

Microbes — Friend or Foe?

It doesn't surprise me that the person who discovered microbes was not a doctor or even a scientist. Antony van Leeuwenhoek, born in 1632, was chamberlain (a sort of superintendent) of the sheriff's chambers in the city hall in Delft, Holland, back in the 1600s. He was also a surveyor and a wine gauger (someone who measures the quantity of wine in barrels), but it was likely his trade in draperies, a business he began at age twenty-two, that earned him a place in history.¹

Leeuwenhoek never published a scientific paper, never wrote a book, nor did he invent the microscope, although he did refine it. By 1654 he needed to be able to closely examine the fibers in his draperies, presumably to count the threads. Anyone in the trades today can imagine what was happening back then. In the 1600s, crude glass lenses were available for magnification. People who used these lenses in their trade were limited by their capabilities, which was undoubtedly frustrating at times. An intelligent and resourceful tradesperson will try to improve on the tools of his or her trade, if possible. That is what Leeuwenhoek seems to have done.

He became so adept at crafting magnification lenses he was able to see the finest details in his drapery threads. His curiosity took over and he began to look elsewhere with his lenses, eventually turning to lake water and rain water, where he saw his first microbes, fantastic creatures he called “animalcules” or little animals.² He was about forty years old by the time he sent his first letter to the Royal Society describing his early observations with his microscopes. Of course, few were going to believe him, especially the scientists of the time, unless they saw for themselves through his proprietary lenses what he was seeing in the invisible world.

Eventually, the scientific community admitted, perhaps begrudgingly, that a nonscientist had made one of the most important scientific discoveries of all time. Although Leeuwenhoek didn't contribute any-

thing to science until he was forty,³ by the time he was forty-eight, he was elected to the Royal Society of London, an award granted to individuals who make a significant contribution to the improvement of knowledge in mathematics, engineering science, and medical science.

Leeuwenhoek died at age ninety-one, in 1723,⁴ another remarkable achievement, considering average life expectancy at that time was about 35 years. When Leeuwenhoek died, he left 247 microscopes and 172 lenses, although he never showed anyone how to use them.⁵

It was nearly a century and a half later, in 1860, when the science of microbiology was born, largely due to the work of Louis Pasteur. Pasteur showed that fermentation was the result of microscopic creatures, some of which could be cultivated in a laboratory.⁶ He also realized that when fermentations went bad, such as in the beer industry, undesirable microorganisms had contaminated the batch. The hunt was now on for microbes, especially the bad ones!

Back in the early 1800s, doctors didn't know what caused disease when microorganisms were involved, since they didn't know what microscopic pathogens existed, and even when they heard about them, some scoffed at such a preposterous idea as invisible beings (like the lady in the front row). Doctors had their own ideas about how to heal sickness, often draining a person's blood and poisoning him or her with mercury. Consider cholera, a disease we now know is caused by drinking water contaminated by *Vibrio cholerae*, a microscopic bacterium.

During the 1832 cholera epidemic in America, doctors attempted to heal patients by draining their blood and administering the "grand remedy, Mercury," otherwise known as calomel, which was the most widely used cholera remedy at that time. Other ways to treat patients, or victims, depending on how you look at it, included tobacco smoke enemas, electric shocks, injections of saline solutions into the veins, strychnine, morphine, and immersion in ice water.⁷

Today calomel is used as a fungicide and insecticide and is considered highly toxic to human beings. The average lethal dose of inorganic mercury salts is about one gram. It causes burning of the mouth and throat, stomach pain, vomiting, bloody diarrhea, rapid and weak pulse,

shallow breathing, paleness, exhaustion, tremors and collapse. Delayed death may occur from renal failure. This makes one wonder how many cholera deaths were actually caused by the bacteria and how many were caused by the treatments.

In the 1800s, cholera was attributed to “green and unripe fruit, especially gooseberries, apples, pears, and green corn.”⁸ Some doctors attributed the cholera epidemics to “small winged insects not visible to the naked eye.”⁹ Other physicians said that a deficiency of ozone in the atmosphere caused cholera, which could be counteracted by sulfur, after which sulfur remedies sold like hot cakes.¹⁰ Doctors argued that cholera was not a contagious disease. Religious publications in 1832 attributed cholera to “Holy God” sweeping away wicked people in heaps like masses of filth.¹¹

In 1849, Dr. John Snow published the theory that cholera was a contagious disease caused by poison in the bodies of its victims, spread by excreta and vomiting, and by a contaminated water supply.¹² He even went so far as to convince a local council in London to disable a well pump on Broad Street by removing its handle. His action is commonly credited as ending the 1854 cholera outbreak on the street where the contaminated water well had been used.¹³

In 1883, a doctor named Robert Koch had isolated the organism that caused cholera, *Vibrio comma* (as it was called then), a curved, comma shaped bacterium.¹⁴ Today Koch is considered the founder of bacteriology, but back then he had his detractors, especially other doctors who thought his theory about bacteria causing cholera was nuts. Official publications in 1885 argued that *neither commabacilli, bad water, insanitary conditions, nor any other single causes have any relation to the march of cholera over a country, and Koch has not satisfactorily proved any causal connection between these bacilli and cholera.* One went so far as to say that Dr. Koch’s postulations were *creating in the imagination of the timid, countless swarms of invisible, death-diffusing atoms against which defense is impossible [which] is after all but the baseless fabric of a dream.*¹⁵

This effort to prove Koch wrong may have been the impetus behind some researchers intentionally drinking water contaminated with

Fallacies and Delusions of the Medical Profession.

BY ALEXANDER M. ROSS, M. D., TORONTO, 1888.

1888

LESS THAN TWENTY-FIVE YEARS AGO thousands upon thousands of human beings had up to that time been hurried into untimely graves by the lancet. Old and young alike were subjected to the fallacy of blood letting for the most trivial ailments; thus whole generations were swept into untimely graves by this bloody delusion, which, happily for the present generation, has been discarded.

LESS THAN THIRTY-FIVE YEARS AGO millions of human beings up to that time had gone to untimely graves, begging piteously for a cup of water to cool their parched lips, while the burning fire of fever was consuming their lives. Doctors in those days said: "Cold water is death; do not give a drop. Give the patient a dose of calomel and a spoonful of warm water." Not only were fever patients denied cold water—nature's remedy—but light and pure air were also denied them; and they were drugged with calomel, physicked with jalap, depleted of their life blood by the lancet, and starved until they gave up the ghost—a tribute to this medical delusion.

LESS THAN TWENTY YEARS AGO calomel was in constant use as a sovereign remedy for every ill that human flesh is heir to. This destructive delusion was not discarded until it had filled the world with hopeless, boneless and toothless wrecks. Hundreds of the wretched victims of this fallacy still live to curse this destructive delusion of the physicians of that day.

ONE OF THE VERY LATEST MEDICAL DELUSIONS is the "germ theory."

MICROBES

As Described by Noted and Advanced Scientists.

1887

The word Microbe means small life, being derived from the Greek *Mikros*, small; *bios*, life. It was suggested by the late eminent French surgeon Sedillot, in a discussion which took place at the Paris Academy of Science on the 11th of March, 1878. He thought it the best word that could be used, as it only referred to small life, whether vegetable or animal, and decided nothing as to the nature of the beings in question. Since that time it has been adopted by the leading scientists of the country, and is now fast coming into general use. This is as it should be, for Germ Theory offers a wide field for investigation of which the masses have heretofore known but little. This condition of things cannot long continue as the influence exerted by the Micro-organism, known to the people as germs, is too great for them to very long consent to remain ignorant of the part that they play in the general economy of nature.

In addition to useful microbes there are others which are injurious to us, and a large number of diseases to which men and domestic animals are subject. The germs of these diseases, which are only the spores or seeds of these microbes, float in the air which we breathe and in the water which we drink, and thus penetrate into the interior of our bodies.

Hence we see the importance of becoming acquainted with these microbes. They are "the invisible agents of life and death."

Early in the last century the great Swede Naturalist, Linnaeus said, "A certain number of diseases result from animated invisible particles, which are dispersed through the air."

MONSIEUR PASTEUR, who for years has made them a special study, first discovered that these minute insects were the causes of spreading the most deathly contagion, through their astonishing rapidity of reproduction. Pasteur discovered them in myriads in human blood, in sheep, rabbits and rats. He found that the microbe was the direct cause of variolosis—or small pox—bronchitis, yellow fever and other contagious diseases.


The microbe in the human system attacked by variolosis, is thread-like, cylindrical, somewhat swelled. It is the smallest of all powerfully magnified animal organisms. It breeds by the thousands per minute. Pasteur, after making a close study of the microbe, discovered that the quickest way to exterminate them was by the free inhalation of oxygen gas or by liquids charged with that gas. **BUT ADMITS THAT THE TIME MUST COME WHEN SOME LIQUID WILL BE DISCOVERED THAT WILL EFFECTUALLY DESTROY THE MICROBE, WHICH LIQUID MUST CONTAIN SUCH GASEOUS COMBINATIONS AS WILL DIRECTLY DESTROY IN THE HUMAN BODY, THOSE GERMS OR MICROBES OF DISEASE.**

PROFESSOR TYNDALL says of the microbe. "They are found in myriads and countless shapes, floating in the air, destroying man as well as beast and vegetation. The virtual triumph of the antiseptic system of surgery is based on the recognition of living contagia or microbes, as the agents of putrefaction, and this discovery made, it behooves the closest study of the subject by the physician, surgeon, chemist, agriculturalist—in fact by all men, to endeavor to discover some POWERFUL LIQUID SUBSTANCE, HEAVILY CHARGED WITH SOME SO FAR UNDISCOVERED GASEOUS SUBSTANCE THAT WILL PENETRATE THROUGH EVERY TISSUE OF THE HUMAN, ANIMAL OR VEGETABLE SYSTEM, AND EFFECTUALLY DESTROY THAT DEATH-DEALING PEST, THE MICROBE."

large numbers of cholera bacteria, after which they showed no cholera disease. That was proof enough that Koch was wrong, as far as they were concerned. Yet, we know now that the multiplication of a virulent bacteria in the human body doesn't have to express itself as a disease. For example, when experimenters around 1900 ingested enormous numbers of *Vibrios cholerae* in polluted water, some developed mild diarrhea, but none developed cholera. Other experiments in which volunteers were intentionally infected with dysentery by oral ingestion resulted in only a few people developing symptoms of dysentery, while most remained unaffected.¹⁶ What they didn't know at that time was that we humans have a microbiome, and that it protects us from invading disease organisms. More on that later. Let's get back to the 1800s when humanure was developing its bad reputation.

In 1865 living conditions in New York City were unsanitary and crowded. Ninety people could live in a five-story house with pit latrines only six feet from the building. Over a hundred people might be living in a two-story house with only one outhouse available to everyone.¹⁷ One section of the Lower East Side had a thousand people living on an area smaller than a football field.¹⁸ It's no wonder that human excrement was polluting the drinking water supplies, and no wonder that cholera epidemics ran rampant from time to time. Other disease epidemics burned through the populations where crowding, unclean water, polluted air, inadequate safe food supplies, and generally unsanitary conditions prevailed. When bacteria from human excrements were polluting drinking water and causing disease epidemics, the *War on Shit* began. And the *War on Shit* morphed into the *War on Microbes*.

Ironically, human excrement can be rendered hygienically safe and disease-free, useful, and valuable, simply by feeding it to those pesky microbes through a process called *composting*. But few knew about this phenomenon back in the days of mass epidemics, and when they figured out that raw human excrement could be a "vector" in the transmission of disease, the reaction was to get rid of the excrement as soon as possible, as completely as possible, and as far away as possible. It's the microbes. They're the problem. At least that's what people thought.



Wm. RADAM'S
MICROBE KILLER

Registered TRADE-MARK Dec. 13, 1887

MICROBES

AND THE

MICROBE THEORY

SHOWING HOW MICROBES
CAUSE DISEASE
AND HOW THEY ARE DESTROYED BY

Wm. Radam's Microbe Killer

SO AS TO PREVENT AND CURE DISEASE.