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How the Gender Perspective Changed the History of Science – Émilie Du Châtelet's ambition for her own reputation

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It is my pleasure to receive the prestigious Elisabeth of Bohemia Prize. I was supposed to be here today to receive the award, but unfortunately, I am unable to come to Tokyo due to illness.

I recently saw a list of the recipients of this award and was pleasantly surprised to see so many names that I feel truly proud to be included among.

When I began studying the history of science in the 1980s, the methodology that was regarded as ***objective*** at that time, was, in fact, very biased, I must say. The methodology posed considerable difficulties for researchers looking at any female scientist or philosopher.

These difficulties were often caused by the commonly accepted myth that men could define women.

Although there were the indifferent, neutral and objective images that science is known for, when people, whether a man or a woman, thought of a scientist, they would picture a man. If someone is described as “so scientific”, the people would imagine some masculinity, with no way to think that the words could mean someone “feminine”. The term ***scientific*** was just not thought of as a feminine attribute. At first glance, the face of science is androgynous, but in reality, it was treated as a masculine study. Therefore, female scientists were “strange” creatures.

They were considered to be performing work that looks

neutral but is actually manly, even though what they were doing had no relevance to gender.

In this environment, I came across Elisabeth Badinter's *Amour en plus*, and then *Emilie, Emilie*. In this famous feminist philosopher's books, I learned about a rare female philosopher, Émilie Du Châtelet (1706-1749), who lived in France in the 18th century, the so-called Age of Enlightenment. I use the word *philosopher* because she was a person of appropriate education, but also because the word *scientist* did not exist in that era. In fact, she was particularly skilled in mathematics and physics, and was known among scholars when I was young as "the only person to translate Newton's *Principia* into French." Among educated people, she was simply known as the philosophical lover of Voltaire, the representative philosopher of 18th-century France. In short, she was only assigned the role of an idol in the fashionable society that decorated famous men.

In addition to Badinter's book, there were several academic papers, but most of them were written by researchers

of Voltaire, Newton, and sometimes Maupertuis, and only a handful had a gender perspective like Badinter's. Research in Japan was also devastating. While I was writing my master's thesis about Du Châtelet, I was often asked questions like, "How was she useful to Newton?" and "What significance does she have other than her translation and interpretation of Newton?" Fortunately, my supervisor, Professor Yoichiro Murakami, was an enlightened person, so I was able to avoid any decisive obstacles. Rather than her translation of Newton, I chose as the main text of my master's thesis her first book, *Institutions de physique (Foundations of Physics)*, which was said to have first introduced Leibniz's ideas to France. I analysed this book from the perspective of gender.

From 1989, I studied in France for two years, but even in France, it was not easy to find enough materials on Du Châtelet, whether primary or secondary sources. This year happened to be the 200th anniversary of the French Revolution, so many secondary sources related to the revolution were published, and

in France, I wrote my D.E.A. dissertation on Marie-Anne Lavoisier (1758-1836), another female intellectual from the 18th century who survived the revolution. However, at the same time, I was collecting as much material on Du Châtelet as I could find. Even France showed the same tendency as in Japan. As with Du Châtelet and Voltaire, Marie-Anne Lavoisier also lived close to a famous man: Antoine-Laurent Lavoisier, Marie-Anne's husband and the so-called father of the Chemical Revolution. For both Du Châtelet and Lavoisier, the emphasis was on how these women served these famous men. Marie-Anne's situation was even worse than Émilie's. She was completely in her husband's shadow and her wishes were not taken into account at all. What I wanted to know was what these women expected from science, their own interest. I wanted to turn the question upside down: What did Voltaire and Lavoisier mean to their lovers and wives? How did men serve women's ambitions?

Now let's take a closer look at how Du Châtelet ended up publishing a book under her own name. However, why ***her name***?

Because in 18th century Europe, it was an adventure for a woman to publish a book under her own name. This was particularly the case for books about science, which was regarded as a “masculine” field. Consider, for example, Marie d’Arconville (1720–1805), a pioneer in the field of chemistry with many achievements. She is said to have discovered the importance of atmospheric air in putrefaction before Lavoisier. However, she published her work anonymously or under a male name throughout her entire life. In an ***unpublished*** text entitled “On the women,” she explains the reason for her decision as follows: “Do they [women] display knowledge or wit? If their works are bad, they are hissed at; if they are good, they are taken away, and all that remains for them is the ridicule of having claimed to be their authors.”

Most women were reluctant to publish their own books even anonymously, as women’s “independence” in academia was not socially expected. Under these circumstances, regardless of their level of knowledge of a given subject matter,

rather than publishing their own books, women tended to translate books by famous male scholars written in Latin or other foreign languages. They then published the translations mostly anonymously and only rarely under their own names. Unlike in modern practice, translated works in the 18th century were often not literal translations, and so translators were able to slip their own opinions into the text or a preface as an alternative to publishing their own books. In this way, academically ambitious women used translations as a means of modest self-assertion “in the shadow of the male giant”.

Although Du Châtelet later openly undertook the translation of Newton’s book with commentary and displayed a dignified attitude befitting her level of competence under her own name, her attitude in her early years was much more modest than d’Arconville’s. From her childhood, Du Châtelet was praised for her talent, and she was acclaimed as a girl genius in the salon of her father, Baron de Breteuil. However, this fame was only accorded to her as a talented woman in fashionable

circles and not as an independent scholar. She started scientific research in earnest only after she began associating with talented scholars as a result of her encounter with Voltaire in her late 20s. In 18th-century France, women were virtually excluded from admission to colleges and universities. Moreover, many women, including d'Arconville, married young. Very few were lucky enough to have some "encounter" that led them to undertake serious studies.

Du Châtelet was around 28 years old when she realized that she might be able to undertake some academic writing of her own. She describes this as follows:

"I am convinced that many women are either ignorant of their talents, because of the flaws in their education, or bury them out of prejudice and for lack of a bold spirit. What I have experienced myself confirms me in this opinion. Chance led me to become acquainted with men of letters, I gained their friendship, and I saw with extreme surprise that they valued this amity. I began to believe that I was a *thinking creature*."

Can we imagine Voltaire or Maupertuis ever doubting their status as *thinking creatures*? Of course not. To them, it was self-evident. However, this was not the case for women—even for exceptionally talented and educated women like Du Châtelet. It took many years for her to first consider herself capable of serious thinking and then recognize that she was qualified enough to write down her own thoughts. This was, she said, due to two factors: a lack of education for girls and social prejudice—in other words, gender bias.

Du Châtelet felt that because society kept women from studying, it was too late for her to acquire sufficient scholarship when she finally began her studies; however, she wanted, at least through works that informed the public of the discoveries of geniuses, to be one of the "negotiants of the republic of letters". This statement, which can be seen as a pioneering expression of feminism, is a quote from the "Translator's Preface" of her unpublished translation of Mandeville's *Fable of the Bees*, probably made around 1735. Until she published a

review of Voltaire's *Eléments de la philosophie de Newton (Elements of the Philosophy of Newton)* anonymously in the *Journal des Savants (Savants Journal)* in 1738, Du Châtelet's occupation with science was indirect or private.

Specifically, as symbolized by Voltaire's famous words, "Minerva dictated, and I wrote", Du Châtelet had achieved fame as a ***femme savante***, but her role was limited to that of the muse who inspired male intellectuals. Her existence was known only from references to her name in dedications or from her figure shown in illustrations in men's books. This was an approach designed to avoid running up against the gender norms of the time—in other words, to maintain the de rigueur "ladylike way." However, it was actually just a "procuration of authority" that denied her the fulfilment of her ambition.

Now let's take a closer look at how Du Châtelet came to be able to promote her work under her own name.

1. List of Émilie Du Châtelet's works published by her will

No. 1. review of Voltaire's *Élements (Elements)*, 1738
No. 2. "Dissertation du feu (Dissertation on fire)",1739, 1744 (2nd. ed.) and 1752 (1st. Ed.)
No. 3. *Institutions de physique (Foundations of Physics)*, 1740, 1741 and 1742 (2nd. ed.) and 1743 (2nd. ed., Italian and German translation)
No. 4. "Réponse (Reply)", A vis viva controversy with a perpetual secretary of the Paris Academy of Sciences, 1741, 1742 , 1743 and 1744 (2nd. ed.)
No. 5. French Translation of *Principia*, 1756 and 1759 (2nd. ed.).

Du Châtelet published a total of five works on her own accord, either in her lifetime or posthumously:

No. 1, a review of Voltaire's *Élements (Elements)* once in 1738; No. 2, "Dissertation du feu (Dissertation on fire)" three times in 1739, 1744 (2nd. ed.) and 1752 (1st. ed.); No. 3, *Institutions de physique (Foundations of Physics)* more than four times, mainly in 1740, 1741, 1742 (2nd. ed.) and 1743 (Italian and German translation of the 2nd. Ed.); No. 4, "Réponse (Reply)", which was a vis viva controversy with a perpetual secretary of the Paris Academy of Sciences, published four

times in 1741, 1742, 1743 (translation) and 1744 (2nd. ed.); and No. 5, a French translation of *Principia* twice in 1756 and 1759 (2nd. ed.). The names and genders of these authors are as follows:

2. Transition of author's name and gender(1)

No. 1. Anonymous. Author's gender is male
No. 2. All three times, 1739, 1744, 1752 anonymous. Author's gender is female
No. 3. Anonymous in 1740 and 1741, Author's gender is Male. In 1742 and 1743, with author's name
No. 4. In 1741, anonymous. Author's gender is female. In 1742, 1743, 1744, with author's name
No. 5. Always with author's name.

No. 1, anonymous male author; No. 2, all three times, 1739, 1744, and 1752, anonymous female author; No. 3, anonymous male author in 1740 and 1741, with the author's name in 1742 and 1743; No. 4, anonymous female author in 1741, with the author's name in 1742, 1743 (translation) and 1744; No. 5, always with the author's name.

3. Transition of author's name and gender(2)

Title		Anonymous	With author's name	Author's gender
"Letter on the *Elements of the Philosophy of Newton*" (1738)		X		M
"Dissertation on Fire" (1739)		X		F
Foundations of Physics (1740)		X		M
Reply (1741)		X		F
Foundations of Physics, 2nd. ed. (1742)	(text, 2nd. Ed.)		X	F
	(Reply)		X	F
Dissertation on Fire (1744)	(Dissertation, 2nd.ed)	X(possible to find author's name)		(F)
	(Reply, 2nd. Ed.)		X	F
Principia (1759) (translation and commentary)			X	F

In other words, we can see that over the years, the author changed from an anonymous man to an anonymous woman, and finally to the real author. However, it was not an easy road. In fact, except for the last work, *Principia*, Du Châtelet started the writing stage in secret and always encountered unexpected incidents along the way, which led to the publication of her gender and name. She wrote Paper No. 2 in secret even from Voltaire, who she lived with, and submitted it to the competition of the Paris Academy of Sciences as Voltaire did, but secretly. After they had both lost the prize, she confided in him and decided to reveal only her gender in the Academy's journal. This

is because No. 2 was rare scientific paper written by woman, and many parts of them were opposed to Voltaire's ideas. Although the two lovers studied together and fought against Academy's old customs, their philosophical views were not in complete agreement, and Du Châtelet was hesitant to make her theory public. However, she could not lie to herself. Deep down, she wanted to show that she was not at the mercy of men. Otherwise, even if she had been rejected, she would not have told him that she had written the prize paper. No. 3 was also written in secret and included a part that explained Leibniz's ideas, which Voltaire disliked. However, her former tutor Koenig, who she had a falling out with, spread the name of the book's author in Paris's fashionable circles, destroying the merits of anonymous publication (asking her to be judged fairly; at the time, this was synonymous with wanting to be considered a man). This book triggered a vis viva controversy with an academy's perpetual secretary, also one of Voltaire's friends, in 1741. Then, her anonymity was in name only. In this work, her theories are in

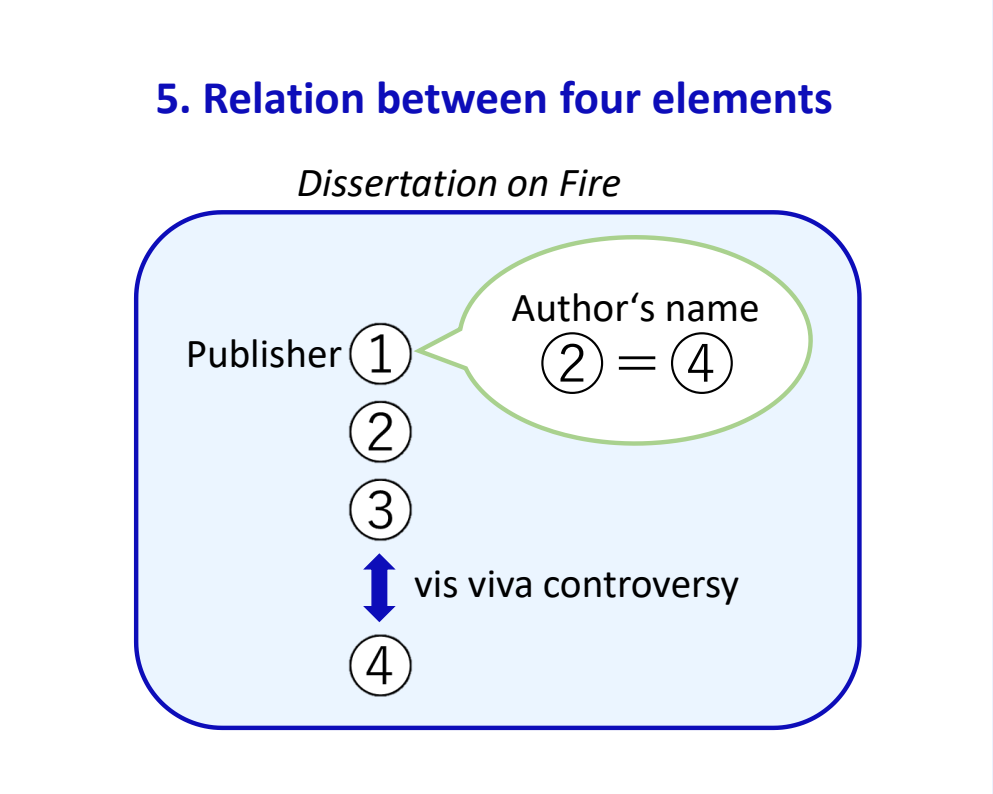
direct conflict with Voltaire's, that is, with Newton's, and she didn't even seem to try to hide it. However, the good reviews began to outweigh the bad reviews she had feared, and Du Châtelet began to feel confident in her own abilities. Thus, from 1742 onwards, she began to publish all her works under her real name.

4. Elements contained in *Dissertation on Fire* (book, published in 1744)

① Publisher's (Prault) Preface
② "Dissertation on Fire", anonymous
③"Letter" of Mairan (Academy's perpetual secretary), with his name and mentioned Du Châtelet's name
④ "Reply" of Du Châtelet, with her name and mentioned Mairan's name

However, there is one strange work here. It is a book, *Dissertation on fire*, published in 1744. It mixes an anonymous attribution and her real name, like in this slide. Each item is printed on different paper and in different fonts. In other words, they appear to have been written and printed at different times.

Moreover, her two papers were rewritten to be more scientific.



Finally, the "Publisher's Preface", probably printed after the others, is designed to make it possible to identify the name of the anonymous author of the article "Dissertation on fire". The reason for not revising the book is unclear, but what is clear is that by 1744, Du Châtelet no longer had any reason to hide her identity.

6. Virtual transition of author's name and gender

Title	Anonymous	With author's name	Author's gender
"Letter on the *Elements of the Philosophy of Newton*" (1738)	X		(M)
"Dissertation on Fire" (1739)	X		F
Foundations of Physics (1740)	X		M
Reply (1741)	X		F
Foundations of Physics, 2nd. ed. (1742)		X	F
Dissertation on Fire (1744)		X	F
Principia (1759) (translation and commentary)		X	F

In the field of science, she no longer hid herself and used her real name just like men of her time, who hid his name when it cames to religion, politics, and morality, but not to science. She was one of Europe's leading intellectuals. Nearly a decade had passed since she had realized she was a ***thinking creature***. This book represents her spiritual journey over the last decade. And let's not forget: d'Arconville, who kept her name secret, was a later generation. Though Émilie Du Châtelet herself had broken through the barrier of anonymity, her influence was not widespread among later generations of women.

So, did any women in this era succeed in making a name for themselves without being ignored or criticized? In fact, there were two female scholars who gained fame in Italy: Laura Bassi (1711-1778), an experimental physicist, and Maria Agnesi (1718-1799), a mathematician.

Laura Bassi, a professor at the University of Bologna and a member of the city's Academy of Sciences, was in great demand at various official ceremonies. But the enormous demands of the city for public lectures prevented her from finding the time to write her own works. As a result, despite her fame, she left very few personal works. Maria Agnesi, also a member of the Academy of Bologna, wrote a much-repeated work, *Analytical Institutions* (1748), which has been translated into many European languages, and she discovered a mathematical law that bears her name, thus achieving the status of "creative genius" that Du Châtelet so aspired to.

For these, Agnesi received expensive gifts from the Pope and monarchs. She was praised everywhere. However, Agnesi's

true ambition was not mathematics, but Christian charity and the relief of the poor, an ambition her father, a wealthy silk merchant, had stifled by imposing “daughterly duties” on her. He had given her an early education to promote his family socially. Despite her aversion to society, she was expected to showcase her talents in fashionable circles and accept the honours in order to promote “the social advancement of the family,” the “good of her parents,” or the “glory of the city.” At the age of 20, Agnesi was excused from attending fashionable events, and finally, after her father’s death, she gave up mathematics altogether. She then sold all the jewelry she received, left her family, and devoted the rest of her life to the poor. She was 32 years old at the time. A lot of famous male mathematicians are said to have mourned her loss. What does this mean? Wasn’t society supposed to combat women who excelled in male domains?

In fact, there’s a hidden rule here: the “exception when patriarchal society requires it.” Femininity was ultimately a

matter of altruism, of giving up oneself and one's life for the good of one's family and those around them. Seen in this light, Émilie Du Châtelet's great courage and passion are surprising, given that she reached the forbidden level, "me first," as Élisabeth Badinter wrote in her book—a rare phenomenon, just as rare as a major scientific discovery. When Du Châtelet began translating Newton's *Principia*, she no longer hid anything. This shows that, after being recognized as the author of the *Foundations*, she had developed sufficient confidence not only in her own powers, but also in the reception she could now expect as Newton's translator. While writing this work, she wondered if she would be well received, because everyone knew what she was working on.

This fear is shared even by many writers today; it's a normal feeling. However, as an 18th-century woman, it took her many years to become aware of this completely "normal" reality. Is the world of equality desired by Émilie Du Châtelet and Marie d'Arconville a reality in science today? Émilie wrote to

Maupertuis: “Life is so short, so full of duty and useless details [when one has a family and a home]. I am in despair at my ignorance. If I were a man, I would be at Mont-Valérien with you, and there I would leave all the uselessness of life.” Is this really a thing of the past? Don’t women still need each other as a pretext, to live for their children, for their family, for other oppressed people? Of course, the idea is not to voluntarily act selfishly. However, are we not stifling more than necessary the voice of the heart that says “I want to act for myself”? The story of Émilie Du Châtelet is more relevant than ever.

It would be great if everybody had the right to speak openly or could freely share his or her viewpoint. Therefore, I wish for us to live in a society where each minority has a voice, not only in gender research, but in other topics as well, and the majority has an ear for these voices.

It is my great pleasure to receive the Elisabeth of Bohemia Award today, because it is an award that honours not me alone, but all women who do not want to lose their own independence.

Thank you for your attention.