



Women Contributing to Science during the Scientific Revolution

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Abstract: *The Scientific Revolution took place where the modern period just started. There appeared more and more positions and jobs that women could take than before, and thus more women appeared in the scientific field. Women had the chance to work as assistants or collectors, later on they worked as scientists on their own. The social classes these women came from did not matter at this point because both the upper class and lower class could contribute to science. There were queens that could support science and also women who were supposed to be diligent housewives but instead got educated and worked hard with other scientists. Their appearance in society also shifted people's view on women. Before the Scientific Revolution, some women were admired just because of physical beauty, and women themselves did not realize their strength in scientific work. As women started to rise during the Scientific Revolution, people's ideas were changed a lot. Some people started to appreciate women's intelligence; some women realized their potential in scientific work. To some extent, this change went all the way to WWII and the current society when women gained independence as well as equal rights in society.*

Keywords: *Female, Scientific Revolution, Women Rights, Women Scientists, Society.*

The Scientific revolution is a period where science in the modern sense started. Many of the scientists reshaped the world, especially faith and thoughts. There also appears to be more and more women contributing to science, contributing to the world. Why did they appear at the time? Were there a lot of women contributing to science coming out? Where did they come from? Did women contributing to science change the way people perceive women? And how did they influence women's position in society? Women did contribute a lot and changed the way some people perceived women during the Scientific Revolution. However, it did not change women's position in society at large since there were only a small portion of female scientists then, ultimately unable to create a huge change.

Around the scientific revolution, there are more positions and jobs that women can take than before, and also more education opportunities, enabling some women to enter the scientific field. Compared to former times, women can have more possibilities both in education and career. With enough knowledge, women began to appear in scientific fields, some of them began as assistants or collectors. Chemistry, geology, astronomy, physics, all of these fields had the appearance of women either as scientists or assistants to scientists. For example, Elizabeth Hevelius started as an assistant to her husband Johannes Hevelius, and she helped Johannes to be one of the foremost Astronomers, and helped him publish works after his death.[1] For another example, Mme Lepaute (1723–1788), the wife of a skillful watchmaker to the king, had done astronomical calculations in assistance of her husband and published books and maps about Astronomy.[2] Moreover, geology needed fieldwork, which was taxing for women, but women can act as scientific illustrators and amateur fossil collectors for their husbands or brothers, contributing to the advance of geology. Starting from here, some women abandoned their traditional housekeeper jobs, and walked out of the home to the scientific research places, making scientific contributions.

It was not only the upper class women who were able to make scientific contributions; women from lower class also had the chance to be scientists, as in the scientific revolution female scientists came from different backgrounds. Upper class women had education from tutors, their interest in science was encouraged by their parents and also the leading scientists of their day, who were acquaintances of these families. Thus the knowledge base, their parents' psychological and financial support, and social connections with scientists all enabled upper class women to be scientists. For instance, Queen Christina of Sweden (1629–1689) was an avid learner who learned theology, philosophy, astrology

and alchemy. She also set up an observatory in her palace and also patronized many astronomers like G.-D. Cassini and Edmond Halley.[3] Even without proper knowledge base or financial support, some women from the working class were also able to contribute to science. With the help from other families who worked in certain scientific fields, or working as assistants to scientists, women from the lower class can also have chances to make scientific discoveries.[4] Caroline Herschel (1750-1848), for example, was a female scientist from the lower class; her family was not well-off, and her mother even wanted her to be a “cheap labor” at home for ever; fortunately, Germany at that time practiced universal education, which enabled lower class girls like her to have the ability to read and write; even better, her brother William Herschel (1738-1822), an astronomer, taught her mathematics and astronomy, and working as the assistant to her brother, she discovered eight comets and was the first woman to discover a comet.[5] Therefore, women from both the upper class and the lower really did make scientific contributions and these contributions finally got recognized by some people.

Their appearance in the scientific field changed some people’s ideas about women. They were not just being women of physical beauty, but they could also study and work for society to improve. During that time, women were having difficulties in society, as they were often portrayed as weaker people. People at the time often denied women’s capabilities of being smart, and women did not notice their potential until the scientific revolution when some of them had the chance to study. “I feel the full weight of the prejudice which so universally excludes us from the sciences . . . there is no place where we are brought up to think,” wrote the physicist Madame du Châtelet in 1735.[6] However, with women’s continuous effort in advancing science, some people began to realize women’s intellectual ability. For example, Rémond de Montmort complimented Catherine Barton in his letter in 1715 that “Ever since I beheld her, I have adored her not only for her great beauty but for her lively and refined wit. I believe there is no danger in betraying me to her. If I had the good fortune to be near her, I would henceforth be as awkward as when we first met”. [7] Here, the woman was not just admired for her beauty but rather for her intelligence. Every woman started to grow their own mind and future, shifting people’s view by a large amount of change. At this point their social status changed a little, they were much more noticeable than before, and they could do more work than they had done before, contributing a lot to science.

Finally, we can notice that the female scientists rose during the scientific revolution, and they found their own value and contributions in the world, stating that women can also go work and study, just like what men can do. Some members of the society also shifted their views on women, knowing that women were capable of doing scientific jobs and work despite difficulties. They contributed a lot to the new world we live in now. However, although women contributed a lot during the scientific revolution, their action was greatly ignored by the patriarchal society at the time. Men were assumed stronger at the time so the idea that women can be strong too was viral; as historians Carolyn Merchant and Sandra Harding claimed, masculine ideas mainly formed science – it was still male scientists who dominated science during the scientific revolution.[8] It was not until WWII when women could work on their own and gain economic independence that they gained some equal rights in society.

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- [5] Winterburn, Emily. "Caroline Herschel: agency and self-presentation." *Notes and Records: the Royal Society Journal of the History of Science* 69, no. 1 (2015): 69-83.
- [6] Gelbart, Nina Rattner. "Adjusting the Lens: Locating Early Modern Women of Science." *Early Modern Women: An Interdisciplinary Journal* 11, no. 1 (2016): 116-127.
- [7] Brook Taylor, *Contemplatio Philosophica* (London, 1793). Newton gave Rémond de Montmort presents for himself and his wife, for which Montmort thanked him, writing of the ‘ornaments given by Mr Newton and chosen by Mrs Barton whose wit and taste are equal to her beauty’, letter of 25 Feb 1717, King’s MS 101.

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This is useful because it shows a lot of examples of female scientists and what they did and also explains how women's role changed during the revolution. And I'm using it to explain about female scientists' role.

Taylor, Brook, and Sir William Young. *ContemplatioPhilosophica: A Posthumous Work, of the Late Brook Taylor... To which is Prefixed a Life of the Author by His Grandson, Sir William Young... With an Appendix, Containing Sundry Original Papers, Letters from the Count Raymond de Montmort, Lord Bolingbroke, Marcilly de Villette, Bernouilli, &c.* W. Bulmer and Company, 1793.

In this book I learned that people realized women's wisdom as scientists, not only their beauty or personality. It explains how women scientists started to appear which helps my view.

Freedman, Jeri. *Women of the Scientific Revolution*. The Rosen Publishing Group, Inc, 2017.

This helps me because it introduces several 17-18th century female scientists that I did not know much about. Moreover, it explains the social difficulties they faced in doing scientific research and publishing their works. Furthermore, not only women from higher classes who have more resources can work as scientists, but also women from the working class can contribute as scientists.

Smeltzer, Ronald K., Robert J. Ruben, Paulette Rose, Marilyn Bailey Ogilvie, and Randi Hutter Epstein. *Extraordinary Women in Science & Medicine: Four Centuries of Achievement*. Grolier Club, 2013.

It not only talks about the major achievements of women in scientific works, but also their contribution to the innovation of research methods and ideology. This helps me to understand how their social situation changed.

Wollstonecraft, Mary. "A Vindication of the Rights of Woman." In *Ideals and Ideologies*, pp. 401-406. Routledge, 2019.

In the 18th Century, people generally denied women's wisdom and women did not realize their potential for intellectual achievement. And the change after this could illustrate women scientists well.

Gelbart, Nina Rattner. "Adjusting the Lens: Locating Early Modern Women of Science." *Early Modern Women* 11, no. 1 (2016): 116-27. <https://www.jstor.org/stable/26431442>.

This is useful because it provides the process of women's intelligence from being denied to being recognized. It also provides social backgrounds of women scientists and how social backgrounds influence their success.

Du Châtelet, Emilie. *Selected philosophical and scientific writings*. University of Chicago Press, 2009.

AUTHOR'S BIOGRAPHY



Jesse, I'm seventeen years old, currently a 10th grader. I have enjoyed my life at Kent School, made a lot of friends, and explored a variety of academic and extracurricular opportunities. I consider myself as an optimistic, outgoing, smart, and humorous person. I like to play the saxophone and play tennis, also I like to read various books and novels.

I had a great time with my boarding experience.

I like to stay with my friends to relax, have fun or do projects together. The sense of community has been a huge part of me and I wish to dedicate myself to community service at my school as well.

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