Feeling Happiness, Feeling Science: Diffractive Readings of Émilie Du Châtelet's and Sophie Germain's philosophical writings

Maria Tamboukou, Major Leverhulme Research Fellow, University of East London, UK

Abstract

In this paper I read diffractively the philosophical writings of Émilie Du Châtelet and Sophie Germain, particularly focusing on their engagement with happiness, both as a theoretical notion and as a lived experience. What I argue is that their take on happiness has nothing to do with the gendered norms and discourses of happiness that they were seen and judged by, in the long durée of the nineteenth and twentieth centuries. Their happiness was more in line with the joys and pleasures of knowledge, understanding, living and creating. While feelings are central in both women's theorization of happiness, they are deployed along different strands in the philosophical history of emotions and affects and despite their original and unique contribution, they are still absent from it.

Key words: happiness, feelings, passions, women mathematicians, philosophers and scientists

'Learned women, even the happiest, have ignored the true happiness', Émile Fage, a member of the *Société des lettres, sciences et arts de la Corrèze*, wrote in 1894 in his review of Rebière's book *Les femmes et la science*, which had been published earlier in the same year. (1894, 255) Two French women mathematicians, philosophers and scientists, Émilie Du Châtelet (1706-1749) and Sophie Germain (1776-1831) were included not only in this publication, but also in the more extended version of the second edition, which was published three years later, in 1897. Fage was amongst those writers, who engaged with Rebière's books, often using his portraits to express their own ideas on the question of women's engagement in science, as Jenny Boucard has commented. (2020, 206)

Rebière and Fage were neither the first nor the last to examine, compare and write about the lives of Du Châtelet and Germain in nineteenth and twentieth century France. Already in 1857, Orly Terquem, editor of the French mathematical journal *Nouvelles annales de mathématiques*, had written that 'la célèbre marquise du Châtelet' and Germain, 'laureate of the Académie des sciences' were amongst the five French women who had excelled in the mathematical sciences. (Terquem 1857, 291). As Boucard (2020) has shown, women scientists, mathematicians and philosophers became the object of interest of several essays, books and articles published at the turn of the eighteenth century and what is more interesting is that scholarship around their biographies were used both to attack and defend women's rights in general and their access to education in particular. It is not difficult to see

why: few as they were, women scientists troubled the waters of gender relations as anomalies that had to be studied and explained.

Such discussions, comparisons and juxtapositions were folded within a polyvalence of discourses, questions and themes, including, the appropriate level and nature of women's education, compatibility of the practice of mathematics or science with happiness and the domestic life, and also compatibility of 'the female nature' with the practice of mathematics. (see Boucard 2020, 208) Among this wide range of discourses and narratives revolving around the French *femmes philosophes,* in this paper, I look at the question of happiness, not through the eyes of various biographers, historians and commentators, but rather through a diffractive reading of Du Châtelet's and Germain's philosophical writings. By referring to diffractive readings I follow lines of feminist affirmative approaches to theoretical texts 'reading important insights through one another [and thus] reworking concepts that structure these insights in the traditions of thought from which they stem.' (Barad 2003, 811)

Having been neglected for long, Du Châtelet's and Germain's philosophical work has become the object of an emerging and burgeoning body of literature, particularly in the Francophone scholarly world.[1] But while some connections have been drawn between the two women in the history of science and mathematics in France, particularly in relation to how they were used and abused in discourses around women's education (see Boucard 2020), their philosophical writings have not been discussed in their interrelation. Moreover, Germain's *Œuvres Philosophiques* have not been translated in English, despite their importance in the nineteenth-century European history of ideas, which was highlighted and praised by eminent philosophers of her times, like Auguste Comte. (1864, 415) As Glesser and colleagues have aptly observed, 'there is more to be done' in appreciating Germain's intellectual span and vision. (2020, 217) It is this gap in the literature that this paper addresses and unfolds in four parts: after this introduction, I consider the two women's engagement with happiness as both a philosophical discourse and as a lived experience and finally in the conclusion I consider their approach to feelings and happiness in their interrelation.

La célèbre marquise Du Châtelet and her *Discourse on Happiness*

Du Châtelet's life has become the object of numerous biographies, studies and essays and there is an important body of literature on her significant contribution to the history of philosophy and science.[2] Born to an upper-class family of the old regime she was brought up to realize her destiny as a dutiful daughter of the aristocracy. And yet her life took an unexpected twist and was eventually devoted to the study of mathematics, science and philosophy. Du Châtelet saw some of her scientific work published during her life and took pride in asserting herself as an important and recognizable intellectual figure of the Enlightenment. Due to her untimely death at child-birth at the age of forty-two however, an important part of her philosophical and scientific work was either published posthumously or

[1] For a comprehensive overview of the literature around Germain, see Musielak 2020 and for du Châtelet, Hagengruber 2022.

[2] For a rich overview of the literature around Du Châtelet, see, amongst others the resources of the *Center for the History of Women Philosophers and Scientists,* https://historyofwomenphilosophers.org/project/directory-of-women-philosophers/du-chatelet-emilie-1706-1749/ [Accessed, 22 September 2023]

remained unpublished and scattered in Voltaire's papers, who was her lover, scientific collaborator, discussant and life-long friend.[3] Her essay, *Discours sur le bonheur* [*Discourse on Happiness*] was probably written over a long period of time, between the end of the 1730s when she was still with Voltaire but living through the end of their amorous relationship into the 1740s. It was finally finished in the spring of 1748, during a period that she was in love again with Jean François de Saint-Lambert to whom it was presented as a gift.[4] Although multiple manuscripts were circulated and read amongst her friends while she was still alive, the book was first published in 1779, thirty years after her death . It is perhaps her most famous text and it appeared in numerous translations and in many editions. However, at the time of its publication, it was ignored and later it received overall negative critiques from the early nineteenth century into the twentieth. Moreover, its theme, happiness, became a dominant discourse in the way women in science were perceived in France in the same period, as we have already seen in the introduction.

In writing an essay on happiness, Du Châtelet participated in what Robert Mauzi, the editor of the *Discour's* critical edition has configured as 'the glorious discovery' of the French Enlightenment in his study on the idea of happiness (1960, 255). As Ritchie Robinson (2020) has further pointed out happiness for the Enlightenment intellectuals was an earthy attainment and indeed an overall purpose in life within the wider context of western secularization. And yet in reviewing the French approaches to happiness in the seventeenth and eighteenth centuries, Mauzi found them insignificant, pendantic, poor in quality and indeed 'pitiful', with the exception of Du Châtelet's treatise, which was in his view original and the only work worth reading in the twentieth century. (1960, 9) It is therefore no wonder that he decided to publish a critical edition of it, although he did not refer at length to her ideas in his own treatment of the idea of happiness. (see Whitehead 2006, 255)

In mapping the intellectual milieu of Du Châtelet's engagement with the question of happiness Barbara Whitehead has particularly referred to three men of her immediate circle, who might have influenced her, since they had all written their own ideas on happiness in poems and philosophical treatises: Voltaire, Claude Adrien Helvétius, a literary theorist and philosopher—who was also Voltaire's protégée during the Cirey years — and the physician and philosopher, Julien Offray de La Mettrie. Helvétius had actually dedicated his *L' Épitre sur l'amour de l' étude*, written in 1730 to Du Châtelet, while La Mettrie had chosen to begin his 1747 edition of the *Traîté de l'âme* with a letter to her. (see ibid., 257).

Du Châtelet's intellectual exchanges with Voltaire particularly during the time they spent at her family estate, the château de Cirey, have been well treated in the literature. (see Wade 1941, 1947) Despite their mutual influences however, there are striking differences in their take on happiness, and as Mauzi has pithily commented 'Mme du Châtelet is undoubtedly Voltaire's friend but her book is in no way a "Voltairean" book: it does not imply any provocation towards established ideas or powers' (1961, lxxxvi). Both Mauzi and Whitehead (2006) have also argued that La Mettrie's ideas had no influence on Du Châtelet's approach,

[3] Du Châtelet's love relationship with Voltaire is a much-discussed topic in the literature, but it is beyond the scope of this paper. See amongst others, Wade 1941, Mitford 1957, Bodanis 2006.
[4] In his introduction to the 1961 critical edition of the *Discours,* Mauzi discusses at length the possible periods of its composition (1961, lxxiv-lxxxiv), but reaches the conclusion that the most possible date would be perhaps sometime in 1747. See also Whitehead 2006, 256 and Du Châtelet 2009, 345.

although there are some similarities in their take on passions. It is further difficult to trace Du Châtelet's intellectual connections with Helvétius, since they were both writing on happiness at the same time. (ibid., 257) Moreover, Helvétius poems on love had received negative reviews even in the eighteenth century. What a comparison with her contemporaries highlights however, according to Mauzi is 'Madame Du Châtelet's entire originality' (1961, civ).

The originality of her ideas notwithstanding, Du Châtelet obviously followed the order of discourse in the Enlightenment philosophical literature on happiness with two critical interventions: she wrote about happiness as a woman, thus disturbing and indeed gendering the abstractness and universality of the philosophical discourse, and in doing so she included her lived experiences in the premises of het treatise. As Mauzi has pointed out in his introduction, through a parallel study of the treatise*,* with Du Châtelet's correspondence, the *Discours* is 'a lived book' that springs from its author's experiences, although its embeddedness also dismisses its universal value: 'not only does Mme Du Châtelet compose it with maxims suggested by her own experience, but she expresses in it an ideal of life, which is hardly valid except for those whose major inclinations coincide with hers: need for love and taste for study'. (1961, 84)

While emerging from the author's lived experiences however, the *Discours* belongs to the tradition of moral philosophy and more particularly to a strand that Mauzi configures as 'modern epicureanism', without any traits of christian morality. (lxxxv) The way she rejects repentance in the text of the *Discours* is particularly striking in this respect: 'This feeling of repentance is one of the most useless and most disagreeable that our soul can experience' (1961, 16-7) she writes,[5] further adding that 'there is no point in looking back, and we should always brush from our mind the memory of our errors'. (17) Her morality then is natural according to Mauzi; it embraces pleasure, comfort and high living, but it does not display a combative character, as 'Émilie hardly cared to fight, in the name of natural morality, for her personal liberation and for that of man in general.' (lxxxvi) In this light 'her essay presents itself as a manual of good living, not as a treatise on human nature.' (ibid.)

Mauzi's comments here point of course to how Du Châtelet's treatment of happiness from a situated perspective radically departed from the universalistic approach to the nature of happiness among her contemporaries, Voltaire and Le Mettier included. But as Whitehead has critically commented, the *philosophes'* idea of the equality of the experience of happiness, was full of paradoxes and contradictions: 'in effect they move from the belief that all can be happy to the rigid position that in order to be happy one must follow a very precise path that only a subset of humanity can walk, and therefore only the few can attain happiness.' (2006, 259-60) It is precisely in her refusal to talk about universal forms of happiness that the value and originality of Du Châtelet's treatise lie, as I will further discuss.

But let us return to the essay's order of discourse and see how Du Châtelet both follows and deflects the philosophical tradition. Indeed, her treatise starts by directly addressing the question of whether it is possible to be happy — a classical theme in the Enlightenment

[5] Although there is an English translation of the *Discours* (Du Châtelet 2009), I have decided to follow the 1961 publication in French, as there were some subtleties in the text that I opted to translate myself.

tradition of the pursuit of happiness, as Robertson has remarked. (2020, 4). While acknowledging the difficulty of attaining the state of happiness however, she directs her readers to the importance of reason in carefully planning their conduct in the anticipation of happiness: 'We commonly believe that it is difficult to be happy, and we have much reason to believe this; but it would be much easier for men to become happy if they could reflect on and planned their conduct before acting' (1961, 3). Du Châtelet's entry in the discourse of happiness thus firmly situates her in the rationalist tradition or perhaps hers is a rationalist and/or modern epicureanism', as Mauzi has commented (lxxxviii), while also identifying a paradox in the way she calls for planned actions, while at the same time embracing passions and illusions:

> To be happy, it is necessary to have freed oneself of prejudices, to be virtuous, and in good health, to have tastes and passions, and to be susceptible to illusions; for we owe most of our pleasures to illusion, and unhappy are those who lose it. Far then, from seeking to dispel illusion by the lantern of reason, let us try to thicken the glaze that it lays on most objects, more necessary for them than are the cares and adornments of our bodies. (1961, 4)

What Mauzi finds paradoxical however, in Du Châtelet's 'modern epicureanism' is precisely the tour de force of her approach to happiness through the realm of sensations and passions: 'the only point of living is to experience sensations and agreeable feelings; and the livelier the agreeable feelings are, the happier one is', she writes. (6) Indeed, the whole logic and argument of the *Discours* revolves around this simple thesis: 'one must have passions to be happy' (19) and in this spirit, Du Châtelet strongly advises her readers to let themselves be 'susceptible to passions' (6), instead of being afraid of them. Being interested in literature and the arts, through her education, but also through her active participation in the culture of the *salons,* Du Châtelet was also passionate about theatre and the opera and throughout her life, she wrote about the pleasures of immersing in the illusions of the performing arts, as a gate to happiness: 'but what pleasure would we have at another spectacle where all is illusion, if we were not able to abandon ourselves in it?' (Du Châtelet 1961, 15) Using the experience of the theatre as a vivid illustration of her argument, Du Châtelet thus insists that illusions do not deceive, but rather open up alternative vistas to what is commonly accepted as 'real', and thus sketch different pathways to happiness. (see also Bok 2010) In her view, the beauty of the spectacle lies in the fact that when going to the theatre we make a secret pact with ourselves to suspend disbelief and allow ourselves to immerse in the drama's illusory worlds.

As Whitehead comments, Du Châtelet's emphasis both on passions and illusions are not components of the Enlightenment ideas on happiness (2006, 270), but the question of how passions are to be understood is also raised in the *Discours*. Here, Du Châtelet configures a clear hierarchy between 'passions' and tastes [goûts] in terms of their importance for happiness. 'One is only happy because of satisfied tastes and passions; I say tastes because one is not always happy enough to have passions, and lacking passions, one must be content with tastes.' (1961, 4-5) The notion of passions does not connote suffering, but rather intense feelings and affects taken as underlying and necessary conditions 'for the enjoyment of great pleasures.' (6)

In reading Du Châtelet's *Discours,* Véronique Le Ru has traced Cartesian traits in her theorization of passions: 'in the way of Descartes, the Marquise does not reject passions', but points to the importance of their regulation, since they are part of the human nature'. (2019, 63) Whitehead has also pointed out that in listing what she calls 'the great machines of happiness' (1961, 4), Du Châtelet follows the Epicurean tradition, that Mauzi had already identified, and in this line 'she decries what to her is the useless exercise of contemplating one's own death with equanimity' (2006, 266). Here her approach to happiness is radically different both from Voltaire's and Helvétius, Whitehead notes, but very close to La Mettrie's. (266-7)

When it comes to Du Châtelet's elaboration of the multifarious connections between passions and happiness, what I suggest however is that she also follows Spinozist traces in the philosophical history of emotions, particularly around the importance of joy as central to the ethics of a good life. This link between Descartes and Spinoza is not surprising, given that Spinoza himself followed Descarte's taxonomy of the emotions in the early draft of the *Ethics,* although he reduced the primary affects into joy, sadness and desire, eliminating the Cartesian primitive affects of wonder, love and hate. (see Shapiro 2020)

According to Mathew Kisner (2012), for Spinoza, passions are inescapable parts of our lives, they can be beneficial, and they finally become barometers of our power in attaining a life of virtue, depending on whether they increase or decrease our power to act. In the same vein, Du Châtelet warns her reader that passions 'must be made to serve our happiness' (19), while others, like ambition should be avoided. She finally refers to passions which are vices—like hatred, vengeance, rage—and which absolutely diminish our power to be happy: 'one must never be vicious if one does not want to be unhappy' (13).

Passions notwithstanding, Du Châtelet was also a rationalist, and in this vein, autonomy, clarity of mind and ability for decision making were all pre-conditions of happiness: 'be decided on who you want to be and on what you want to do, this is what most people lack; it is however the condition without which there is no happiness', Du Châtelet wrote in presenting some of 'the great machines of happiness' in her *Discours sur le bonheur* (16). In deploying the notion of 'the machine' Du Châtelet was pointing to the idea that happiness is not an inner state that just happens, but rather an active making, a fabrication and a process — an *œuvre à faire* [work to be done] in Etienne Souriau's philosophical vocabulary (2009).

While configuring a relational notion for happiness, 'our happiness will always depend on others' (1961, 20), Du Châtelet nevertheless observes that 'the less our happiness depends on others the easier it is for us to be happy.' (20) Here it is important to highlight that although happiness is a relational feeling in the *Discours*, men and women experience it differently. Among the very few sources of happiness that women have access to, the love for study is the most independent and constant one, and the whole *Discours* revolves around it. 'The love for study holds within it a passion from which an elevated soul is never entirely exempt, that of glory' (20) she wrote. Men can find 'infinite sources' (20) for glory and therefore happiness in their life, she goes on to observe, but 'women are excluded, by their state, from any kind of glory, and when, by chance, there is someone who was born with a rather elevated soul, only study remains to console her for all the exclusions and for all the dependencies to which she is condemned'. (21)

In thus walking the thin line between dependence and independence, Du Châtelet suggests that 'for this reason of independence, the love of study is, of all the passions, the one that contributes the most to our happiness'. (20) Her own serious engagement with the study of science and mathematics was a living example of how the work on happiness was materialized in her life. Indeed, du Châtelet's scientific publications, the fruits of her love for study, became her independent sources of happiness. Her famous *Foundations of Physics* first published anonymously in 1741 and then again in 1742 with both her name and her portrait on its frontispiece, while almost immediately translated in German and Italian in 1743. Her last years were dedicated to the translation and commentary on Newton's *Principia,* which was published posthumously in 1759, after her untimely death at childbirth on September 10, 1749.

But apart from her personal experiences, in highlighting the importance of the love for study as a pathway to happiness, Du Châtelet also positions herself at the heart of the Enlightenment project. Gottfried Wilhelm Leibniz, the mathematician and philosopher who had largely influenced her own approach to 'the living forces' [vis viva] had also drawn links between wisdom, science, love and happiness: 'Wisdom is the science of happiness [scientia felicitatis] . . . . A *good man* is one who loves all human beings. To *love* is to find delight in the happiness of another. To find delight is to feel harmony.' (cited in Antognazza 2009, 115) But in positioning herself as an Enlightenment intellectual, Du Châtelet also points to the classic tradition of her education: 'Cicero is right to say: *The pleasures of the senses and those of the heart are, without doubt, above those of study; it is not necessary to study to be happy: but there is perhaps a need to feel that we have this resource and this support within us*.' (1961, 23) Du Châtelet had indeed engaged with the philosophical works of Cicero since an early age and according to Voltaire's memoirs, it was her father who had taught her Latin. (see Hamel 1910, 22-3)

Apart from the love for study, Du Châtelet also considers the love for men and indeed explores the very notion of love in depth. Her famous statement that 'we know more of love through the unhappiness it causes than by the often-obscure happiness it spreads over the lives of men' (1961, 6) has often been read as an expression of her disillusion with her love affair with Voltaire, but it is much more than that. Happiness through love in her discourse is felt and does not need to make public revelations: 'happy people do not seek anything and will not notify others of their happiness' (5). In this light, love is 'a sixth sense' in her discourse, 'the finest, the most delicate, the most precious of all', a feeling that brings together happiness and pleasure in an untangled knot. It thus follows that life has no meaning without love, and 'you have to give up life when you lose that happiness'. (1961, 23) But since it is very rare for two souls to come together in the bliss of love, happiness could also be attained through 'the pleasure we feel in giving ourselves up to our feelings of tenderness.' (30)

It is in this section of the *Discours* that Du Châtelet fully reveals herself as a woman, who was in love with a man for ten years without having realized that she was actually loving for two: 'I spent all my time with him, and my heart, unsuspecting, enjoyed the pleasure of loving and the illusion of believing myself loved.' (32) The author here becomes brave enough to confess the depth and extent of her suffering: the wound in my heart has bled for a long time' she writes, but despite her demise her advice to her readers is to go for love, since 'it would be

ridiculous to refuse oneself this pleasure for fear of an unhappiness that perhaps will only be experienced after having known great happiness'. (35) It is no wonder that in reading these lines Mauzi found Du Châtelet's essay so moving because of its self-revelations, but also because of the subtle way she crafted the process of suffering, mastering the passions of the soul and eventually attaining transformation. (1960, 9) Her sincerity and boldness about love notwithstanding, Du Châtelet nevertheless suggests that we might need 'to leave love behind', when the day comes that 'love ceases to make us happy'. And since this day will inevitably come, a cultivated 'taste for study' will make 'our happiness depend only on ourselves'. (1961, 39)

In gendering love and therefore happiness, Du Châtelet disrupts the universal character of happiness in the Enlightenment tradition, and it is not just gender, but also social class and age that enter the *Discours* as markers of difference in the experience of happiness. Already in the first pages of the essay she had mapped her situated position by stating that 'I do not aim to write for all kinds of social conditions and for all people; not all ranks are susceptible to the same kind of happiness' (7). Later on in the essay when discussing the passion for gambling, she had differentiated the pleasures of youth and the pleasures of the old age: 'Every age has its own pleasures; those of old age are the most difficult to obtain: *gambling*, *studying*, if one is still capable of it, *the enjoyment of fine foods*, *consideration*, those are the mainsprings of old age.' (38) Her personal approach to happiness was criticised as elitist and irrelevant to a universal image of humanity, but as Whitehead has commented, it is in engaging with the gender, class and age differences in the experience of happiness that du Châtelet's originality lies: 'Those who held to a universal view would never have to confront the issue of the differences in material conditions of men and women, the well off and the poor. Mme du Châtelet's personalized approach allows for consideration of these differences.' (2006, 263)

Time was also important in the lived experience of happiness and Du Châtelet offers an image of time where past, present and future co-exist in its subjective experience: 'we are happy in the present moment, not only by our actual pleasures but by our hopes, by our reminiscences' (1961, 22) she wrote. Here again she follows the Enlightenment project of the possibility of happiness during our life on earth. As John Locke wrote in 1677: 'The business of man [is] to be happy in this world'.[6] Thinking about time and since Du Châtelet's scientific work was the main and constant source of both her glory and happiness, she made sure it would be saved for the archives of the future. Indeed, one of her last extant letters before she died was addressed to Claude Salier, the royal librarian, to whom she deposited her manuscripts: 'I use the liberty, you have given me to leave in your hands the manuscripts, which I have great interest in securing that they will remain after me.' (in Kölving & Brown 2018, II, 478*)* While wishing that all would go well with the birth, despite her fears, she nevertheless asked the librarian 'to put a number in the manuscripts and to register them, so that they are not lost.' (478) These manuscripts were indeed not lost, but many others of her papers were dispersed in different archives, and they are still emerging from their hideouts.[7] Indeed, the adventures

[6] *Diary entry, 8 Feb. 1677,* in Gibb & Gibb 1936, 88.
[7] See 'Émilie Du Châtelet (1706-1749): The Saint Petersburg Manuscripts' Ruth.E. Hagengruber, Andrew Brown, Ulla Kölving, Stefanie Ertz (2020-2021), at https://historyofwomenphilosophers.org/stp/ [Accessed, 10-1-2023]

of Du Châtelet's papers run in parallel with Germain's fragmented archives, as I turn to them in exploring happiness in the writings of a *femme philosophe* in post-revolutionary France.

Sophie Germain and the search for the happy idea

Sophie Germain's (1776-1831) 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 without acknowledgement or proper citation, with the notable exception of Louis Bucciarelli's and Nancy Dworski's important study (1980). 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 18 May 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. The second was written by Jean-Léon-Hippolyte Stupuy, a poet, playwright and literary figure. 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.

Short as it is, Libri's 'Notice' paints an intimate picture of his biographical subject, drawing on his recollections of their real life and epistolary dialogic exchanges. His account is lively and irrupts from the senses, despite the official plural 'we' of the discursive conventions of his time: 'We have often heard her speak of the *happiness* she enjoyed when, after long efforts, she was able to persuade herself that she understood the language of analysis'. (1833, 12, emphasis added) Happiness springs again here from Germain's realization that she had mastered the language of analysis, a difficult task even when guided by a tutor, let alone as a self-taught attainment.

Both biographers highlight Germain's interest in finding the mathematical laws underpinning the physics of acoustics, which eventually led to the unprecedented achievement of winning a prestigious prize in mathematics by the French Academy of Sciences in 1816, but also created 'a remarkable opportunity, which made her known as an author' (Libri 1833, 14). Stupuy also marks her engagement with the theory of elasticity as the beginning of her writing career. 'Here are the circumstances in which she began her life as an author' he notes, (1896, 19) before elaborating at length on the nature of the problem and its development in the history of sciences (20-27). In flagging up the importance of Germain's contribution, Stupuy cites amongst others, Diderot, Euler Bernoulli and Comte, particularly highlighting the way Comte praised Germain's contribution, not only in the mathematical sciences, but also in philosophy:

> We would imperfectly appreciate the high range of Mademoiselle Sophie Germain, if we limited ourselves to consider her as a mathematician [géomètre], whatever the

> eminent merit she demonstrated in mathematics. Her excellent posthumous discourse, published in 1833, on the state of science and the letters in the different periods of their culture, indicates in her a very lofty philosophy, both wise an energetic, of which very few superior minds have such a clear and profound feeling today. I will always attach the highest value to the general conformity that I saw in this writing with my own way of conceiving the whole intellectual development of humanity. (Comte 1864, 415)

Unlike Libri, who only makes a passing reference to Germain’s philosophical thought, Stupuy, discusses Germain’s posthumous discourse at length, criticizing Libri for not mentioning her *Considérations* in his obituary. (1896, 45) Although the dominant perception was that her unfinished posthumous discourse was written in the last months of her life, while suffering from breast cancer, Stupuy argues that this work must have started much earlier: ‘it is without temerity to suppose that, imperfect as it still was, as to the execution, when death tore the quill from the hands of the writer, a work of such great significance had been conceived long before, at length thought through, often revised and retouched.’ (44) There is no evidence for this assertion, only clues that Stupuy takes by studying in depth not only the text of the posthumous discourse, but also Germain’s ‘Pensées’, which were also published in the volume of her *Œuvres Philosophiques,* alongside a number of unedited letters. (Germain 1896). Seen as a mathematical set of thought fragments, Germain’s *Pensées* can be configured as a philosophical annex to her *Considérations,* a poetic rendition of the ideas that her philosophical work either develops or leaves out at least in its extant unfinished form, but it can also serve as an exemplar of the interwoven intellectual processes, between science, literature and the arts. In this context, Stupuy particularly draws on the following fragment, using it as a corroboration of the speculation that Germain’s philosophical work must have been written over an extended period, alongside her mathematical work and not just in the last years of her life:

> If the men who have advanced the sciences through their work, if those to whom it has been given to enlighten the world, want to return to the path they have taken, they will see that the most beautiful ideas, the greatest, are the ideas of their youth matured by time and experience. They are enclosed in their first trials like the fruits in the spring buds. (Germain 1896, 208-9)

We cannot be sure that a fragment of Germain’s ‘Pensées’ can sustain Stupuy’s speculation. Perhaps this essay was ‘the outgrowth of her early habit of writing down pensées’, as Louis Bucciarelli and Nancy Dworsky have suggested. (1980, 112) But does this matter? As Stupuy notes, what is important in Germain’s philosophy is ‘to seek the how and no longer the why, this is, in fact, what marks the philosophical progress outlined by the school of Diderot’ (1896, 56). In the same vein the ‘when’ of her philosophical composition seems an irrelevant question, limiting her creative spirit within a linear conceptualization of time. It is rather the durée of her philosophical thought that is more important, the time of subjective experience where past, present and future co-exist—Germain’s time and our time, in which her philosophical thought comes alive.

In thus focussing on ‘the how’ of the work let us consider its structure first. Germain’s unfinished essay comprises two chapter: in the first she formulates the simple thesis that the

human mind is subject to laws and the character of truth is a spontaneous feeling of order and proportion: 'a deep feeling of order and proportion becomes for us the trait of truth in all things' (78). Both the sciences and the letters are therefore dominated by this feeling which is common to them and in this vein order, proportion and simplicity are 'intellectual necessities', eventually leading to the universal type of the beautiful and the true: 'The oracles of taste and the judgments of reason resemble each other; order, proportion and simplicity do not cease to be intellectual necessities. The subjects are different, but judgment is constantly based on this universal type which also belongs to both the beautiful and the true.' (79)

After the statement of this principle, Germain compares the impressions we get from fictional and scientific works and concludes that there are no important differences between them as 'the human mind is guided in all its conceptions by the foresight of certain results, towards which all its efforts are directed' (81), and therefore obeys 'the laws of its own existence' (97). In this light in all the traits of genius, in eloquence, in the sciences, the fine arts, or literature, what pleases us is the discovery of a host of relations which we had not yet been perceived. (82)

In making these comparisons, the author carefully demonstrates the identity of intellectual processes both in poetry and in science by showing that there is a continuous interchange of feelings [sentiments], imagination and rational reasoning in the way they unfold. For the poet there is 'a tumultuous struggle' of abstract images and opposing projects until a simple idea finally emerges. (82) For the mathematician there is also a simple, 'fruitful idea' that arises through [his] struggle with imagining a new problem in areas already researched and established:

> he sees results he cannot yet achieve; his imagination soars, to seize them, in the roads it has blazed; he fears he has lost his way, he doubts his first glimpses, he retrogrades and tries to re-enter the indications which had first guided him; a large number of ideas joined those which were the first; they complicate matters, share attention and suspend judgment. But, through this chaos of thoughts, the genius distinguishes a simple idea; his choice is irrevocably fixed, he knows that this idea will be fruitful. (83)

Germain pursues these parallel intellectual movements between poetry and science in the realization of the work: 'in tracing his plan, the poet will never lose sight of the principal idea. It will give his work the unity of interest and action, the source of all true beauty'. (83) In the same way, the mathematician 'pays close attention to the *happy* idea that directs his research', by unfolding a chain of truths, already contained in the first truth of his initial idea (84, emphasis added).

Germain often returns to the notion of 'the happy idea', a linguistic recurrence, which is not accidental in my view, since in tracing the process of creation, Germain also points to the importance of the choice of style and makes reflections of remarkable accuracy on the perfection of language in literature and of 'the language of calculations' in mathematics: 'the man of letters will take care of the choice of words, their arrangement, the harmony of the verse or that of the sentence' (86). But the mathematician also needs to attend to the demands of style, since the language of calculations also has its own aesthetics: the choice of

words in literature corresponds to the choice of mathematical expressions, which can be 'more or less elegant' (83) as 'not all authors write it with the same degree of perfection'. (82) In the realm of the aesthetics of style and language then 'the happy idea' is a carefully chosen notion that takes us back to the previous section and the link between knowledge and happiness in the Enlightenment tradition, that Germain also follows in the creation of her *Considérations.*

In the second chapter of her treatise, Germain follows a historical investigation of her principles through different periods in science and culture. In this context she recounts how under the initial reign of imagination, poetry first recounted the most remarkable events and painted the great scenes of nature. Imagining an action would come later for the poet, she notes, but the need was soon felt to discover the rules, which would later become the precepts of art: 'unity of action, unity of interest and clarity of exposition'. (92) As [he] found himself 'thrown to the earth in the midst of the immensity of things' man marvelled at himself and seeking his own image everywhere, he personified inanimate and intellectual beings, rendering them 'children of his imagination' (92) This is how the human type became universal: 'faithful to his constant thought, man has never ceased to regard his own existence as the type of all other existences' (94).

Germain traces the process of universalization in the works of the antiquity and the Middle Ages: from the first astronomical knowledge, up to the foundation of Cartesian geometry and Newton's discoveries, amidst 'the thousand deviations' of reason that the history of science has pointed to. (113) Here she highlights the importance of mathematics in offering truth and nothing but the truth: 'From their birth, the mathematical sciences have offered the human mind the full realization of this type of truth, the object of its dearest affections.' (118) The reason is simple: while philosophical language was at times 'even more obscure than the ideas it was intended to convey' (122), the language of 'the exact sciences' has always been precise and clear. In this light she is optimistic about the fallacies of the human mind:

> We had to get lost; and yet the errors of the human mind, which would seem inexhaustible, are all closer to certain truths, and have not been so numerous as the defect of the processes could make it presume. This is because the feeling of truth [le sentiment du vrai] has never abandoned the authors of all these systems. *This happy feeling* [cet hereux sentiment] was not enough to preserve them from arbitrary and forced suppositions, but it captured their imagination within certain limits. (1896, 140)

Germain's reference to the 'happy feeling' is also remarkable in the above extract, very much related to the joys, pleasures and happiness of knowledge that we have already discussed in the previous section. Happy or not, the notion of *feeling* [sentiment], is indeed recurrent in the discourse of the *Considérations,* but what is important to highlight here is that the main thrust of Germain's take on feelings is very different from the common understanding of feelings as affects or emotions. Throughout her treatise she refers to *sentiments* as the precursor of human understanding, the first stone in the long process of reasoning and knowledge production, as well as the path to the ethics and aesthetics of the human existence. Whether she refers to 'a profound feeling of order and proportions' (78), which is the regulator of all intellectual movement either in the works of high literature or the rich

discoveries in science (81), 'a feeling of continuity', 'a feeling of analogy' (112), or 'a feeling of freedom' (135), Germain configures a universal feeling, which corresponds to a universal type of truth and has given rise to the creations of the human mind:

> We can no longer doubt it, the sciences, the letters and the fine arts were born out of one and *the same feeling*. They have reproduced, according to the means which constitute the essence of each of them, endlessly renewed copies of this innate model, a universal type of truth, so strongly imprinted in higher minds. (90)

As a matter of fact, whenever we get pleasure from a trait of genius or a trait of eloquence in sciences, in fine arts, or in literature, it is because through them we can discern previously unseen relations and we are transported in a realm where we discover 'an unexpected order of ideas or feelings', she wrote. (81) Feelings also emerge in her *Pensées* connected to movement and power: 'force is in the body the faculty of moving itself and of moving others; it is in us *the feeling* of power'. (153) Feelings are in short connected to the focus of Germain's philosophical work, namely investigating, the 'how' of intellectual processes.

Happiness springs at the moment when the idea which will drive the creation of a work of art or a mathematical treatise first emerges, but it also follows the whole process and is being infused in the 'feeling of order and proportion'—a repetitive beat in the overall rhythm of the 'intellectual movement'.

> But, if it is today in the character of our intellectual culture to attach more value to the solidity of the doctrines than to their brilliance; if we want reason to dominate all the creations of the mind ; if even we feel the taste for research to cool down our imagination, let us not despair of arriving at a *happier* time, where we will be able to unite all our faculties in the production of a *new* genre. (Germaine 1896, 189-90, emphasis added)

The errors of the human mind are neither 'inexhaustible', nor so far from the truth, Germain wrote in contemplating the inevitable 'defects' of human inquiries and understanding in the history of ideas: 'we had to get lost' she remarked, although 'the feeling of truth' has never abandoned the creators of science, literature and art. Indeed 'the feeling of truth' is a central concept of her philosophical treatise, *Considérations Générales* and is deployed throughout its text in different modalities and contexts, but is most importantly interwoven with happiness, as we have already seen above.

In thus contemplating the originality of a mind that was formative for her analytical thought, (see Musielak 2020, 178), Germain wrote in her 'Pensées': 'Euler made a *happy* application of geometry to physics, when he imagined composing objectives of two glass lenses that would contain water between them' (1896, 220, emphasis added). In her *Pensées,* Germain often makes transpositions between science and politics through the lens of happiness: 'Happy is the nation which joins constancy to wisdom! It lives peacefully and quietly without being bored with its happiness' (1896, 201) she wrote, juxtaposing it with 'those restless nations that are constantly tormented by their activity' and 'oscillate around happiness' without ever attaining it. And yet even within the chaos of trouble, thought moves and something new emerges: 'this anxiety produces the movement of thoughts; it is within trouble, quarrels and

divisions; it is in the theatre of ambition that the genius appears on earth' Germain added (201), having perhaps in mind the turbulent times within which she lived, thought, and created.

Feeling/thinking/writing/ happiness

In reading diffractively Du Châtelet's and Germaine's philosophical work, with a particular focus on their treatment of happiness, what I have argued in this paper is that and their take on happiness has nothing to do with the gendered norms and discourses of happiness that they were seen and judged by, in the long durée of the nineteenth and twentieth centuries. Their happiness was more in line with the joys and pleasures of knowledge, understanding and creating. 'We act only insofar as we understand' (E IVP24D), Spinoza has famously written.[8] Greater understanding gives subjects an increased sense of feeling their power and this empowering process also enacts a new source of joy and puts in motion I would add the machines of happiness. In this context, 'knowledge and adequate understanding are the key to human happiness, freedom and well-being' in Spinoza's philosophy, as Steve Nadler has pointed out. (2006, 155)

Whether taken as sensations that will lead to 'happy ideas' or as illusions and passions that can serve our happiness, feelings are central in the philosophical work of both Du Châtelet and Germain. Already in this paper we have had some glimpses in the diverse genealogies around affects, feelings and happiness in the history of philosophy in general and the history of sciences in particular. And yet one can scarcely find any of these two women philosophers and scientists mentioned, discussed, or cited in the current burgeoning literature revolving around feelings and affects. What I suggest is that it is hight time that their work entered the archives of knowledge, which will be significantly enriched and widened by their ideas and writings.

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[8] Abbreviated references to the *Ethics* follow Curley's conventions (1994, p.xxxv)

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