a Lady for Ladies', 59–60.

³² Pinkus, *Alchemical Mercury*, 4.

Like others working outside of their discipline and outside of their gender roles, Meurdrac's work resists the hegemonic, progressive views of the history of science, and it resists being confined to such definitions. The foreword and the recorded experiments and observations appear to ally themselves with a new science.

An advocate of the growing trend of experimentalism, Meurdrac defends her burgeoning new discipline, assures us of the truthfulness of her own work, and the efficaciousness of her medical remedies in the closing words of her forward. She relies more on her own empirical testing of chemical operations and medicines than on written authorities. Some of her appeals to authority or humble admissions of her own limitations are admittedly commonplace, but nonetheless show an awareness of her role in the contemporary scholarly debates surrounding chemistry. Observation and experimentation were of course growing in importance in scientific communities in Europe in this period, and Meurdrac's work was no exception to this empirical vogue. Her foreword emphasizes that her experiments followed strict parameters, and that they were often repeated. She makes a few recognizable, indirect allusions to older medical, chemical, and alchemical texts; but she often provides her own updated and tested versions of well-known medical recipes that appeared in countless medical commonplace books in France and England throughout the mid fifteenth and sixteenth centuries. However, her textbook is much more organized, structured, explanatory, and pedagogically oriented than older medical manuals, and because of this, her work is unique and cannot be lumped together with medical commonplace books or household manuals.

From Medicine to Make Up

The six sections of Meurdrac's book also speak to the scientific and multidisciplinary nature of her experiments. In addition, the sections appear to include both the practical aspects and the theoretical underpinnings of chemistry. The divisions Meurdrac makes are: principles, methods and techniques of chemistry, properties of plants, animal and mineral-based substances, preparation of medicine, and cosmetics.³³ The title of the first section sets out its pedagogical objectives: 'teaching the principles,

33 'principes, méthodes et techniques de la chimie, propriétés des végétaux, des substances animales et des minéraux, préparation des médicaments, et cosmétiques'.

operations, vessels, lute,³⁴ furnaces, flames, and weights that are used in chemistry'.³⁵

On the theoretical side, Meurdrac distinguishes active and passive principles, looking forward to the principles of modern chemistry. As for the practical aspect, procedures and materials are all part of the chemistry course and Meurdrac may have demonstrated proper usage privately to female students in her laboratory. Needless to say, women were in the minority in the scientific and education communities, but one assumes that the interested female audience Meurdrac addresses in her text really did exist, and were learning from her work in chemistry.

Over two dozen distinct chemical operations (with several that either are the same or have analogues in chemistry today) and specific types of fires are described in detail, including at least six types of distillation, cohobation (repeated distillation), sublimation, rectification, calcination, coagulation, filtration, desiccation, amalgamation, fermentation, torrefaction, and others. Distillation operations are the most frequently presented with examples, perhaps the most practical, or the most sought-after, procedures for Meurdrac's students.

For most of the remedies in the pharmacopeia section, Meurdrac includes descriptions of the therapeutic properties of ingredients (again, unlike many past medical commonplace manuals, which omit explanations of how ingredients work with human physiology). Part of her experimentation in medicinal chemistry was to distribute remedies and medicines—from elixirs to ointments—to those in need in the name of charity, but also in the name of scientific experimentation on human subjects. Meurdrac offers treatments for many common ailments and symptoms from haemorrhoids to jaundice, and even experimental treatments for epilepsy. Perhaps most impressively, she includes medicines with preparations that would today be known to include antiseptic and antibiotic qualities in her sections on wound-care and burn-care. She offers treatments for the plague, small pox, gout, dysentery, and other major diseases common in that time. Her recipes include more detailed instructions and physiology than do earlier sixteenth-century medical manuals in circulation at the time that may have been her sources. Her medicine is still inscribed in the Paracelsian tradition

34 Lute was a substance used by chemists or alchemists to seal and protect vessels from heat for distillation, or to line furnaces.

35 'Enseignant les Principes, les Operations, les Termes, les Vaisseaux, les Luts, les Feux, les Fourneaux & les Poids dont on se sert en Chymie'.

and Galenic principles of course, but at times is also quite inventive and based on her own experimentation with symptoms and remedies.

Meurdrac's instructions for medicinal therapies distilled from plants, flowers, fruits, barks in the second section, and remedies mixed from animal bi-products, ranging from animal fats to honey to bone in the third section, would also ally her work with the medical community of male physicians and apothecaries using biological and chemical preparations in their treatments. Meurdrac's text treats a full range of illnesses and disease from head to toe, having more in common with the late medieval and early modern tradition of written medical commonplace books written by or for male physicians than it does, for instance, with the more female-specific or female-written textbooks circulating in her time.³⁶

Chemical properties and various chemical compounds appear in the fourth section including minerals, salts, sulphuric acid, nitric acid, saltpetre, and many others, that are characterized. She makes a division between salts, sulphur, and mercury, harkening back to the Paracelsian movement that relied on the principle of the balance or harmony in these three elements, for the tripartite organization of the chemical part of her work.

Recipes in the fifth section range from familiar plant products to more exotic plant preparations for a variety of therapies, including migraines, heart palpitations, melancholy, burns, and toothache. There are preparations from aromatherapy to vermicide to pain-killers such as laudanum, and those that still follow principles that are used by both traditional and holistic medicine today. Meurdrac's preparation for laudanum and other recipes shared many similarities with the sixteenth-century pharmacopeia of the Swiss-German Paracelsus (1493–1541). Meurdrac's chemical theory and medical materials are very much in line with Paracelsian doctrine as accepted by her contemporaries.³⁷

Some of the more shocking oils and powders offered in the medicinal recipe section include medicines made using dried human blood or ground human bone, or dried slugs, recalling the type of content found in earlier fifteenth century medical commonplace book recipes. Most of the other

36 Such as Louise Bourgeois's learned treatises on obstetrical theory and practical midwifery. See: Perkins, *Midwifery and Medicine in Early Modern France*.

37 A discussion of Paracelsian chemistry's supporters and detractors in this period is outside of the scope of this chapter. See Clericuzio, *Elements, Principles, and Corpuscles*, 26–35, for further contextualization of chemistry and natural philosophy in this period, and specifically a discussion of the status of Paracelsian chemistry and its relation to atomism in this context. See also the landmark studies on the intellectual history of English and French Paracelsians by Allen Debus.

medical preparations are in line with contemporary remedies with probably more effective and more botanical ingredients.

From the mid-sixteenth century through to the mid-seventeenth century, iatrochemistry, or the art of chemical medicine, was growing in popularity. Chemistry itself was thought to be a key to understanding medicine, disease, and human physiology (iatrochemistry was also popular with British chemists, including Robert Boyle). The concept of balance in chemistry and in the human body was important in the theories of iatrochemistry, and the distillation of plant and mineral products, and metals, aimed at using their essence to treat imbalances. Many male chemists in this period attempted to promote their discipline as the key not only to practical medicine, but also to natural philosophy, with chemicals as the building blocks of nature. Meurdrac's work is largely informed by iatrochemistry.

The more gendered final section of the manual includes cosmetics and what might be considered dermatology today. Cosmetics—including hair colouring, skincare, lipstick, rouge, and medicinal perfume—feature in the end of the work. Again, she gives detailed instructions for the distillation and isolation of substances found in plants, both for medicinal and cosmetic uses, some of which appear to be the first time some of the plant compounds were isolated, paving the way for Pelletier and other chemists who isolated plant alkaloid compounds almost a century later. But only after five lengthy sections on chemical principles and the preparations of herbal medicine does her manual's sixth section turn to cosmetics, including treatments for wrinkles, tooth whitening, hair regrowth, and hair colouring, skin bleaching, sunscreen lotion, scar treatments, and make up (including rouge, eye liner, concealer, and others), as a practical application for her chemistry. Some of her cosmetics are related to the diseases common in her time, such as waters and creams to treat the scars and marks of smallpox. She is also interested in women's health and offers therapies related to menstruation, lactation, childbirth, and other women's health issues. Meurdrac states she has added this section for women, so that they can avoid dangerous accidents in cosmetics when mixing their own at home, because they do not yet know enough about chemical compositions.

Conventional praise poems that appear following the foreword highlight her talents and attest to impact and reception of her work. Du Pelletier's prefatory sonnet begins, 'Your book shows us marvellous effects'.³⁸ Moreover, this sonnet and others allude to Meurdrac's discoveries, inventions, or revelations of secrets: 'The secrets of your book are laid bare on each

38 'Ton livre nous fait voir de merveilleux effets'. Meurdrac, *La Chymie charitable et facile*, 6.

page'.³⁹ Somewhat tellingly, not all of them refer to her gender, concentrating instead on her competence and contributions. They almost act as letters of recommendation for her entry into the scientific and academic communities. One praises her approach and thinks she makes it look easy and explains her techniques well. Moreover, one praises her for her ability to discover and explain in simple language the secrets theories of the ancients. Meurdrac's approach is indeed clear and detailed, as this sonnet suggests, and often jargon-free, aimed at the beginner who requires basic instruction in chemical compounds, detailed definitions and descriptions, and simple techniques such as distillation. It is a remarkable contribution to the field of chemistry that unlike many medical chemical treatises or even cookery books prior to her work, Meurdrac adds precise quantities and measurements by weight and volume, times, and temperatures, and equipment or vessels to be used in the preparation of medicine.

Meurdrac demonstrates an awareness of the high cost of materials and laboratory supplies, offering advice on where to make affordable purchases, or how to make substitutions if one is unable to acquire the necessary materials. If a woman's place was in the kitchen in this period, Meurdrac wanted that kitchen to be well equipped with chemistry equipment. She also invites her readers to her own laboratory if they are unable to conduct experiments or make her medical recipes at home.⁴⁰

Meurdrac invites her readers to contact her personally if they have questions, or to meet in person if they desire further hands-on personal instruction in her home laboratory. As in male-dominated laboratories of this period, growing interest in experimental methodologies meant possibilities for collaborative work and social networks within the growing scientific community. Meurdrac attempts to build this female community with the publication of her textbook, and promises she can reveal to her students other 'secrets' and discoveries. This is not alchemy, so it is not a secret. It is chemistry, so should be shared and its findings replicated. She goes on to explicitly guarantee the accuracy of her observations and the quality of her instruction, by offering to demonstrate her experiments in person. She assures the reader that the operations that appear in the book have all been

39 'Des Secrets que ton Livre explique en chaque page'. Meurdrac, *La Chymie charitable et facile*, 7.

40 One scholar mentions Meurdrac and suggests that perhaps for her and for later early modern women scientists, 'The association of chemistry with the kitchen gave women a certain confidence to publish in the field', Schiebinger, *The Mind Has No Sex?*, 113; however, Meurdrac goes out of her way to set up a legitimate laboratory space, and to explain the need for and proper safe use of specific chemistry vessels and equipment.



Figure 3.2: Title page of the second edition of *La chymie charitable et facile* (left), and the book's frontispiece, featuring an image of Marie Meurdrac in her laboratory. Images courtesy of the Science History Institute (Philadelphia, PA).

tested, and are tried and true. She promotes communication and shared results among scientists. Moreover, the publication of her experiments, results, and replications lent further credibility to her work as a scientist.

As for the contemporary reception of her work, from what little is known, it is clear the *La Chymie charitable* became very popular over the next five decades or longer. Five French editions (1666, 1674, 1680, 1687, and 1711)—three of these editions while she was still alive—as well as at least six translations into German (between 1674 and 1738), and at least one in Italian (1682),⁴¹ attest to the broad circulation and growing popular reception of the textbook for women, though it is not known how many women or men were

41 Ray, *Daughters of Alchemy*, focuses on Italy in the sixteenth and seventeenth centuries, and mentions Meurdrac, showing that female scientists—and those engaging in what she calls 'practical alchemy'—were more commonly accepted in Italy than in France in the early modern period.

using the textbook as a learning tool in their own homes or laboratories. The 1687 French edition adds a frontispiece with a portrait of the author, seated on a box of materials in front of shelves full of books and laboratory equipment including vessels and glass containers for distillation, with this iconography highlighting the identity and gender of the author, and lending further authenticity to the text by picturing both written textual authorities and realistic laboratory materials (Figure 3.2).

In the end, Meurdrac's voice remains a unique combination of learned science, educational advocacy, and practical medical and cosmetic instruction. She is aware that she is on the fringe of the scientific community, and her preface endeavours to justify both her field and her sex. The structure, content, level of detail, and scientific methodologies set her work apart from the traditions of household manuals of the time. She makes a compelling argument in her foreword for stepping out of the margins and into the laboratory to publish a chemistry primer for women. Such an argument from the seventeenth century is still relevant today, as sexism, gender bias, double standards, and significant gender pay gaps still exist in science and STEM fields.⁴² She celebrates women's education and female agency. Moreover, when Meurdrac logs her own laboratory experiments that she conducts ostensibly on her own or with her own female students, her voice is heard—giving voice to the often voiceless women of science in this period and beginning a conversation about gender bias in the scientific community that continues today. She argues that the mind has no gender and that science should not either. Despite its author's initial fears of the reception of a scientific textbook by a woman, in the decades immediately following its publication, *La Chymie charitable* was widely circulated and eventually earned a spot on the shelf in the chemical education library that was far from marginal.

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42 I extend my thanks to MollyAnne Porter for her input on this chapter.

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