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Semmelweis at 200: creativity, skepticism and charm in medicine

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Abstract. 2018 marks the 200th anniversary of the birth of Ignaz Semmelweis, the man who first intuited the iatrogenic and infectious causes of puerperal fever, then was violently opposed for questioning old dogmas, and ultimately died of sepsis in a mental asylum. The rejection he encountered is not unusual among innovators, as breakthroughs are often ridiculed before eventually being accepted as self-evident. In fact, automatic rejection of new ideas has even been dubbed "The Semmelweis Reflex". Thus, the anniversary of his birth provides a timely opportunity for revisiting the risks and benefits of skepticism in the creative process.

Key words: history of medicine, skepticism, creativity, antisepsis, semmelweis

"If you want to tell people the truth, you'd better make them laugh or they'll kill you."

(G. B. Shaw)

Born in Budapest in 1818, Semmelweis was the ultimate outsider: an ethnic German in Hungary, a Hungarian provincial in Austria, the son of a lowly grocer in aristocratic Hapsburg society, and a leftist sympathizer in conservative Vienna. This barred him from an Internal Medicine residency (1) and forced him to instead accept a position at the Viennese General Hospital's Obstetrics Clinic. Feeling ostracized made him resentful and angry, and thus might have contributed to his eventual downfall. Yet, on the positive side, alienation might have also increased his independent thinking and thus made him more creative. In fact, another creative mind that actually relished being a "lone traveler" was that of Albert Einstein, who wrote in *The World as I See It*, "I have never belonged to my country, my home, my friends, or even my immediate family, with my whole heart."

The problem Semmelweis and his Viennese colleagues were trying to solve was puerperal (childbed) fever, a post-partum menace traditionally blamed on "bad air", or *miasmas.* Curiously enough the bad air was killing many more women in the physicians' maternity wards than in the clinic run by midwives (2). Nobody knew why.

Then in 1847 something unexpected happened. One of Semmelweis' colleagues got cut during a post-mortem exam, acquired a febrile condition, and died. At autopsy he presented findings remarkably similar to those of women dying of childbed fever.

There was no germ theory yet, but Semmelweis postulated that through that cut his colleague might have acquired some "cadaveric particles" and that these particles eventually caused his demise. Then Semmelweis had an epiphany. Since autopsies were only performed by doctors, and doctors typically rushed from the autopsy room to the delivery room with hands still soiled, Semmelweis speculated that this might have favored the exclusive transmission of cadaveric particles to the women cared for by doctors (2).

Hence, years before Pasteur, he required all physicians on his ward to wash their hands with chlorinated lime. He also washed surgical instruments. The result was a drop in maternal mortality from 18% to 1.3%

(3). As Semmelweis put it: puerperal fever was not a "species of disease but a variety of pyemia" (4).

It was a breakthrough but conflicted with established explanations. Thus it earned its young and "provincial" discoverer only rejection and scorn. Semmelweis was denied a reappointment and ultimately dismissed (5).

In 1850 he returned to Budapest where he accepted a position without pay at the Szent Rokus Hospital. There he introduced the same lifesaving washing protocol he had used in Vienna (Figure 1), obtained an appointment as professor at the University of Pest, and finally published his work on childbed fever in 1861. That was also the year Pasteur began studying pyogenic bacteria. Still, criticism continued and eventually Semmelweis lashed out.

He started writing ranting letters with sentences like, "You have participated in the massacre of women and children. Murder must cease!" (5). He was right, of course, but insulting colleagues has never been a good way to win acceptance.

In the end, either because of all the humiliations he had to endure, or because of a case of early dementia or syphilis, or simply because of a mental breakdown, Semmelweis cracked. In 1865 he was admitted against his will to a mental asylum, straitjacketed, isolated and beaten. Less than two weeks later he died of sepsis from wounds acquired during the beating (2). He was forty-seven years old. Ironically, the day before he died, pioneering British surgeon Joseph Lister began using those phenol antiseptic techniques that quickly earned him the respect of the medical community.

Figure 1. The funerary monument of Teresa Pelzer, a young German woman from Aachen, who was described by contemporaries as "litteris et musicis scientissima" (exquisitely gifted in music and literature). After marrying the Italian Antonio Cerasi she moved to Rome, where in 1852 she died of puerperal fever at the age of twenty-six. Her newborn baby died with her. The Latin inscription on their grave says, "Post Tenebras Spero Lucem" (After Darkness I Hope in Light). The year of their death coincided with the time when Semmelweis had been able to lower maternal mortality at the Szent Rokus Hospital in Budapest to only 8 deaths out of 933 births (0.85%). (Sculpture by Giuseppe Tenerani. Cappella Cerasi of Santa Maria del Popolo, Rome, Italy; Photo by SM)

Why was Lister accepted while Semmelweis suffered violent rejection? What can we learn from their stories that might help us think critically but also better promote our ideas?

The answer probably lies in the personality of the discoverer and the timing of the discovery. As in vintage Greek tragedy, Semmelweis was the proverbial hero with "hamartia" -- the single tragic flaw of hubris that ultimately causes the hero's demise. Conversely, Lister remained humble, charming, totally comfortable in his own skin, and generally well-liked (6). Maybe his time was also ripe. After all, Pasteur's insights had just been published, and physicians were becoming more receptive to the need for antisepsis. This might have helped Lister's ideas, since whether pioneers end up unscathed or with arrows in the back is often a matter of how far ahead they find themselves. Whatever the reasons, Lister died a hero.

Of course, nowadays Semmelweis is a hero too. The Austrians placed him on a stamp and a 50 Euro gold coin, his home in Budapest has become a museum, and the oldest medical school in Hungary is named after him. That is all good, but no consolation for a man who experienced lifelong rejection.

Still, Semmelweis' case is not isolated. Hubris and arrogance have brought down scores of innovators. Andreas Vesalius is another example of an outsider's self-destruction. Competitive, arrogant, boasting and self-promoting, the Flemish firebrand started chipping at Galenic dogma while still a student in Padua, Italy. Made full professor at the age of 23, he eventually became the man who reinvented anatomy. Yet his attacks on academia so irritated the medical community that by age 50 he had become a pariah.

Fellow Padua graduate William Harvey couldn't have been more different.

Quirky and colorful (great people often are), Har-

vey was also self-sacrificing and genuine, definitely not the boasting kind. It was probably the charm of his personality that eventually helped him promote his bold idea of "circulation" and earn the love of the English nation.

So, what lessons can we learn from the tragedy of Ignaz Semmelweis that might allow today's young arsonists to set dogmas on fire without getting burned?

The first and foremost is undoubtedly the need for *courage*. Innovators have to defy conventional wisdom, shift paradigms and turn holy cows into burgers. That entails daring. Creativity, said Matisse, requires courage. Innovators must also be *iconoclastic free-thinkers*. Nobel laureate Rita Levi Montalcini urged us to nurture a taste for rebellion. Leonardo da Vinci was even more blunt: "Selvatico e' quello che si salva" (only the loner saves himself). Hence, pathfinders must be *willing to reject authority*, including the authority of the group. Dogma and conformity are good for religion but not for science. To this end, it might help to be young, since we are all born arsonists but we die firefighters. That is why Osler semi-jokingly spoke of the "comparative uselessness of men above 40." (7) Semmelweis had all these qualities.

Yet, if courage, rebelliousness and independent thinking are fundamental for the creative process, there is another and even more important ingredient that may determine the initial failure or success of a new idea: *salesmanship*. That depends on the personality of the creator. Vesalius and Semmelweis are good examples of how arrogance and confrontation inevitably lead to rejection. Conversely, Harvey and Lister remind us that an agreeable, humorous and charming personality can better help us convince others of even the most outlandish insights. This is as fundamental for the creative process as creation itself, since a breakthrough that doesn't take hold is ultimately lost to mankind.

Obviously, to become new dogmas, breakthroughs will eventually have to stand the test of time. Yet, Semmelweis' story reminds us that if violently resisted, innovation may be smothered in the cradle (8). To paraphrase Bertrand Russell, if all great truths are born as blasphemies, blasphemy might also get us burnt at the stake. Hence, a pre-requisite for the success of a new idea is often the charm of the innovator. In other words, be bold but be charming.

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