An Award Letter Too Late to Receive: Considering Sophie Germain's Mathematical Correspondence

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Abstract: In 1816, Sophie Germain became the first woman to win the Grand Prix de Mathématiques, awarded by the Class of Mathematics and Physics of the French Institute for her work on the theory of elastic surfaces. However, due to a failure in communication, she never received the formal invitation with her ceremony tickets and ultimately did not attend. Instead, she received a brief notice at the last moment, advising her that she was welcome to be present. Taking this undelivered letter as a reflection of broader structural barriers, this paper examines the role of mathematical correspondence in both facilitating and limiting women's participation in scientific networks during the late modern period. By tracing the complexity of Germain's epistolary exchanges, I argue that her letters remain key documents for reconstructing her intellectual trajectory and understanding the challenges of recognition and institutional inclusion.

Introduction: Women Writing Letters as Mathematicians and Scientists

In 1816, Marie-Sophie Germain (1776–1831) became the first woman to win the Grand Prix de Mathématiques, awarded by the Class of Mathematics and Physics of the French Institute for her theory of vibrations of general curved and plane elastic surfaces. And yet she did not attend the award ceremony due to a mishap with her invitation. Instead of receiving the award letter along with her tickets, she was sent a curt notice at the last moment informing her of the invitation, while acknowledging that her admission tickets had been lost in the mail:

> M. Delambre has the honour to present his homage to M^lle^ Germain and sends her two Institute tickets, although presuming that her friends will ask her for more than she will have to distribute, if, as he supposes, she has received them yesterday or today. But M^s^ Delambre having learned from M. Sedillot that M^lle^ Germain had not yet received them last night, he fears that there has been some oversight, and requests, in this case, to resort to him, and since the printed tickets are sold out, he can make up for it with a hand-written ticket for as many people as it will suit M^lle^ Germain to indicate to him.[1]

This is a very strange letter to be sent to the winner of such a prestigious prize. In addressing the award receiver, Jean-Baptiste Delambre, the perpetual secretary for the mathematical sciences of the Institute, is openly uncomfortable: he offers no congratulations whatsoever but instead pens a confusing letter, first admitting that the Institute tickets are fewer than Germain might have probably needed, and then acknowledging—without any apology—that the first woman to receive such an award had not even got her admission tickets to the award ceremony. In lieu of this glaring omission, Delambre merely offers handwritten tickets for as many attendees the winner wished to invite. Overall, the tone of the letter is condescending, perhaps expressing the fact that Germain

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won the award being the only candidate for three consecutive submissions and with some reservations by the award committee. As Luis Bucciarelli and Nancy Dworsky have commented, the flaws of her submission were related to the fact that although she had a brilliant mathematical mind, her approach was "awkward and clumsy when viewed against the background of available mathematics at the time."[2] This was due to her lack of rigorous mathematical training, having been excluded from the higher institutions that were accessible to her male contemporaries.[3]

The cold and patronizing tone of the letter notwithstanding, what is the discursive context of this letter, what is the sender trying to imply, and how is the receiver supposed to read it and respond? There is here a strange epistolary relationship which is highly gendered to say the least. The fact that Germain received this letter only two days before the award ceremony speaks volumes about the gendered politics of science in her time and beyond. It is no wonder that under the circumstances, Germain decided not to attend the ceremony, although we can never be sure about her decision not to attend. Surely, she was not the only one to have been puzzled by this "miscommunication." This is how the *Journal des Débats* reported her non-attendance at the time:

> The class of mathematical and physical sciences of the Institute held its public session today, a very large assembly that attracted without doubt those desiring to see a virtuoso of a new kind, Miss Sophie Germain, to whom the prize for elastic membranes was to be awarded. The expectation of the public was disappointed: the young lady did not go to take the trophy that no one of her gender has ever received in France.[4]

In considering the letter that Germain never received as emblematic of its time, I look into the role of mathematical correspondences in both including and excluding women from the world of science and mathematics during the late modern period and beyond. Scientific correspondence played a crucial role in the production and circulation of knowledge in the eighteenth and nineteenth centuries, operating within the broader framework of the Republic of Letters—a transnational intellectual community that relied on epistolary exchanges to share discoveries, debate ideas, and establish scholarly networks.[5]

The nineteenth century saw a surge in critical editions of mathematical correspondences, a trend that has continued into the digital age with large-scale editorial projects aiming to preserve and analyse these exchanges. As Maria Teresa Borgato and Irène Passeron have pointed out, letters between mathematicians, as well as between mathematicians and politicians, publishers, and intellectuals, offer invaluable insights not only into mathematical debates but also into broader cultural and scientific developments. Moreover, correspondences from lesser-known mathematicians contribute to reconstructing biographies, tracing the evolution of scientific ideas and clarifying the historical context of mathematical texts.[6]

Within this evolving archival landscape, letters have become particularly significant in uncovering women's engagement with mathematics and science. Given their exclusion from formal institutions, women often pursued mathematical studies in domestic or informal settings, making their correspondences vital sources for understanding their intellectual contributions. Beyond their role in scientific discourse, these letters also reveal personal details about their lives—their struggles for recognition, their relationships with mentors and peers, and the emotional and intellectual labour involved in their mathematical pursuits. Correspondence provides glimpses into their daily routines, financial difficulties, health concerns, and the social constraints that shaped their opportunities. Through these letters, we gain insight into how they negotiated access to knowledge, built

networks of support, and positioned themselves within intellectual circles, even as they remained outside institutional frameworks. It is in this context that I consider Germain's correspondence in this paper.

Having been neglected for long, Germain's mathematical work and correspondence has become the object of a small but robust body of literature, although her philosophical work has received less attention and has yet to be translated in English.[7] Germain's letters have been read as evidentiary documents of her mathematical abilities, as well as testaments to her contribution to the field of number theory. Apart from some passing references to the insights that these letters offer into her ideas and personal relations, however, their epistolary traits and the multifarious ways they throw light on the troubling relation between gender, science, and mathematics in nineteenth century France have not been discussed.[8] To fill this gap in scholarship of Germain, this paper focuses on her epistolary practices and offers some insights emerging from the analysis of her letters in different forms of archival documents.

The paper unfolds in four sections. I outline Germain's intellectual portrait, examining how her letters not only filled gaps in her mathematical education but also documented her evolving identity as a mathematician in dialogue with her peers. I then address methodological and epistemological questions that emerge from working with four distinct types of documents: digitised letters, analogue manuscripts, posthumously published correspondence in *Œuvres Philosophiques*, and Germain's epistolary meta-archive—letters transcribed, published, and analysed in modern studies. Finally, I argue that her correspondence with fellow mathematicians in France and abroad is essential to reconstructing her intellectual trajectory, while also revealing the complexities of archival fragmentation and misattribution.

Letters and Life Narratives

Sophie Germain's life has been told and retold from several angles and in different genres and media over the years. Almost all renditions of her life, however, draw on two historical sources, often paraphrasing them and sometimes without acknowledgement or proper citation. The first biographical note came from her friend, Guglielmo Libri, an Italian mathematician and member of the French Academy of Sciences. Libri first wrote Germain's obituary in the *Journal des Débats* on May 18, 1832, almost one year after her passing, and it was then included in the preliminaries of the first publication of her philosophical work *Considérations Générales* in 1833.[9] The second was written by Jean-Léon-Hippolyte Stupuy, a poet, playwright, and literary figure.[10] His study first appeared in the 1879 publication of her *Œuvres Philosophiques* and was included again in its second edition in 1896. Unlike Libri, Stupuy did not know Germain, as he was born in 1832, one year after her death. His biographical study, however, was an opportunity to enwrap his own thoughts and ideas about social and gender inequalities around the life of his biographical subject. What I have found interesting in studying these first two biographical sources is the unacknowledged iterations that slip from the first to the second, eventually creating a biographical matrix, within which all subsequent biographies are entangled. "Events and political discussions have prevented us from drawing public attention to the loss which some time ago, the mathematical sciences suffered in the person of M^{lle} Sophie Germain," Libri wrote in the beginning of his obituary, referring to the uprisings that shook Paris throughout 1831.[11] As Dora Musielak has noted, political upheavals marked Germain's life from the beginning of her life till the very end. Let us go to the beginning then.

At thirteen, Sophie Germain found the French Revolution unfolding on her doorstep—her childhood home on the Rue St. Denis placed her in the heart of Paris. Moreover, her father's active involvement in revolutionary politics left, as Stupuy remarked, "an indelible imprint on her mind."[12] More than a witness, she experienced firsthand the sociopolitical and intellectual upheavals that defined France at the turn of the eighteenth century, later reflecting on them in her unfinished philosophical treatise.[13]

But revolutions bring fear as well as fervour, and the radical phase of the French Revolution was particularly harrowing for a young girl. Both of her biographers note that Germain sought refuge in her father's library, believing that "a strong and sustained occupation could be a diversion from her fears."[14] The climate of suspicion extended beyond political dissidents to scientists as exemplified by the infamous declaration at Antoine Lavoisier's trial: "The Republic has no need for geniuses."[15]

Given that as a woman Germain was excluded from all formal educational institutions for higher studies—before, as well as after the revolution—the library became the site of her self-education, while she chose mathematics as her favorite discipline.[16] The details of her fascination with mathematics through the story of Archimedes' death as a result of his total immersion in the magic world of numbers, figures, and calculations has become a refrain in Germain's biographies: "this geometrical science so endearing that nothing can distract from it, not even a threat of death, this science of which she hardly knows the name, this is the one that suits her; and, on the spot, she takes the heroic resolution to give herself completely to it".[17]

Germain's mathematical education began at home but later extended beyond its confines. When the École Polytechnique opened in 1794—admitting only men—she gained access to lecture notes and, despite the restrictions, submitted the required written responses under a male pseudonym. Disguising herself as Antoine-August LeBlanc, the name of an enrolled student, she wrote to Joseph-Louis Lagrange, professor of analysis at the École. Impressed by LeBlanc's insights, Lagrange sought out the promising student only to discover Germain's true identity. Far from deterring Lagrange, this revelation secured his mentorship. More than an act of defiance, this marked the beginning of a profound intellectual exchange. Through persistence and correspondence, Germain forged connections with leading mathematicians, shaping both her own mathematical development and her place within the Parisian scientific community.[18] Some letters from this period carry traces of her acknowledgement as a mathematical mind of her times: "Citizen Cousin requests the honor of being presented to you as well as to Mademoiselle your daughter, if you condescend to agree," Monsieur Bernard, a bookseller, wrote to Germain's mother.[19] Cousin was the author of a popular mathematical book, *Leçons sur le calcul différentiel et le calcul intégral*, and he had asked for this meeting so that he could offer Germain "all the facilities he possessed that could be useful for her career in science that she had cultivated so successfully."[20]

When Carl Friedrich Gauss published *Disquisitiones Arithmeticae* in 1801, Germain was deeply impressed by its originality. Eager to engage with his ideas, she initiated a correspondence with him—an exchange that provided fresh impetus for her exploration of number theory. [21] This intellectual dialogue would ultimately lead her to her later work on Fermat's Last Theorem.[22] There are fourteen extant letters in their correspondence, ten from Germain and four from Gauss. The first one is dated November 21, 1804, and the last one March 28, 1829, with a period of ten years without epistolary communication between 1809 and 1819.

What characterises this correspondence from the very first letter is Germain's attitude towards Gauss as a fellow mathematician and not as a schoolgirl seeking advice: "Your *Disquisitiones Arithmeticae* has been the object of my admiration and of my studies for a long time," she wrote

in the first letter, and while praising his "beautiful theorem" in the last chapter of his book, she was also keen to point out that this theorem could be generalised, enclosing two proofs of this generalization in the letter.[23] Apart from sending her own comments and proofs, she was further bold enough to disclose that "I did this work with all the more pleasure," linking this unusual feeling of pleasure in doing mathematics with an informal learning process: "it gave me the opportunity to familiarise myself with this method which, I have no doubt, will be in your hands the instrument of new discoveries," she wrote.[24]

Germain revisits the notion of feelings (*sentiments*) in her philosophical treatise, but her perspective diverges sharply from the common understanding of feelings as mere emotions or affects. For her, sentiments are the foundation of human understanding—the first step in the long process of reasoning, knowledge production, and the ethical and aesthetic dimensions of existence. Whether she speaks of "a profound feeling of order and proportions" as the guiding force behind both great literature and scientific discovery, or evokes "a feeling of continuity," "a feeling of analogy," or "a feeling of freedom," she constructs a universal sentiment—one that corresponds to a universal truth and underpins the creative power of the human mind.[25] Her pleasure in engaging with Gauss' number theory was thus a component of her philosophical take on feelings.

But to return to the letter and Germain's epistolary practices, despite the assertive tone of the letter in responding to Gauss's problems and solutions with her own ideas and proofs, Germain was also aware of their difference given Gauss' status in the mathematical field in juxtaposition to her own self-identified position as "an amateur": "I take the liberty of submitting these essays to your judgment" she wrote towards the end of the letter, "hoping that you will not disdain to enlighten with your opinion an amateur enthusiast of the science which you cultivate with such brilliant successes."[26] In finally signing the letter as "LeBlanc," Germain also indicated to her recipient that should he find it worth the candle to reply, he should direct his letter to M. Silvestre de Sacy, a member of the National Institute, Rue Hautefeuille in Paris. There is therefore a third person complicit in this correspondence, the recipient of the letter as an object and not necessarily as content, who was willing to keep her secret and help her initiate an epistolary relationship with Gauss.[27]

Germain's correspondence with Gauss has been well studied in terms of the mathematical problems they addressed. However, one aspect that remains unexplored is how their exchange operates within and across multiple discursive formations, seamlessly integrating distinct thematic and epistemic concerns. While in their first letters, they simply exchanged ideas about mathematical formulas and theorems, the Napoleonic wars opened up the scene for personal relationships to unfold and eventually for the revelation of Germain's gender. When the French army invaded Prussia in 1806, Germain feared for Gauss's safety. Her biographers link this concern to her childhood fascination with Archimedes, who was killed by a Roman soldier while engrossed in his mathematical work during the siege of Syracuse.[28] Believing Gauss might be similarly oblivious to the dangers of war—especially after the death of his patron, the duke of Brunswick—she used family connections to secure his military protection. However, when the message reached Gauss, he was baffled to learn that an unknown *Mademoiselle Germain* had taken an interest in his safety. The confusion was cleared through Germain's revelation of her true name and gender in a letter she wrote on February 20, 1807, in which she explained that "fearing the ridicule ascribed to the title of learned woman, I borrowed the name of M. LeBlanc to write to you and to communicate to you notes which, doubtless, did not deserve the indulgence with which you were kind enough to respond to them."[29]

Although the circumstances of the revelation of her gender to Gauss have often been cited and discussed in the literature, what has gone unnoticed is Germain's explanation that she had not hidden her gender identity because she was a woman but because she wanted to detach herself from the figure of "the learned woman," which she conceived as ridiculous and unworthy of her position in the field of mathematical sciences. The ridicule attached to the figure of "the learned woman" [*femme savante*] comes of course from Molière's 1672 comedy, *Les femmes savantes*.[30] Beyond its theatrical origins, the figure of the "learned woman" has a rich genealogy in the history of women in mathematics and science, tracing back to the seventeenth century and Bernard le Bovier de Fontenelle's *Conversations on the Plurality of Worlds,* published in 1686. In this influential work, Fontenelle sought to popularise scientific knowledge through dialogues between a male philosopher and intellectually curious women eager to grasp the mysteries of the natural world. As Paula Findlen observes, this book introduced a new scientific persona—no longer the scholastic master instructing male disciples but a witty philosopher who made science accessible through cultural analogy, charming and engaging female interlocutors in the process.[31]

Fontenelle's dialogues helped open pathways for women in what historians have termed "public science." During the seventeenth and early eighteenth centuries, science was increasingly practiced outside institutional settings by independent scholars, and this shift allowed more women of privileged backgrounds to participate in intellectual discourse.[32] However, for women deeply engaged in mathematics and science, the figure of the "learned woman" often felt trivializing. When Francesco Algarotti published *Il Newtonianismo per le dame* in 1737, which presented Isaac Newton's theories in a popularised form, it led female mathematicians like Émilie Du Châtelet and Maria Gaetana Agnesi to dismiss it as frivolous and irrelevant to their serious work.[33] This tension between popularization and serious engagement resurfaces decades later in a letter of apology from the astronomer Jérôme Lalande, who had also published a scientific book for ladies, the *Astronomie des Dames* in 1785, which testifies to Germain's indignation at not being taken seriously as a scientist and mathematician.: "You told me that you had read Laplace's *Systeme du Monde* and that you did not wish to read my short work on astronomy. I said that I thought that you could not understand the one without the other. I assume that it was this suggestion that caused your anger. For this I apologise," Lalande wrote to young Germain in November 1797.[34]

Germain's rejection of the literary stereotype of the "learned woman"—one defined by a male gaze and guidance with a superficial and pretentious fixation on learning—was motivated by her desire to establish herself as an independent mathematician, actively participating in meaningful dialogue and collaboration with her peers. However, her discomfort with being associated with this image contrasts with her self-identification as an "amateur scientist," a term she first expressed in her letter to Gauss and which resurfaces in her "revelation" letter. This tension not only helps to justify her use of a male penname but also underscores her desire to reconcile her admiration for Gauss and his contributions to mathematics with her appreciation of his support for her own mathematical pursuits, as she links her efforts to secure his safety with her reverence for his work: "The gratitude I owe you for the encouragement you have given me, by showing me that you count me among the amateurs of the sublime arithmetic whose mysteries you have unrevealed, was for me a particular reason for seeking news from you in a moment when the troubles of war could inspire some fears, and I have learned with real satisfaction that you have remained at home as undisturbed as circumstances could permit."[35]

It is important to note that the subject position of the amateur—an independent scholar working outside institutional structures—carried different connotations in Germain's time than the degraded notion of "amateur" we know today or the ridicule associated with the "learned woman."

As Gianna Pomata has pointed out, non-institutionalised scholarship was common in pre-revolutionary France, "the rule rather than the exception."[36] The figure of the amateur, distinct from the academic scientist, emerged in the nineteenth century amid the professionalization of the sciences, which included national and international conferences, scientific journals, and disciplinary standards. Germain could thus identify herself as an independent scholar—an amateur of her era—but not as a "learned woman."

Having revealed her gender identity to Gauss, Germain was also keen to emphasise her eagerness to continue with her mathematical studies, since his work was motivating: "I have an appetite for analysis that I developed after reading your work, and which inspired me and gave me the confidence to send you my feeble attempts" she wrote.[37] She also expressed her hope that their correspondence would continue despite the revelation, asked for his response as an acknowledgement, but also enclosed an addendum of four pages with mathematical proofs:

> I hope that the information, that I have today confided to you, will not deprive me of the honour that you have granted me under a borrowed name, and that you will not disdain to devote a few moments to send me your news. Believe Monsieur, the interest I attach to it and receive the assurance of sincere admiration with which I have the honour to be,
>
> Your very humble servant,
> Sophie Germain[38]

Germain did not need to worry as Gauss's response was warm and enthusiastic: "The scholarly notes with which all your letters are so richly filled have given me a thousand pleasures. I have studied them with attention, and I admire the ease with which you penetrate all branches of arithmetic, and the wisdom with which you generalise and perfect," Gauss wrote after expressing his gratitude for her "precious friendship" and admiration for her "noblest courage, totally extraordinary talents, and superior genius" despite the difficulties and prejudices that she had faced as a woman.[39] After this warm and enthusiastic acknowledgement, Gauss continues his letter with three densely written pages of mathematical formulas in what historians of mathematics have considered as a very important letter in terms of the mathematical problems he communicated to Germain.[40]

As noted above, one aspect that remains unexamined in the literature on the Germain-Gauss correspondence is the fluid interplay of different discursive elements within their letters. This pattern is not unique to Germain but can also be observed in the correspondence of other female mathematicians from the early and late modern periods.[41] Such variations in epistolary conventions suggest that the formal structures, objective tone, and logical rigor typically associated with mathematical correspondence are often reshaped by the dynamics of intellectual exchange and social context. Moreover, they highlight the inherently relational and dialogic nature of letters, which extends beyond the mere transmission of knowledge, diverging from the structured evaluation processes familiar in modern scholarly communication. Germain's 1809 letter to Gauss exemplifies this nuanced and layered form of exchange:

> I do not pretend to fathom the profundity of your research. I sense that my intellect is far removed from yours, although our tasks are similar, since I, as you, have a great predilection for arithmetic problems. I find this part of science susceptible to a particular kind of elegance, which is not attained in the mathematical-physical sciences. It appears that in everything the interest of ideas is in inverse proportion to the usefulness they have in practice. This is not surprising when we consider that the human intellect, when working for its own satisfaction, should encounter the greatest intellectual beauties rather than when guided by an external motive.[42]

This epistolary extract echoes Germain's overall philosophical approach to science, which was further elaborated in her treatise. Indeed, it is in her philosophical work where she formulates the simple thesis that order, proportion, and simplicity are "intellectual necessities" eventually leading to the universal type of the beautiful and the true.[43] In this light there are no important differences between science, literature, and the fine arts as "the human mind is guided in all its conceptions by the foresight of certain results, towards which all its efforts are directed," and therefore obeys "the laws of its own existence," without any external compulsion obligation or "motive," precisely as stated in her letter to Gauss above.[44]

Germain's correspondence with Gauss ceased in 1809, after which her scientific focus shifted toward uncovering the mathematical principles behind acoustics. This shift culminated in her groundbreaking achievement of winning a prestigious mathematics prize from the French Institute in 1816. Biographers often highlight this accomplishment as a pivotal moment in her recognition as a published author. However, to fully appreciate the significance of this award, it is essential to understand its context.

The *Institut de France* was founded in 1795 in the wake of the French Revolution as part of the new constitution introduced by the National Convention. Marking a departure from the old royal academies, the Institute sought to advance scientific and artistic endeavors on a national scale and was structured into three major divisions or "classes," the first of which—the *Classe des Sciences physiques et mathématiques*—was, as Musielak has noted, essentially a reconstitution of the former Academy of Sciences.[45]

The primary role of the Institute was to foster scientific exchange, establish national standards for research, and provide advice to the government. It also organised scientific competitions and awards to encourage innovation. In 1809, the Institute announced a prestigious prize for a breakthrough in the physical sciences, specifically focusing on the modes of vibration of thin, flat, elastic plates. This was the competition that Germain entered and ultimately won but only after three attempts. As Bucciarelli and Dworsky have noted some prizes remained unawarded, and it was not uncommon for a contest to yield no entry deemed worthy of even an honorable mention. In such cases, the competition could be extended sometimes with the prize amount doubled.[46]

It is in this phase of her academic and writing career that Adrien-Marie Legendre, an eminent member of the First Class, became her true mentor, tutor, friend and eventually collaborator, since he gave her the opportunity to contribute to his most important book on number theory, *Essai sur la théorie de nombres.*[47] Their correspondence reveals that Legendre became seriously interested in Germain's work, and he respected her intellect and mathematical mind. At the same time, he was a rigorous critic, and his comments were both harsh and constructive.

When Germain's first attempt to enter the competition for solving the problem of vibrating surfaces was unsuccessful, Legendre wrote to her on December 4, 1811: "I do not have good news to give you concerning the examination of your memoir. Your principal equation is not correct."[48] The rest of the letter is an exposition of how her submission had gone wrong, including suggestions for a different approach: "your error seems to arise from the manner with which you tried to deduce the equation of a vibrating surface from the equation of a simple lamina," Legendre wrote.[49] His letter ended with a prediction that since her submission was the only entry that the Institute had received, the competition would be renewed and she would eventually have a second chance to solve the problem: "the same problem will be posed after a suitable time; therefore, hope is not lost. On the contrary, one may dream more than ever of carrying off the palm."[50] Germain's response was swift and appreciative: "I am not so surprised by the results you have informed me of

since I had little confidence in my work. I was carried away by an analogy that seemed striking, but which I was not fully able to comprehend. I am most obliged to you for the care that you have taken to obtain a judgment for me and for enlightening me on the errors that I have made."[51] Her appreciation and gratitude to Legendre notwithstanding, there are no letters between them during the period that she was preparing for her second entry to the competition, which was announced early in 1812 with a deadline in October 1813, as Legendre had anticipated. What is remarkable in this period, however, is that Germain seems to have matured as a scientist as a draft of a letter to an unknown recipient, who seems however to be a high ranked scientist at the Institute, testifies: "I think that my theory is supported by sufficient proofs and that it is more advanced," she wrote, expressing at the same time doubts about her work: "Despite all the reasons that I see in favour of my ideas, I have so little confidence in my judgment that I still doubt their value."[52]

Germain's lack of confidence is not unusual among female mathematicians and scientists, but what is notable in this letter is that she clearly linked her lack of confidence not to herself but to what she considered to be a prejudiced examination of her memoir given that the great Lagrange had proclaimed the problem she was tackling to be almost insolvable: "Without doubt, the problem has been abandoned only because this grand geometer judged it difficult. Possibly this same pre-judgment will mean a condemnation of my work without a reflective examination," she wrote in the same letter.[53] It was against this backdrop that she had chosen the following epigram for her memoir, following the protocol of submissions: "But by far the greatest obstacle to the progress of science and to the undertaking of new tasks and provinces therein is found in this: that men despair and think things impossible."[54] Germain drew on Francis Bacon's philosophical thought to call attention to her anxiety about the judgement of her work, but this epigram also carries traces of her determination to pursue science and mathematics in a man's world against the odds and despite all difficulties.

Germain's second submission was also unsuccessful, but this time she received an honorary mention as Legendre had again predicted in a letter dated December 4, 1813: "Putting the analysis aside, the rest, concerning the explanation of the phenomena, may be good. If the commission of the Institute were of this opinion, you might at least receive an honourable mention," he wrote, adding that he hoped "that the incorrect analysis will not harm the rest of the memoir and the parts of it that are correct."[55] Although ending with hope and encouragement, the tone of this letter is different as it shows irritation from the part of Legendre and unwillingness to be of further help: "I do not understand the analysis you send me at all; there is certainly an error in the writing or the reasoning," he wrote, adding that "I will not try to point out to you all the difficulties in a matter that I have not especially studied and that does not attract me; therefore it is useless to offer to meet with you and discuss them."[56] From the letter we understand that Germain wanted to make some amendments in her submission, but Legendre clarified that this was not possible at this stage. What he suggested instead was that Germain could pursue the publication of her memoir irrespective of the decision of the committee, something that eventually happened, but only after her last and successful attempt: "In any case, there is the possibility of having your research published, reestablishing the correct analysis or downplaying it, and your work will bring you honour. This was perhaps the proper thing to have done in the first place."[57]

What transpires from this flurry of letters between Germain and Legendre during the period that she was working on the problem of vibrating surfaces is not only that the award was not won easily, but also that Germain must have been a very strong and determined woman in pursuing her love and passion for mathematics. Apart from the difficulties of working on her own and without the academic background of a rigorous mathematical training, as we have already noted above, we

also need to visualise Germain working through the years of unprecedented social and political events not just for France but for the whole of Europe, including the fall of Napoleon and the restoration of the monarchy.[58]

Following her award, it was now time for Germain to prepare her first publication, which was of course self-funded, but still gave her honour, as Legendre had predicted. During this period Germain developed a friendship with Joseph Fourier and it is in their correspondence that we further follow tracks and traces of the long and difficult process of being established as a published mathematician and scientist. Their correspondence began 1816 and although their relation was more personal than professional, Fourier's position as a permanent secretary of the Academy of Sciences enabled Germain to become more integrated in the Parisian scientific community. In a letter sent on May 30, 1823, Fourier invited Germain to become a permanent attendee of the public meetings of the Institute, a privilege which was reserved only for the wives of the members: "I have the honour of informing you that every time you wish to attend the public meetings of the Institute you will be admitted to one of the reserved seats in the center of the hall. The Academy of Sciences wishes to demonstrate, by this distinction, all the interest that your mathematical works inspire, especially the scientific research that it has crowned through the award to you of one of its annual, grand prizes."[59]

It was thus in the social gatherings of the Parisian scientific community that Germain first met Libri on May 13, 1825, at one of the parties that the astronomer François Arago held at the Observatory every Thursday evening. Following their first meeting, Germain invited Libri to her home for lunch, and their subsequent friendship flourished mostly through correspondence. "I cannot express to you how much I regret having to leave Paris without having the honour of seeing you," Libri wrote from Florence on November 17, 1825, explaining that he had to leave Paris in a haste due to his mother being unwell.[60] In the same letter he mentioned that he had sent her a paper that she was interested in: "Mr. Arago, who was kind enough to spend a few days here, was kind enough to take it upon himself to give you, on my behalf, a copy of Riccati which you seemed to wish to possess: I hope it will help you remember a person who has the deepest feelings of esteem for you," Libri wrote.[61] Their letters have become important in the appreciation of Germain's contribution to the mathematical sciences, but they are also revealing of her personal feelings and thoughts. It was to Libri that she could talk openly about her frustration for being marginalised by the Parisian scientific circles, as in the following letter sent on September 26, 1826: "I am not surprised at your eagerness to renew conversations that cannot be found elsewhere than in Paris, all the doors are open to you. As I am not allowed to go to any sessions, I find myself almost as foreign to the movement of sciences as if I lived in another country. And yet, I prefer to be here even more than elsewhere because sometimes it happens to me to find by chance an opportunity to instruct myself."[62] This intimate letter reveals indeed how female mathematicians felt knowing that it was only through letters that they could have a sense of belonging to the academic community, although they continuously felt the effects of exclusion, even when receiving award letters as we have seen above. And yet they would stick to these rare epistolary opportunities to maintain some kind of belonging to the academic community and of course to advance their knowledge, as well as get feedback about their work, as the following letter to Augustin-Louis Cauchy, dated July 18, 1826, indicates: "I have followed your judgment, by publishing. I would be happy if you would take the trouble of communicating your observations to me. There are in this small work three things that seem to me to be of some importance."[63]

Germain wrote this letter to Cauchy after submitting to the Academy a memoir she published in 1826 to further elucidate her ideas on vibrating surfaces. When the Academy asked Cauchy to

review this memoir, Germain thought that this would be an opportunity for her to get feedback from the scientific community, which would be otherwise difficult to obtain. As Musielak has commented, the context of this letter reveals Germain's uncomfortable position in the Parisian scientific world.[64] First of all, she wrote a memoir and published it without the Academy's approval but then submitted it to them for a review, following Cauchy's advice, as the letter indicates. Bucciarelli and Dworsky have further observed that Cauchy must have given her this strange advice in order to avoid the difficult and unpleasant task of having to reject it, a process that would be only natural with any male mathematician: "they could not treat her as a full professional colleague, as they would any man, by simply rejecting the work. But how was she to know this? Once again, respect for her sex led to such disrespect for her person that she was allowed to appear ridiculous."[65]

Thus despite her efforts not to be identified with the ridiculed figure of "the learned woman" Germain must have often felt that she was treated like one, but in her correspondence with Libri she felt freer to express both her mathematical ideas as well as her personal feelings and fears. Even when writing letters during the painful time of her illness, she would find a way to convey some new ideas to her friend and correspondent. Thus, in the first letter where she communicates the news of her illness to Libri, she writes that she has been suffering a lot and as a result she was not able to study: "I have lost the ability to bring together the most common ideas, I have felt that my intelligence has been destroyed," she wrote on February 8, 1830.[66] But it is in the same letter that she goes back to a mathematical problem she was thinking about before her illness: "a short time before the start of all these problems I had undertaken to write on a subject [which] has been rolling around in my head for a long time, it is about average curvatures whose notion derives from the comparison between the curvature of the sphere and that of the surfaces."[67] Despite the fact that she was still suffering, she wrote to Libri about her struggle to clarify her ideas and invited him to visit her so that they might work together. But in a letter dated only a year later, on April 18, 1831, Germain confessed to her friend that her illness had advanced and had become unbearably painful: "My health is in a frightful state. A prompt death would be a relief to me, because I suffer from unbelievable pain, which leaves me not a moment's rest. I wanted to read at least the third volume of De LaCroix, but I cannot. I remain shut up. I see neither M. Legendre nor my other friends, except for St. Amant, who is always concerned about you and my sister. I am told that my condition is not desperate, but I am warned of long suffering."[68] This letter was written only two months before her death, and yet she did find the courage to inform her friend about the publication of their work: "I have received from M. Crelle the issue that contains one of your memoirs and mine," she wrote.[69] In the same letter she also conveyed to her friend news about the Parisian scientific community: "There is definitely a fate hanging over all mathematicians—your unhappy preoccupation, that of Cauchy, the death of M. Fourier. Finally, that student Galois, who in spite of his impertinence displays a good disposition, has managed to be expelled from the Ecole Normale."[70]

Germain died on June 27, 1831, during a month in which fierce riots had erupted in the streets of Paris as a rebellion of the *miserables*. Libri himself was involved in these events, having taken active part in the July 1830 uprising that overthrew the Bourbons, at the same time as his involvement in the unification movement in Italy.[71] While at the end of his obituary for Germain he wrote that he was a "stranger to her country, but not to her affections and to the objects of her studies," he became a French citizen and got heavily involved in the cultural politics of the July monarchy.[72] Libri had to flee Paris following the collapse of the 1848 revolution and a large part of his archive, which included some of Germaine's letters, were confiscated, although they are now housed at the

Bibliothèque Nationale in Paris. Some of the manuscripts and letters that Libri took with him were later sold at an auction that he held in London in 1859. In the same year the Paris Academy received another part of Germain's archive as a donation from her sister and her nephew. Ten years after Libri died, half of his archive, and therefore Germaine's papers, manuscripts, and letters, were dispersed, while the other half of his archive, including his correspondence with Germain, has been lost.[73] It is thus Germain's epistolary archive that I will discuss in the next section.

Epistolary Traces

In their meticulous study of Germain's mathematical correspondence, Andrea Del Centina and Alessandra Fiocca have discussed how Germain's letters were dispersed after her death, while the process of their rediscovery, which started in the late 1870s, is still on-going.[74] Moreover, the publication of some of Germain's letters that were dispersed in different archives and public libraries in Europe has been equally adventurous and has included archivists, mathematicians, historians of mathematics and publishing editors from the Paris, Göttingen, and Turin Academies of Sciences.[75] This interest was mostly because of her correspondence with Gauss and the intensive archival and editorial work that surrounded the celebrations of the first centenary of his birthday in 1877.

In thus considering Germain's letters, we encounter a highly complex meta-archive encompassing analogue and digitised documents, unedited published letters, as well as transcriptions and translations in both historical and contemporary sources. What Liz Stanley conceptualises as "ur-letters" emerges from the processes of transcription, editing, and publication, where original letters—or, rather, selectively mediated versions—are shaped into new textual forms.[76] These reconstructions are not mere reproductions; they are transformed through editorial choices, omissions, and interpretive frameworks that influence their presentation. As such, "ur-letters" embody the layered nature of archival transmission, where each stage of reproduction—whether in printed editions, scholarly compilations, or digital databases—simultaneously distances the letter from its original material context while expanding its reach and interpretive possibilities.

There is of course a burgeoning body of literature around digital and digitised archives, the way they have changed the epistemological nature of archival research in general, and the way we approach, understand and analyse archival documents in particular.[77] Moreover, most archival researchers know by now that even when we work in classic archival spaces like museums and libraries, the experience has shifted. Although we may have access to analogue documents, the scans and photos we are usually allowed to take—often without restrictions or expenses—have gradually changed how we engage with archival work. They have also altered the ways we analyze digitized archival materials. As Liz Stanley and colleagues have put it in creating an online archive for Olive Schreiner's letters, "transcriptions are not 'the letters' themselves - but then, neither are jpeg images of letters 'the letters' either, but another two-dimensional representation."[78] Thus, with the various challenges of archival research with digital and digitised documents in mind, I will now consider contextual loss as well as modalities of transcription, translation, and citation in relation to my work with Germain's letters.

Contextual loss is one of the most pressing epistemological challenges in the study of archival documents, particularly letters. Transcriptions, published selections, and digitisation practices frequently extract individual documents from their original contexts, severing them from the collections in which they were housed, the annotations that accompanied them, and their connections to

other materials. This fragmentation is especially pronounced in the case of women's letters, as women rarely had their papers formally archived as cohesive collections or *fonds*. Unlike their male counterparts, whose intellectual legacies were often safeguarded through institutional recognition and systematic preservation, women's letters—if they survived at all—were frequently scattered across multiple archives, incorporated into the fonds of prominent men, or subject to arbitrary archival relocations. These disruptions, often driven by a lack of funding or institutional interest, further obscure the intellectual networks and discursive formations in which women's work took shape.

Liz Stanley's counter-paradigm directly challenges the archival and editorial practices that contribute to such fragmentation.[79] She critiques the conventional treatment of letters as isolated texts and instead emphasises their embeddedness within relational and documentary fields. In her work on "ur-letters", Stanley highlights the editorial interventions that shape meaning and reception over time.[80] Rather than viewing letters as static artifacts, she advocates for an approach that foregrounds their fluidity, revealing how they are mediated through archival selection, transcription decisions, and historiographical framing.[81]

This perspective is particularly relevant to Germain's correspondence, which has suffered significant loss and dispersion across various European collections. Many of her letters survive only as drafts—either because recipients did not preserve them or because archivists failed to recognise their historical value. This issue of contextual loss is particularly evident in her significant exchanges with Legendre where only draft versions survive. These incomplete documents create critical gaps, hindering our ability to fully reconstruct the depth of her engagement with mathematical problems. Without the final versions of these letters, we are left to speculate on the nuances of her revisions, the precise phrasing of her arguments, and the ways in which she adapted her correspondence in response to Legendre's feedback. The consequences of such loss extend beyond individual letters to broader historiographical misinterpretations. The absence of key documents has led to misdatings of her relationships with prominent mathematicians, while overlooked corrections and revisions in her drafts have resulted in misunderstandings of her mathematical contributions.[82]

Stanley's insistence on treating letters as "units within a unity"—rather than as discrete texts—offers a necessary corrective to the fragmented historiography of Germain's work. In a similar spirit, her approach to assembling Schreiner's epistolary archive, which prioritized preserving the structural integrity of the collections in which the letters were found, underscores the need to recontextualize Germain's correspondence within the intellectual networks in which it circulated. This means moving beyond isolated readings of individual letters to reconstruct the shifting archival pathways through which they have been transmitted, cited, and republished. Archival errors—such as misattributions, fragmentary citations, and the omission of key exchanges—have significantly distorted the historical understanding of Germain's role in mathematical developments.

Applying Stanley's counter-paradigm to Germain's letters means resisting the impulse to reconstruct a fixed or authoritative version of her correspondence. Instead, it requires an acknowledgment of the contingencies of archival survival, the instability of textual transmission, and the interpretive layers that mediate access to her work. The loss and dispersion of Germain's correspondence reveal the precarious nature of women's historical presence in scientific archives, where contextual erasures shape not only how their contributions are understood but also the broader structures of knowledge production and transmission. By situating Germain's letters within a broader network of intellectual, editorial, and archival entanglements, we gain a more nuanced

understanding of her contributions—not only as a mathematician but as an active participant in the circulation of knowledge within post-revolutionary scientific culture.

In further examining Germain's meta-archive, I have emphasised the importance of accurate transcriptions, translations, and citations, not only as technical concerns but as central to the reconstruction of her intellectual trajectory. With the exception of her correspondence with Gauss and select letters featured in her biographies, much of Germain's mathematical and philosophical work, including her letters, remains untranslated into English. This linguistic inaccessibility has reinforced the fragmentation of her archive, limiting the scope of scholarly engagement with her ideas and further contributing to the historiographical erasures surrounding her contributions.

Proper citations are not merely a matter of attribution; they serve as a crucial means of tracing the circulation of Germain's letters, establishing the contexts in which they were read, republished, and interpreted. In this sense, citations function as epistemic markers, guiding researchers to locate her surviving correspondence and analyse the textual and material conditions of its preservation. Misattributions, selective inclusions, and fragmentary transcriptions have all shaped the way Germain has been positioned within the history of mathematics, often reinforcing narratives that either marginalise her intellectual labour or isolate her work from the broader mathematical discourse of her time. By foregrounding the editorial and archival processes that mediate access to her letters, this paper has sought to challenge these historiographical distortions, advocating for a methodological approach that treats her correspondence not as discrete texts but as part of an evolving network of intellectual exchange.

This emphasis on transcriptions and citations connects directly to the problem of contextual loss and the critical interventions proposed by Stanley's counter-paradigm. If Germain's letters have been misrepresented through incomplete or decontextualised transcriptions, then a careful reexamination of their archival trajectories becomes an essential step in recovering the complexity of her contributions.

Conclusion: Reassembling Germain's Mathematical Correspondence

Taking my starting point from an award letter that Germain never received, this paper has examined the role of letters in reconstructing her intellectual trajectory within post-revolutionary France. By tracing archival pathways through Germain's meta-archive, I have highlighted the importance of carefully citing different versions, publications, and translations of her correspondence. Mathematical letters have long been recognised as a crucial means of addressing the historical exclusion of women from formal scientific education, yet Germain's correspondence has primarily been analysed for its mathematical content rather than for what it reveals about the broader structures that shaped her career.

Reassembling Germain's epistolary archive is not simply a matter of filling gaps but of mapping the shifting contours of how her work circulated, was received, and was preserved—or lost—over time. Her letters, whether addressed to Gauss, mathematicians of the French Institute, or her friend Libri, stand as critical documents in the history of mathematical sciences. Yet their fragmentation, misattributions, and omissions underscore the broader challenges of reconstructing women's intellectual legacies. By attending to these archival complexities, this paper has sought to foreground the work of reassembly as an ongoing process—one that does not restore a fixed or complete picture but rather illuminates the material conditions and contingencies that shape what remains.

NOTES

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[1] Correspondance de Sophie Germain avec les mathématiciens et savants Cauchy, Delambre, Fourier, Gauss, Le Gendre, d'Ansse de Villoison, etc., 1801–1900. Bibliothèque nationale de France, Département des manuscrits. Available online at https://gallica.bnf.fr/ark:/12148/btv1b9007572p, 8. Unless otherwise indicated, all translations in English are mine.
[2] Louis, L. Bucciarelli and Nancy Dworsky, *Sophie Germain: An Essay in the History of the Theory of Elasticity* (Dordrecht, 1980), 7.
[3] For more details about the race for this award, see Bucciarelli and Dworsky, *An Essay*, particularly chapter 7 and Dora Musielak, *Sophie Germain: Revolutionary Mathematician*, 2nd ed. (Springer, 2020), particularly Chapter 6.
[4] *Journal des Débats*, January 9, 1816, 2.
[5] There is a rich body of literature around the republic of letters as well as women's position within it. See Dena Goodman, *The Republic of Letters: A Cultural History of the French Enlightenment* (Cornell University Press, 1994); Marie-Claire Hoock-Demarle, *L'Europe des lettres: Réseaux épistolaires et construction de l'espace européen (Evolution de l'humanité)* (Albin-Michel, 2008).
[6] Maria Teresa Borgato and Irène Passeron, "Introduction" to *Mathematical Correspondences and Critical Editions*, eds. Maria Teresa Borgato, Erwin Neuenschwander, and Irène Passeron (Birkhäuser, 2018), vii.
[7] Musielak, *Sophie Germain*; Bucciarelli and Dworsky, *Sophie Germain*; Andrea Del Centina and Alessandra Fiocca, "On the Correspondence of Sophie Germaine" in *Mathematical Correspondences and Critical Editions*, eds. Maria Teresa Borgato, Erwin Neuenschwander, and Irène Passeron (Birkhäuser, 2018).
[8] See Andrea Del Centina, "Letters of Sophie Germain preserved in Florence," *Historia Mathematica* 32 (2005): 60–75.
[9] Guglielmo Libri, "Sciences Mathématiques-M^{lle} Germain," *Journal Des Débats,* May 18, 1832, 1–2; Guglielmo Libri, "Notice sur M^{lle} Sophie Germain" in *Considérations générales sur l'état des sciences et des lettres aux différentes époques de leur culture par Mlle Sophie Germain,* ed. Armand-Jacques Lherbette (Lachevardiere, 1833), 13-16.
[10] Jean-Léon-Hippolyte Stupuy, "Étude sur la vie et les œuvres de Sophie Germain" in Sophie Germain *Œuvres philosophiques de Sophie Germain, suivies de pensées et de lettres inédites* (P. Ritti, 1896 [1879]), 1–73.
[11] Libri, "Sciences Mathématiques," 1.
[12] Stupuy, "Étude," 5.
[13] Germain, *Considérations Générales.*
[14] Libri, "Sciences Mathématiques," 1.
[15] See Steve Jones, *No Need for Geniuses: Revolutionary Science in the Age of the Guillotine* (Little Brown, 2016).
[16] For a discussion of women's education in the revolutionary and post-revolutionary period in France, see Caroline Fayolle, "L'éducation est-elle un instrument de l'égalité? Les débats sur l'éducation des femmes à la période révolutionnaire et post-révolutionnaire" in *Revisiter la "querelle des femmes": Discours sur l'égalité/inégalité des sexes, de 1750 aux lendemains de la Révolution*, ed. Éliane Viennot (Publications de l'Université de Saint–Etienne, 2012).
[17] Stupuy, "Étude," 6.
[18] Libri, "Sciences Mathématiques," 1.
[19] M. Bernard to Madamme Germain, letter dated November 4, [no year] MS. Fr., 9118, available online at Gallica, https://gallica.bnf.fr/ark:/12148/btv1b9007572p/f7.item and included in Germain, *Œuvres Philosophiques*, 249.
[20] MS. Fr., 9118, included in Germain, *Œuvres Philosophiques*, 249.
[21] See Libri, "Sciences Mathématiques," 1.
[22] For a detailed discussion of Germain's work on Fermat's last theorem, see Musielak, *Sophie Germain*, particularly Chapter 9; and Reinhard Laubenbacher and David Pengelley, "'Voici ce que j'ai trouvé': Sophie Germain's Grand Plan to Prove Fermat's Last Theorem," *Historia Mathematica* 37 (2010): 641–92.
[23] "Le Blanc" to Gauss, letter dated November 21, 1804, in Baldassarre Boncompagni, *Cinq Lettres de Sophie Germain à Charles Frédéric Gauss,* publiées par B. Boncompagni d'après les originaux possédés par la Société Royale

des Sciences de Göttingen, Berlin, Institut de photolithographie des frères Burchard (Gustave Schade, 1880), 1. Transcribed in Andrea Del Centina and Alessandra Fiocca "The Correspondence between Germain and Gauss," *Archive for History of Exact Sciences* 66 (2012): 585–700 (636–37); translated into English in Musielak, *Sophie Germain,* 221–22.

[24] Boncompagni, *Cinq Lettres*, 1.

[25] *Œuvres Philosophiques*, 78, 112, 135.

[26] in Boncompagni, *Cinq Lettres*, 3.

[27] Antoine-Isaac, Baron Silvestre De Sacy (1758–1838), was a French linguist and orientalist, but there are no details about his friendship with Germain in her historical biographies. It was Musielak who first noted this unusual arrangement in Germain's epistolary relationship with Gauss. See Musielak, *Sophie Germain,* 201.

[28] See Bucciarelli and Dworsky, *An Essay*, particularly Chapter 3; Del Centina and Fiocca, "The Correspondence," 587; Musielak, *Sophie Germain*, particularly Chapter 3.

[29] Germain to Gauss, letter dated February 20, 1807, in Boncompagni, *Cinq Lettres*, 13–14, included in Germain, *Œuvres Philosophiques,* 271; transcribed in Del Centina & Fiocca, "On the Correspondence," 668–69; translated in Musielak, *Sophie Germain,* 227–28.

[30] As his last and popular play written in verse, Molière's *Les Femmes Savantes* was a social satire of women's obsession with learning as well as the effects of excessive pretension to knowledge.

[31] Paula Findlen, "Becoming a Scientist: Gender and Knowledge in Eighteenth Century Italy," *Science in Context* 16 no. 1/2 (2003): 59–87 (59–60).

[32] For a discussion of the field of "public science" and women's position in it, see Karen Detflensen, "The Rise of a Public Science? Women and Natural Philosophy in the Early Modern Period" in *The Cambridge History of Philosophy of the Scientific Revolution,* eds. David Marshall and Dana Jalobeanu (Cambridge University Press, 2022), 128–45.

[33] See Findlen, "Becoming a Scientist," 64–65.

[34] Lalande to Germain, letter dated November 4, 1797, Bibliothèque Nationale, MS. Fr. (N.A.), 4073, published in Choron, A. Delambre, Joseph Fourier, Sophie Germain, Lalande De La Grange, Guillaume Libri, Charles Henry, "Les manuscrits de Sophie Germain et leur récent éditeur-documents nouveaux," *Revue Philosophique de la France et de l'Étranger* 8 (1879): 619–41 (635); translated in Bucciarelli and Dworsky, *An Essay*, 13.

[35] Germain to Gauss, letter dated February 20, 1807, in Boncompagni, *Cinq Lettres*, 13.

[36] Gianna Pomata, "Amateurs by Choice: Women and the Pursuit of Independent Scholarship in 20th Century Historical Writing," *Centaurus* 55 (2013): 196–219 (197).

[37] Germain to Gauss, letter dated February 20, 1807, in Boncompagni, *Cinq Lettres,* 14.

[38] Boncompagni, *Cinq Lettres*, 15.

[39] Gauss to Germain, letter dated April 30, 1807, in Boncompagni, *Lettera inedita di Carlo Federico Gauss a Sofia Germain* pubblicata da B. Boncompagni, Calcografia e autografia Achille Paris (Firenze, 1879), 2. Transcribed in Del Centina and Fiocca, "Germain and Gauss Correspondence," 671–74; translated in Musielak, *Sophie Germain*, 228–32.

[40] See Musielak, *Sophie Germain,* 219; Del Centina and Fiocca, "Germain and Gauss Correspondence," 672–74; and Bucciarelli and Dworsky, *An Essay*, particularly Chapter 3.

[41] For a discussion of female mathematicians' epistolary practices in the eighteenth and nineteenth centuries, see Maria Tamboukou, *Numbers and Narratives: A Feminist Genealogy of Automathographies* (Routledge, 2025), forthcoming.

[42] Germain to Gauss, letter dated May 22, 1809, Universitatsbibliothek, Gottingen, transcribed in Del Centina and Fiocca, "Germain and Gauss Correspondence," 688; also translated in Bucciarelli and Dworsky, *An Essay*, 121.

[43] Germain, *Œuvres Philosophiques*, 79.

[44] Germain, *Œuvres Philosophiques*, 79, 81, 97.

[45] Musielak, *Sophie Germain*, 13.

[46] Bucciarelli and Dworsky, *An Essay*, 33.

[47] Legendre's *Recherches sur quelques objets d'analyse indéterminée et particulièrement sur le théorème de Fermat*, contains a footnote on page 17 stating that the proposition is due to Mlle Germain (now known as Germain's Theorem). The paper was published in 1827 in the Mémoires de l'Académie des Sciences of 1825.

[48] Legendre to Germain, letter dated December 4, 1811, Bibliothèque Nationale, MS. Fr., 9118, ff. 48–49; also available at Gallica, https://gallica.bnf.fr/ark:/12148/btv1b9007572p/f53.item and included in Germain, *Œuvres Philosophiques*, 300–3.

[49] MS. Fr., 9118, ff. 48–49.
[50] MS. Fr., 9118, ff. 48–49.
[51] Bibliothèque Nationale, MS. Fr. (Nouv. Acq.) 5166, transcribed and translated in Bucciarelli and Dworsky, *An Essay*, 58–59.
[52] MS. Fr. (Nouv. Acq.) 5166, ff. 61–62.
[53] MS. Fr. (Nouv. Acq.) 5166, f. 61.
[54] All submissions were anonymous and should include an epigram, as an indication of the candidate's intellectual attitude and frame of mind; the epigram is a translation of Bacon's *Novum Organum*, CIX. In *The Works of Francis Bacon,* eds. James Spedding, Robert Laslie Ellis, Douglas, and Deanon Heath (Longman, 1875), 8: 140–41.
[55] Bibliothèque Nationale, MS. Fr., 9118, ff. 50–51; also available in Gallica, https://gallica.bnf.fr/ark:/12148/btv1b9007572p/f55.item, included in Germain, *Œuvres Philosophiques,* 303–6; translated in Bucciarelli and Dworsky, *An Essay*, 63–64.
[56] MS. Fr., 9118, ff. 50–51.
[57] MS. Fr., 9118, ff. 50–51.
[58] See David Chandler, *Waterloo: The Hundred Days* (Osprey, 1980).
[59]Bibliothèque Nationale, MS. Fr., 9118, f. 12, also available at Gallica, https://gallica.bnf.fr/ark:/12148/btv1b9007572p/f16.item, included in Germain, *Œuvres Philosophiques*, 323; translated in Bucciarelli and Dworsky, *An Essay*, 89.
[60] GL to SG, letter dated November 17, 1825, BN, MS. Fr. (Nouv. Acq.) 4073; also published in Delambre et al, "Les manuscrits de Sophie Germain," 636.
[61] BN, MS. Fr. (Nouv. Acq.) 4073.
[62] Sophie Germain to Guglielmo Libri, letter dated September 15, 1826, Moreniana Biblioteca di Firenze, fondo Palazzi–Libri, filza 432. (MBF/FPL/f432), transcribed in Del Centina, "Letters in Florence," 66.
[63] Draft of a letter, from Germain to Cauchy, dated July 18, 1826, BN. MS. Fr. 9118; also at Gallica, https://gallica.bnf.fr/ark:/12148/btv1b9007572p/f5.item, included in Germain, *Œuvres Philosophiques*, 328; translated in Bucciarelli and Dworsky, *An Essay*, 106–7.
[64] Musielak, *Sophie Germain*, 105.
[65] Bucciarelli and Dworsky, *An Essay*, 106–7.
[66] SG to GL, letter dated February 8, 1830 (MBF/FPL/f432); transcribed in Del Centina, "Letters in Florence," 68.
[67] MBF/FPL/f432.
[68] SG to GL, letter dated April 18, 1831, BN, MS. Fr. (Nouv. Acq.) 4073, also published in Delambre et al, "Les manuscrits de Sophie Germain," 636; translated in Bucciarelli and Dworsky, *An Essay*, 121–22.
[69] BN, MS. Fr. (Nouv. Acq.) 4073.
[70] BN, MS. Fr. (Nouv. Acq.) 4073.
[71] For details on Libri's political activities during this period, see P. Alessandra Maccioni Ruju and Marco Mostert, *The Life and Times of Guglielmo Libri (1802–1869)* (Verloren, 1995), particularly Chapter 5.
[72] Libri, "Sciences Mathématiques," 2.
[73] See Del Centina and Fiocca, *L'Archivio di Guglielmo Libri dalla sua dispersione ai fondi della Biblioteca Moreniana* [The Archive of Guglielmo Libri from its Dispersal to the Collections at the Biblioteca Moreniana] (Olschki, 2004).
[74] See Del Centina and Fiocca, "Germain and Gauss Correspondence," 672–74.
[75] See Del Centina and Fiocca, "Germain and Gauss Correspondence," for a detailed history of the discovery of Germain's correspondence as well as its different editorial projects, 595–602.
[76] Liz Stanley, "The Epistolarium: On Theorizing Letters and Correspondences," *Auto/Biography* 12 no. 3 (2004): 201–35 (218). http://dx.doi.org/10.1191/0967550704ab014oa.
[77] See Katja Müller, *Digital Archives and Collections: Creating Online Access to Cultural Heritage* (Berghahn, 2021); *Use and Reuse of the Digital Archive*, ed. John Potts (Springer, 2021); James O'Sullivan, *The Bloomsbury Handbook of the Digital Humanities* (Bloomsbury, 2022).
[78] See "The Olive Schreiner Letters Online," Archives & Transcripts, at https://www.oliveschreiner.org/vre?page=275, para. 4.
[79] See the two main archival collections online: "The Olive Schreiner Letters Online," https://www.oliveschreiner.org/vre?page=275; as well as "Whites Writing Whiteness," https://www.oliveschreiner.org/vre?page=275.

[80] Stanley, "The Epistolarium."
[81] Stanley has written extensively on these issues. See Liz Stanley, "An Empire of Letters: The Vindolanda Tablets, Epistolarity, and Roman Governance," *The Journal of Epistolary Studies* 2 no.1 (2020): 4–18. https://jes-ojs-utrgv.tdl.org/jes/article/view/25 ; Liz Stanley and Margaretta Jolly, "Epistolarity: Life after Death of the Letter?," *a/b: Auto/Biography Studies*, 32 no. 2 (2017): 229–33. https://doi.org/10.1080/08989575.2016.1187040; Liz Stanley "The Death of the Letter? Epistolary Intent, Letterness, and the Many Ends of Letter-Writing," *Cultural Sociology* 9 no. 2 (2015): 240–55. https://doi.org/10.1177/1749975515573267; Liz Stanley and Helen Dampier, "The Work of Making and the Work it Does: Cultural Sociology and 'Bringing-Into-Being' the Cultural Assemblage of the Olive Schreiner Letters," *Cultural Sociology* 7 no. 3 (2013): 287–302. https://doi.org/10.1177/1749975512473463.
[82] See Del Centina and Fiocca, "Germain Correspondence," 152–54.