

A Great Example of Scientific Attitude: Semmelweis' Discovery of Germ Theory

A decade before the proposal of germ theory, when medics were still using “opium, mandrake juice, and even hypnosis as anesthesia “(Explorable), a man who worked as a lowly assistant physicist discovered something that would forever change the understanding of medicine. You’d imagine such a person in the modern day to be rewarded. But it was not the case for Ignaz Semmelweis for he was living in the dark age of medical care that contradicted the then medical beliefs. When the germ theory did prove to be correct, people realized Semmelweis’ contribution to medicine. Alongside, they also witnessed a noteworthy demonstration of scientific attitude. Scientific attitude refers to the way one approaches proving a scientific idea. A positive scientific attitude is about respecting empirical evidence and being willing to seek other pieces of evidence if one fails to prove the scientific idea. The purpose of this paper is to investigate how Semmelweis’ practice of scientific attitude contributed to his discovery of how hygiene and sanitation could millions of lives.

Lee McIntyre summed up what a person with a scientific attitude’s mindset is in two points in his book *‘The Scientific Attitude’*:

“(1) We care about empirical evidence.

(2) We are willing to change our theories in light of new evidence.” (McIntyre)

Keeping the aforementioned two points in mind, we dive into how an assistant physicist working at the world’s largest maternity clinic discovered the importance of washing hands in any medical procedure. The maternity clinic was divided into two wards, and the first ward had an unusually high mortality rate due to childbed fever. To find the root cause of the problem, many hypotheses were offered. The first one was that Ward 1 was overcrowded. However, upon gathering empirical evidence, Semmelweis found that overcrowding was much worse in ward 2, eliminating population as the cause of the high mortality rate. The following

hypothesis was that the first ward's physical layout made it so that the priest giving last rites to mothers who were dying passed through much more beds than in the second ward. Semmelweis tested this by asking the priest to take a different route that avoided other beds and debunked it. After two possible causes failing to explain the problem, Semmelweis respected the evidence and open-mindedly searched for other answers instead of dwelling upon them hoping for them to magically prove to be true.

Persistent and embraceful of integrity, Semmelweis moved on to his next hypothesis which accounted for the people who were performing the delivery. While midwives worked at ward 2, it was medical students who worked at ward 1. Suspicious of the medical students' skills, they were told to work in ward 2. However, this did not change the results. This may have been frustrating and disappointing for Semmelweis especially during the 17th century when it had been only 200 years since the start of the scientific revolution. Nevertheless, he accepted that his most hopeful hypothesis had failed, and was willing to change his theory if new evidence was found. Finally, Semmelweis realized that there was a difference between where the midwives and medical students came from before entering the maternity ward. This theory became popular after one of Semmelweis' colleagues died after performing an autopsy on a mother with childbed fever. It turned out that the medical student came into the maternity ward after doing autopsies, while midwives were not responsible for other medical procedures. There was no practice of sterilizing or cleaning their hands or medical instruments after a medical procedure since germ theory was not even thought of. This hypothesis actually proved to be true later although Semmelweis at the time could not explain why cadervic matter caused the transfer of disease due to lack of technology (microscopes).

Semmelweis was committed to the two principles of scientific attitude that Mclyre proposed. He came up with various hypotheses and began to test them one by one. When a hypothesis proved to be false, he moved on to the other one with an open

mind to not only find the cause, but also learn new information along the way. He used the information learned in his previous attempts to test his new hypotheses and persistently continued until he proved them to be true. His open-mindedness and integrity served as a great contribution to germ theory and medicine.

However, the story does not stop there. While the scientific attitude Semmelweis practiced individually has helped modern medicine stand where it is today, the scientific attitude practiced among the then-scientific community held back what could have saved millions of lives. The medical practitioners did not want to be held accountable for giving their own patients a disease that caused their death, only to have more mothers killed for the same reason for years. Even though Semmelweis laid out chlorinated hand wash reducing the risk of the disease as empirical evidence, they simply did not care for their own benefit. They failed the first principle of scientific attitude a medical community was supposed to hold let alone the second. As mentioned before, Semmelweis could not prove his hypothesis at the microscopic level due to a lack of technology, which made medical practitioners highly reluctant to accept a new theory. If even a small group of the medical community cared about the empirical evidence and contributed to proving the hypothesis at a minute-level, a lot of lives may have been saved. But this was not the case, instead, Semmelweis faced his own death after being penalized to a mental asylum for doing the right thing. Unironically, he died of a similar disease after being beaten by the guards who beat up someone with that disease.

While Semmelweis portrayed an excellent demonstration of the scientific attitude, some may argue that he was ahead of his time. The 1850s scientific community failed to abide by their scientific attitude, resulting in the unnecessary loss of countless lives. This is the role scientific attitude plays in the world and why it is so important that not only individual scientists, but the scientific community as a whole must stay true to it in order to proceed to discover and implement new ideas into human lives.

References:

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