

“*Authority and reason on her wait. . .*”\*

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When I began studying science as an undergraduate, and over the years since as a postgraduate student and postdoctoral researcher, people often commented that the choice of science was an unconventional, and in some sense, pioneering vocation for a woman. This was surprising news to me, because in fact nearly half of my peer-group student cohort consisted of women, and nowadays I have many respected and valued women colleagues. But I did wonder why people outside science thought so. I often wanted to say: “Hold on, we *are* here, we are not invisible”. There seems to be a gap or lag between women’s participation and acceptance in the world of science, and recognition of this by outsiders. Perhaps this contributes in a feedback effect to the real and perceived inequities between women and men in science. Women scientists, it seems, often become invisible, not only to the upper echelons of the masculine scientific culture, but also to the general public.

I am convinced there have been many occasions, in history and in our own time, when the achievements of women in science were ignored or belittled at the time or unrecognized by posterity, to, I think, the detriment of scientific progress. A good example is the story of Mary Montagu (1689–1762) and smallpox inoculation.

Mary Montagu? Who was she? Well, compared to the famous big-fellas of the Renaissance and the Age of Enlightenment, such as Leonardo, Leibniz, Wren, and Voltaire, I guess she was a fairly minor polymath of the 18th century. Denied a formal education, she was self-educated in languages and natural history. She was a gifted writer, raconteur, and poet. She was a perceptive observer, an accomplished satirist, an adventurous traveller, and keenly interested in foreign societies and cultures. Her record of her travels, Turkish Embassy Letters, are still considered among the finest specimens of the epistolary genre. Her dying words in 1762 were reported to have been: “*It has all been most interesting.*”

Mary Montagu was also the discoverer and populariser of the first effective method of inoculation against smallpox.

We cannot now imagine the terror and devastation caused by smallpox. In Australia smallpox was a swift and deadly period to much early Aboriginal resistance; and in Asia and Europe the disease had been present for centuries, a perennial killer of mainly infants and children. During the 18th century, an estimated 10 percent of all deaths in Europe — as many as 400,000 per year — were caused by smallpox, and many more sufferers were left blind or horribly disfigured.

A crude method of immunizing against smallpox was practised in Asia and the Middle East and it was Mary Montagu who introduced the practice, and, importantly, the concept, of inoculation to Europe. While visiting Turkey in 1717 she observed and documented the method of *ingrafting* that was used by women to inoculate people against smallpox. This consisted of inserting a drop of serum from a known very mild form of the disease into a scratch on the arm. The recipient would develop this relatively harmless version then recover, protected henceforth against the more deadly infections of the disease. (Remember, this was an era when nothing, nothing at all was known about viruses and immunology.)

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\*Milton, *Paradise Lost*

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Mary Montagu was so impressed that she became convinced that it was her patriotic duty to inoculate the people of her own country and on her return to England immediately began this mission. In one of her first experiments seven criminals were given a horrible choice: the gallows, or freedom on condition they submitted to Mary Montagu's new smallpox inoculation. The outcome of the latter choice could be freedom and good health, freedom and severe scarring, or death from the disease. The prisoners chose inoculation and all survived. She repeated her experiment on six orphans, who also survived.

The practice of inoculation against smallpox began to be adopted, patchily, in England and Europe, but it was strongly condemned as immoral, heathen, and unnatural by the high priests of medicine, science, and religion. Because smallpox was claiming so many lives, news of the use of inoculation was taken across the Atlantic to Boston where an epidemic was rapidly spreading. City fathers in Boston immediately outlawed the use of inoculation. Back in England the medical and scientific authorities objected vociferously to being told by a woman what it was their business to know. Mary Montagu was vilified and discredited by the medical and scientific establishment and the Church hierarchy (although not at all for carrying out cruel and inhuman experiments — no-one at the time seemed to think there was anything wrong with forcing prisoners and orphans to play such potentially deadly games of roulette). Even in the 18th century the British scientific establishment was well-practised and expert in intense campaigns of vilification and white-anting of those who evoked its wrath, and most people would have crumbled in the face of its onslaught.

Not Mary Montagu. She simply thumbed her nose at her critics and detractors, and — worse! — sent the stuffiest one up in public, and published a scathing critique of the medical profession for not doing enough to protect their patients' health, while doing too much to protect their own income and prestige. She continued publicizing and campaigning for inoculation, and indeed succeeded in virtually eliminating smallpox from England for a while, but the practice gradually declined because it did not have the imprimatur of the scientific establishment.

The credit for developing a method of immunization against smallpox is now given to Edward Jenner, who almost 80 years later in 1796 carried out the famous experimental vaccinations with cowpox. Of course the story of smallpox does have a happy ending: in 1980 the World Health Organisation officially declared the world and its peoples free of this disease.

Why am I telling this story? Because as new graduates, *we* are the future scientific establishment. Provided we can beat off the bureaucrats, politicians, and managers, the directions that scientific enquiry take will be decided by us and our peers. I hope that knowing what has happened in the past will help us make wise and humane decisions when confronted by unconventional ideas or challenging data.

Mary Montagu was articulate, well-educated, and determined. She was also flamboyant, influential, and had a flair for publicity. With the possible exception of tactfulness, she had all the qualities that today would be considered desirable in a high-achieving scientist. In the face of ignorance, bigotry, and vested interests Mary Montagu lost her battle to popularize inoculation against a deadly disease and obtain recognition —  
***but that wasn't the end of the war.***

## **Bibliography**

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