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## 2

# Perceptions of Germs: Historical and Philosophical Overview

*We dance round in a ring and suppose,  
but the secret sits in the middle and knows.  
Robert Frost<sup>1</sup>*

### Historical Overview

In the earliest writings, disease was described as being caused by a visit from deities who were intent on punishing human beings for their sins and other nefarious acts. Likewise, people sometimes believed disease was cured by a visit from deities who were intent on healing the sufferer.

In the first century B.C., Varro and Columella expressed the idea that disease was caused by invisible living things, which they termed "*animalia minuta*." Although his theory was vague, most medical historians consider Girolamo Fracastoro to be the first person to clearly formulate how contagion causes illness.<sup>2</sup> In the sixteenth century, Fracastoro coined the term "syphilis" and said that the disease was transmitted by living agents or seeds that spread through contact with other people.<sup>3</sup> Fracastoro discovered that mercury could cure syphilis, and this led to a popular saying: "One night with Venus can lead to a lifetime of mercury."

Fracastoro believed that the contagious entity that led to diseases such as syphilis could be transmitted in three ways: by physical contact between people, by using objects that had been handled by an infected person, or by breathing air that contained an infectious agent.<sup>4</sup> Therefore, the first traces of germ theory actually originated in the late 1400s, well before the modern advent of germ theory.

Hippocrates viewed the practice of medicine as treating the whole person, including factors such as diet, lifestyle changes, and environment. This holistic approach changed dramatically with the discovery of

microorganisms such as bacteria, which led to the germ theory of disease.

Contagion of illnesses has played a key role in the development of the modern world. Smallpox is one of the major diseases permanently etched in world history. Biologists believe the disease originated in Egypt or India and was spread by the Spanish Conquistadores to South America first, then to North America. A black slave in Cortez's army is immortalized as the specific person who spread the disease. I find it interesting that smallpox was allegedly traced to a *black* person. This may be an instance of the sort of bias I will be cover in more detail in Chapter 5.

Later, when Europeans were colonizing North America, they realized what a powerful tool smallpox was and used it to gain control over the native inhabitants of the New World. Many historical records indicate that European soldiers were well aware of how contagious smallpox was and how susceptible the Indians were to this disease, and soldiers intentionally attempted to immobilize the Indians through illness and attrition. Europeans tried to accelerate the spread of the disease by introducing contaminated items, such as blankets from smallpox victims, into the Indians' lives. There are accounts of

European soldiers giving blankets and handkerchiefs taken from a smallpox hospital to the Indians, with the hope and intention of infecting them.<sup>5</sup>

In *The Civilizing Process*,<sup>6</sup> Elias Norbert outlined a theory of social restructuring during the Middle Ages that defined what constituted disgust and vulgarity. Dictates about avoiding disgust, which is integrally related to contagion, underlie social and etiquette rules. Elias cited a fifteenth century etiquette book, which stated, "It is unseemly to blow your nose on the tablecloth." Mentioning the handkerchief in the sixteenth century, the etiquette for blowing one's nose was further stipulated: "Nor is it seemly, after wiping your nose, to spread out your handkerchief and peer into it, as if pearls and rubies might have fallen out of your head."<sup>7</sup> Fascination with bodily fluids and products is apparently universal; children sometimes exhibit fascination with their feces, as do men with their semen.

Prior to the late 1800s, a theory spread among the common people that people suffering from diseases such as tuberculosis or influenza exuded an invisible substance that could make others ill. People thought that the clothes, sweat, breath, or urine of sick people contained seeds that could spread and cause well people to become ill. The

exact nature of the seeds was unknown. This became known as the miasma theory, which postulated that since some people become ill without any contact with ill people, the illness seeds must spread in an atmospheric or generalized way.<sup>8</sup>

An example of the medical profession lagging behind the public is the cholera epidemic in the 1800s. A survey of medical literature from 1832 to 1833 suggests that approximately 83 percent of physicians thought cholera was caused by something in the atmosphere and was not contagious<sup>9</sup>. The majority of the public, however, believed cholera was contagious and could be passed from person to person through contact.

In 1832, Rigoni Stern noticed that celibate women seldom developed cervical cancer. Following this observation, he formulated a contagion hypothesis. To test this hypothesis, he compared incidence rates of cervical cancer between celibate nuns and women in the general population. He found a higher than average incidence of cervical cancer among non-celibate women, but his findings went largely unnoticed. It was not until 1983 that Harald zur Hausen, a cancer researcher in Germany, discovered that the *human pappiloma virus* could cause cervical cancer, and Zur Hausen's findings were met with

suspicion as well. However, it is now widely believed that this virus is responsible for cervical cancer.<sup>10</sup>

### **Louis Pasteur's Contribution**

Beginning with Aristotle and prior to Louis Pasteur's work, germs were thought to generate spontaneously. The advent of germ theory anthropomorphized germs; they were perceived as living organisms that reproduced and needed nourishment.

Pasteur's research led him to believe microorganisms (germs) were responsible for fermentation, and he hypothesized that some diseases were caused by germs also. Pasteur's hypothesis was met with skepticism, but resistance decreased in 1862 when he performed a series of experiments that showed that bacteria do not arise spontaneously from inorganic matter.<sup>11</sup> Germs were demystified in the sense that people believed that disease was due to identifiable causes rather than acts of sin or unknown forces.

Pasteur realized the limitations of germ theory. Although he believed that germs caused diseases, he realized that "the terrain" (i.e., the environment) was also



a factor in whether germs became agents of destruction. Pasteur's work with silkworms led him to believe that the presence of germs was only one factor, and the physiological state of the silkworm was another important factor. He believed that resistance to germs could be strengthened.<sup>12</sup> Pasteur and his colleague Claude Bernard frequently debated whether germs produced disease or whether the body's resistance was more important. Pasteur placed more emphasis on the microbe, while Bernard focused more on the environment in which the microbe existed and the body's ability to maintain equilibrium. On his deathbed, Pasteur said "*Bernard avait raison. Le germe n'est rien, c'est le terrain qui est tout.*"<sup>13</sup> ("Bernard was right. The germ is nothing, the soil is everything.") This was certainly a strong statement for a man who spent his life researching germs. Obviously germs are important, but Pasteur seemed to be compensating for the simplicity of his theory and attempting to counterbalance the simplistic, microbial-physical emphasis in medicine that he helped create. While some diseases, such as measles, cause illness for nearly everyone, for most diseases, there are mediating factors that influence whether someone will become ill if they are exposed.

Pasteur recognized that mental states affected resistance to infection and believed that improving a person's physiological and psychological conditions could help ward off infection. Pasteur believed that the body has natural healing powers, and the physician's job was to help restore the natural physiological state of the body so that the patient could heal<sup>14</sup>. Even today, although it is gaining acceptance, this belief is controversial in conservative medical circles.

Pasteur did not agree with the evolutionary viewpoint that competition and aggression were necessary for survival. He disliked the terms used to describe germs—i.e., “attackers,” and “invaders,”—how was one supposed to “attack” germs? And how were doctors supposed to “conquer” disease?<sup>15</sup> He saw the rich, intricate interactions between biological organisms and thought the crude idea of “kill or be killed” was too simplistic to describe biological relationships. Pasteur was intrigued by symbiotic and harmonious relationships in nature. He saw beyond the *zeitgeist*, which stated that with knowledge, one could attain power over nature. Pasteur did not believe living tissue should be viewed as a permanent battleground between microorganisms.

However, this is still a major theme that guides and dictates how we see our world today.

### **Germ Theory: Dualism and Medicine**

In the fifth century, Plato is believed to have been one of the first to theorize about the duality of mind and body, although the concept probably extends back to the very beginning of human thought. Dualism has been incorporated into Jewish and Christian religions. In the seventeenth century, René Descartes described the body and mind as two distinct and separate entities that operated under different laws. This perspective helped lay the foundation for rationalism and reductionism in empirical science. Within this framework, nature is considered to be a self-contained machine, with physical laws dictating events in a logical fashion. Nature can only be explained through observation and measurement, within the confines of its own internal parts. Medical science aligned itself with the physical or “body” aspect of the argument and doctors thought that almost all physical diseases had organic causes that could be empirically observed. Thus health was viewed as self contained within

the machine known as the body and all aspects of bodily functioning were dictated by logical mechanisms.

In the 1800s, dualism was strengthened by Pasteur's discovery of germs and their role as disease vectors. Diseases could be accounted for by mechanistic actions, rather than by supernatural acts. Germs were seen as unwanted foreign invaders that could create havoc on the body. By the early 1900s, some exceptions to this rule started to emerge. For example, on the non-materialistic, intrapsychic level, Sigmund Freud and Josef Breuer<sup>16</sup> suggested that unconscious conflicts could appear to be organic, but were actually psychologically based problems. Conversion disorders (a symptom that appears to be physical but actually results from emotional stress) are a classic example of this.

Blood pressure and heart rate were believed to be autonomic responses and not under a person's conscious control. Even the idea that stress might be related to high blood pressure was not believed by most medical experts. In spite of these prevailing beliefs, in the 1960s, physician Herbert Benson demonstrated that squirrel monkeys could control their physiological responses by using biofeedback to lower their blood pressure. Shortly after this, Benson and other colleagues found that people could also lower

their blood pressure and heart rate during meditation.<sup>17</sup> Empirical evidence mounted for a mind-body connection, rather than a mind-body dualism. For example, empirical evidence that cancer, heart disease, and infections may have a psychological basis has been derived from an openness to synthesize mind and body issues. In line with this notion, Graham<sup>18</sup> has suggested that the words “psychological” and “physical” are two perspectives on the same phenomena.

Psychology and medicine have blended to form a “mind-body” psychology where the physical-microbial level and the emotional-spiritual domain are no longer considered mutually exclusive. Understanding germs is a very good way to study this transformation of human thought. Generally, it is assumed there has been a linear trend from ancient to present thought about the reasons and treatments for illness. The trend moves from magical, to mystical, to religious, and then to scientific, which means pre-germ theory to post-germ theory. Increasingly, what is known about how germs actually function and how we think about germs combines elements of the magical and the mystical with technological and microbial medicine.<sup>19</sup>

Science, particularly psychological science and pathological microbiology, are moving targets. Just as one explanation for understanding disease is accepted into the scientific community and social discourse, a paradigm shift is likely to occur and another rival hypothesis emerges that may seem more likely. Residuals from previously held beliefs may linger in popular culture (or sometimes thinking by the expert community lags behind the lay community), but some new beliefs tend to proliferate as well. Sometimes the “new” ideas are not perceived to be as reasonable as the older beliefs, or vice versa, and this leaves people in a quandary over what to believe.

A common contemporary example about change and confusing information is diet. In the 1970s, expert thinking painted sugar as the major villain working against good health and wellbeing. By the 1980s, the diabolical entity was identified as cholesterol, especially from eggs; in the 1990s, the villain became red meat. More recently, press releases indicate that moderate sugar intake may not be as bad as people once thought, more people are eating lean red meat, and even eggs have received a more favorable review.

Increasingly, as psychology and medicine advance, psychologies and folkbiologies once considered naive are shown to be less irrational than once believed. Sayings such as “A little dirt is good for you,” “Cancer is contagious,” and “Prayer can heal,” may hold some wisdom.

According to Nancy Tomes, a history professor at the State University of New York at Stony Brook, the phrase “germ theory of disease” came into existence about 1870.<sup>20</sup> This is when germ consciousness rooted itself in germ moralizing and thus a psychology of germs was formed. Germs were perceived as malevolent, malicious, and foreign. Germs were seen as entities that could attack and strike people, and people, in turn, could malign others by projecting the best and the worst of this “germ gospel” onto others. Often, though, germs were perceived as intentionally doing bad things to people. This belief is still held by many people today. Germs are mediums for determining whom or what we want to join with or separate from, and this concept will be discussed extensively in Chapter 3, “The Psychological Nature of Contagion.”

Incorporating germs into our consciousness became pervasive in the late 1800s and early 1900s in the United

States. Germs could lurk on and in everything. Nearly every illness or infection supposedly had its own set of germs. Germ consciousness created a new dimension in human life. Understanding the names, characteristics, and treatments for each germ must have seemed quite mystical at the time. This new information confronted people with a microcosmic realm. It required that they think and feel differently about their existence in the world and their relationships with other people.

In some ways, germ theory likely proliferated as part of the feminist movement. Women in New York City formed the "Rainy Day Club." The group preached the merits of shorter dresses as a way to reduce bringing germs into the home. Long, trailing hemlines began to rise when people thought that long dresses should be abandoned because "they caused evil things to be brought into the home and distributed to all the family without their knowledge or consent."<sup>21</sup> Other Rainy Day Clubs formed throughout America to combat non-hygienic modes of dress. Home fashion also changed because of germ consciousness. Overstuffed furniture was thought to be fraught with germs, and other styles emerged that were hailed as more hygienic because they emphasized less fabric and smoother lines.



This alteration in style also held true for men: moustaches and beards were thought to be harbors for germs. The modern, healthy look became a clean-shaven face. Beards were especially thought to be infected with tubercular germs, and advertisers and inventors began making money from germ theory. For example, King Gillette invented the straight razor, and advertisements proclaimed that men could ensure safety from infection by shaving their faces.<sup>22</sup> In some respects, a clean-shaven face symbolized an allegiance to germ theory. The smallpox vaccination scars found on most people's upper arms represent the same symbolism: that is, belief in germ theory, belief that unseen entities at the cellular level may be harmful, and the belief that science can prevent illness.<sup>23</sup> As another example, after the disease of consumption was recognized as infectious and not hereditary, a semantic change occurred to correlate with this change in illness cognition—consumption became known as tuberculosis.

### **Penicillin: The Desire to Conquer Germs**

Penicillin is a fungus and was not known to possess any medicinal value until Alexander Fleming discovered its

worth in the 1920s in England. Penicillin was advertised in magazines during World War II, and in the mid-1950s, it was available without a prescription. Advertisements and easy access led to abuse of the drug; people viewed it as a miracle drug for whatever ailed them. Fleming warned that widespread and indiscriminate use of penicillin could lead to germ mutations that were resistant to the drug. Granted, there are multiple reasons for antimicrobial resistance to antibiotics, but underlying most reasons are psychological concepts—the desire to conquer, the beguiling desire for health, and the desire to avoid illness and death.

To demonstrate how seductive it is to believe in a magical cure, the French medical journal *La Revue Prescrire* played a joke on April Fool's Day in 1984. (Ironically, the journal was striving to improve medical prescriptions in France.) The journal ran an advertisement for a new medication, "Panaceum," claiming that a single dose of this drug could control mental illness for an entire year. The editors thought that physicians would know that this could not be a real drug, but within days of publication, the journal was bombarded with calls from physicians and pharmacies wanting more information about Panaceum. The editor of *Prescrire* had to make a public announcement

on television that the article about Panaceum had been meant as a joke.<sup>24</sup>

### **Contemporary Issues: Antimicrobial Resistance to Antibiotics**

Knowledge is frequently arbitrary, and medicine and psychology epitomize this. Rosenberg<sup>25</sup> speculated that, paradoxically, people increasingly resent modern medicine because they feel so dependent on scientific advances. Further, people distrust medical information because it is ameliorated through consensus and negotiation. This then begs the question as to whether information about germs can be self-serving, selfless, or absolute versus negotiated information.

This confusion about medical information can be viewed in terms of what is known about contagious diseases and the germs that cause them. Until the 1980s, penicillin and antibiotics were viewed as positive. Resistance of germs to antibiotics has increased dramatically. Now, iatrogenic diseases (those inadvertently introduced by some medical procedure or diagnosis) are the eighth leading cause of death in the United States.<sup>26</sup> A report by the Institute of Medicine indicated that 33.6 million people were admitted to a

hospital in 1997. A minimal estimate is that 44,000 of these patients died due to medical errors. However, the American Hospital Association stated that the actual number of deaths could be as high as 98,000.<sup>27</sup> Therefore, deaths due to iatrogenic conditions exceeded the number of deaths attributed to car accidents (43,458), breast cancer (42,297), or AIDS (16,516), according to figures gathered by the Centers for Disease Control.

Penicillin resistance was relatively rare in the United States prior to 1992. A national survey conducted between 1979 and 1986 by the Center for Disease Control detected intermediate resistance to antibiotics in about 5 percent of pneumococci strands, and only one strain had high level resistance. However, from 1996 to 1998, penicillin resistance increased from 13 to 18 percent<sup>28</sup>. Rates vary depending on geographical location and within different hospitals. Since the early 1990s, antimicrobial resistance to penicillin and other medications used to treat pneumococci in the United States has risen 30 to 44 percent<sup>29</sup>. Prior antibiotic use primarily determines whether an individual will be resistant to antimicrobial medication.<sup>30</sup> Resistance to another antibiotic, tetracycline, was also relatively low. The estimated resistance rate was

between 2 to 6 percent until 1994<sup>31</sup> but by 1998, resistance had risen to between 7.5 percent and 16 percent<sup>32</sup>.

In healthcare, the advent of impersonal medicine may have begun with the discovery of antibiotics. Penicillin, seen as the magic pill, was miraculous and saved countless lives. However, its use also transformed patients' ideas about the meanings and causes of their illnesses and the healing powers of physicians were minimized. The idea that antibiotics would cure anything replaced prayer, holding hands, long vigils, visits, and care taking from family members and physicians. This may be where our tunnel vision started, with the ideas that pills have transformative powers and all illnesses can be healed.

### **Germ Theory: Religion and Culture**

Islam is the main religion in the Middle East and one of Islam's major tenets is that cleanliness of the body and purity of the soul are synonymous<sup>33</sup>. The Koran states:<sup>34</sup>

Believers, do not approach your prayers when you are drunk, but wait until you can grasp your words; not when you are polluted—unless you are traveling the road—until you have washed yourselves. If you are ill and cannot

wash yourselves; or if you have relieved yourselves or had intercourse with women while traveling and can find no water, take some clean sand and rub your faces and your hands with it.

The Islamic religion goes further in asserting that cleansing the body is symbolic for cleansing the soul. Before they can say their five daily prayers, Islamic worshipers must wash their hands, arms, and feet. Mosques often have a fountain or water tap for this purpose. Both Muslim and Jewish women are told to purify themselves after menstruation.<sup>35</sup> In orthodox Judaism, this ritual bath is called the *Mikvah*, and it must be performed before sexual relations can be resumed.

Cleanliness on the part of children is not nearly as important in the Islamic culture. Children are not required to maintain the same level of cleanliness, since parents fear that the evil eye may be captivated by an attractive, clean, well-dressed baby, and this is viewed as more of a danger than a runny nose or dirty clothes. Bad luck because of the evil eye is still taken very seriously in the Middle East<sup>36</sup>.

Bathtubs are somewhat uncommon in the Islamic culture, since sitting in a tub of dirty water is not considered hygienic.<sup>37</sup> At the other extreme, all family members and guests share the bath water in traditional

Japanese homes, although people wash themselves before getting into the communal bathtub<sup>38</sup>. While Americans may see communal bathing as unnatural, the Japanese find it offensive that most Americans do not take off their shoes when they enter a home, and thus track in dirt, mud, and germs.

Purity is associated with good, while dirt is associated with evil in Christianity. The Hebrews strongly believed in the contagiousness of leprosy, and in the Old Testament of the *Bible*, Leviticus describes precisely how to avoid contagion from lepers. In medieval times, the Catholic Church proclaimed lepers were dead to the world. In a symbolic ritual, the “unclean” were ordered to stay away from others. This probably minimized the spread of contagion but also gave lepers some perceived degree of possessing immortality.<sup>39</sup>

Residues (which to some extent are essences) from other people can be found everywhere. For example, approximately 75 percent of dust is composed of human skin.<sup>40</sup> The extent to which contact with residues from others influences our behaviors is probably overlooked in terms of our phenomenological experiences in daily life.

Germ theory extended life into the invisible realm.<sup>41</sup> The world in which we live is different from the world

people inhabited and envisioned before the nineteenth century. Then, the smallest thing that could actually be seen was dust, and dust was a common metaphor, just as viruses and germs are common metaphors today. “. . . For dust thou art, and unto dust shalt thou return.”<sup>42</sup> Biblical references indicate that God took some dust from the ground and created Adam by shaping him into a human figure.

### **Non-Western Disease Beliefs**

Murdock<sup>43</sup> studied 139 primitive, historical, and contemporary societies. He found that the germ theory of disease was the main theory of illness in only one place—southern Okayama in the south of Japan. In fact, only 31 other societies even mention infectious agents such as germs. Even when germ theory was alluded to, it was usually in the form of worms or insects rather than germs.<sup>44</sup> In a separate (supernatural) category, Murdock identified “contagion” in a broad sense that included “coming into contact with some polluting object, substance, or person.”<sup>45</sup> In 79 cultures, Murdock found that beliefs about contagion had mystical parallels with the



natural cause of infection. Forty-nine societies considered contagion a viable source of illness. Murdock noted that menstrual blood and dead bodies were most likely to be viewed as possessing contagious qualities.

Caprara has also explored how disease transmission is interpreted in other cultures. She identified five dimensions for conceptualizing germs: empirical, symbolic, interpersonal, social, and supernatural, and asserted that contagion should be explored from these multiple vantage points.<sup>46</sup> Another dimension that I think should be included is the phenomenological experience of having a contagious illness.

When Caprara studied the Afro-Brazilian and Cote d'Ivoire cultures of Bahia, she found that contagion was conceptualized as a social dynamic based on everyday activities and behaviors. There, a person's symptoms are not as significant as his or her situation. In contrast to Western germ theory, multiple causes can lead to illness, such as being jealous of someone, becoming a victim of a disease, and being prone to a disease due to personal weakness are some examples. In these cultures, *koto* indicates the transmission of a disease from one person to another. *Koto* expresses an action, as if the disease were willfully passed from source to recipient, thereby making a

disease the expression of a relationship between the two people. Similarly, *pisa* is a disease of guilt, such as when a social more has been broken. *Pisa* can manifest itself in different ways. The actual illness that results depends on the individual. Adultery is the most common cause of *pisa*, which strikes both men and women and can cause death. If a wife commits adultery, then the disease will manifest itself when her husband and her lover have direct or indirect contact with each other, although the disease is most likely to occur when the two men meet and touch each other. Because the lover knows who the husband is but the husband may not necessarily know that the wife has a lover, it is the lover's responsibility to make every effort to avoid contact with the husband, for fear that either or both of them may become ill or die from direct contact<sup>47</sup>.

In the Alladian culture, semantics are used to try to diminish the severity of illness.<sup>48</sup> *Nnowie akra-kra* is one of the most dreaded and feared diseases, but literally translated it means "the benign disease." There are individual reactions to this disease. For example, if a person is afraid to visit someone suffering from *nnowie-akra-kra*, the fear can represent the reason why the potential visitor will become ill. At an empirical level,

experience shows that these infectious illnesses can be transmitted through direct contact with infected persons, and therefore, certain behaviors must be adopted to keep the disease from spreading; this behavior itself can be viewed as an expression of fear of the disease and—for the Alladians—may be a sufficient reason for contracting the illness.

James Morrison<sup>49</sup> was an explorer who visited Tahiti in the 1920s and noted that the natives there had some unusual ideas about contagion. For example, it was acceptable to touch the dead body of someone whom was killed in a war or during a sacrifice ritual. However, if a person touched the body of someone who had died in any other way, the toucher's hands were viewed as unclean for one month and someone else had to feed and bathe the toucher. Similarly, when a person with abscesses or large sores died, the house and all of his or her belongings would be burned. Although these behaviors may be viewed as extreme, they can also be viewed as effective measures that were ideally suited to limit contagion and death when antibiotics and disinfectants were not available.

Explorer William Ellis<sup>50</sup> and sociologist Robert Levy<sup>51</sup> both noted that cleanliness is highly regarded in Tahiti.

Tahitians bathe once or twice daily and Levy stated that Tahitians considered poor personal hygiene to be an indication of deviance of psychotic dimensions.

### **Japanese Conceptualizations of Germs**

In the Japanese language, the word *kirei* means both beautiful and clean. The term and its meanings are interchangeable, and reflective of how intertwined these concepts are in the Japanese mind. According to Ohkuni-Tierney<sup>52</sup>, the Japanese conceptualize germs and many aspects of illness in a different way than people in the Western world do, and spatial issues are of primary concern. However, in the Western world too, spatial factors are extremely important in determining whether something is valuable or undesirable. The universal cry of mothers as their children are about to touch a foreign object: "Don't touch that! We don't know *where it has been!*" is quite telling about spatiality in relation to cultural beliefs about contagious factors.

However, having said that, the Japanese may be more categorical in their spatial dimensions about germs. The inside is viewed as "pure" or "clean," while the outside is

viewed as impure and unclean. External concepts, such as the outside world and strangers, are viewed as dirty. Thus, in Japanese thought, germs are largely social and cultural symbols; outside and below are seen as bad, while inside and above are seen as good.

Spatial delineations further suggest that vertical positions are important; that is, the higher up something is, the cleaner it is. The upper part of one's body is cleaner than the lower half. In one's own home, the feet, floor, and ground are dirtier or more impure than the upper part of one's body, the furniture or the ceiling.

Also note that the "above and below" aspects of purity and impurity are fundamental in Christianity; hell is below and heaven is supposedly above us. Shinto and Buddhist religions, like Christianity, discuss this spatiality in relation to purity and impurity.<sup>53</sup>

To keep the germs of others at bay, Japanese people remove their shoes before entering homes, and often wash their hands and gargle upon returning home. However, gargling has become less common among younger people, and presently is mostly a custom among older Japanese persons. Levi-Strauss<sup>54</sup> noted that the accepted explanation for these behaviors is germ theory, but Ohkuni-Tierney noted that germ theory is likely a smokescreen for the

pervasive cultural and symbolic belief that pollution is outside and purity exists inside.<sup>55</sup>

Another way Japanese persons protect themselves from germs outside is by wearing a face mask, especially in winter. The rationale is that this protects them from breathing in germs and protects their nostrils and throat from cold air. Interestingly, the Japanese use a mask to protect themselves from the germs of others, and in the Western world, surgeons and other health professionals wear masks to keep from spreading their own germs to others, and less for protection against contracting a contagious illness from their patients.<sup>56</sup>

To the Japanese, having a toilet (an object associated with an unclean bodily function) in the same room as a bathtub (an object of purification) would blur the boundaries between purity and impurity beyond imagination. Even towels from the bathroom, and underwear worn on the lower half of the body, are washed separately from other laundry.

Money has always been regarded as distinctly dirtier in the Japanese culture than in the Western world. Japanese children are taught to wash their hands after handling money. Money represents spiritual dirt, and worldly concerns are devalued. In the feudal period,

merchants were deemed the lowest in the four-caste system, allegedly because they were the people who were the least pure since they handled money and therefore deserved low status.

Further evidence of fear of contagion is noted with the way library books are handled. Warning stickers on the cover direct readers to avoid licking the pages, and to wash one's hands before and after reading. When patients return books to the Japanese National Institute for Cancer Research, the books are disinfected with alcohol, even though cancer is not regarded as contagious by Japanese medical professionals.<sup>57</sup>

### **Thoughts as Contagion**

Richard Dawkins<sup>58</sup>, an English ethologist, invented the term "meme" as an analog to the word "gene." With memes, information and thoughts can be passed from one person to the next; therefore, what is passed can be seen as "contagious." A common analogy is that memes can parasitically pass information from one person to the next. Once infected, a person's beliefs, mood, and behavior can be altered in much the same way that a virus can alter a

person's behavior or genetics can influence behavior. All information passed from one person to the next—fashions, slogans, jokes, music, and technology—are memetic. An idea or information pattern is not memetic unless it has been replicated; that is, has caused someone else to repeat it or embody it in such a way that it is transmitted from one person to the next. Thus, a meme is not really a meme unless it is contagious, i.e, one person contracts a certain idea from another person.

In keeping with the pervasive interest humans have with physical, microbial metaphors, memes have a wealth of metaphors and analogies to draw from. However, unlike most contemporary theories of germs, memetic transmissions can also be positive or neutral. In traditional germ theory, microbial transmission is generally negative or neutral (except, perhaps, following the tenets of the hygiene hypothesis and vaccinations; see Chapter 6).

In Dawkins' theory, then, information is acquired in one of two ways—either by genetics or through memetics. Memes are elements of a culture or a system of behavior that may be transferred from one person to the next by non-genetic means. Dawkins asserted that memes are now the most common way that knowledge is imparted, and that genes are a relatively slow way of imparting



knowledge. However, both memes and DNA are simultaneously evolving and co-existing. Memes can influence genes and genes can influence memes. The two systems interact: as an example, genetically inherited material (such as personality) affects our choices of memes and our ability to learn new information. Therefore, genes act as a gatekeeper for what memes one is exposed to and incorporates.

Likewise, our memes can influence the type of person we marry (or do not marry), which in turn can affect the gene pool. Keeping up may be impossible for DNA due to the rapid changes in the world and the instantaneous transfer of knowledge. Our strongly held beliefs that much of our behavior is genetically determined may need to be modified due to rapid cultural transformations. Genetics are slow and memes are fast. The memes held by people who have many children will probably proliferate more extensively than memes held by people without children. Thus, memes may shape the gene pool.

Aaron Lynch<sup>59</sup> noted that memes are powerful, but not always positive or accurate. Smokers view smoking as pleasant and positive, but this meme is also slowly killing the people who embrace this particular meme.

Do we acquire beliefs about germs or do beliefs about germs acquire us? As Lynch suggests, we may merely be hosts to ideas that exist in space. Certain ideas propagate better than do others, and understanding the psychology of how and why ideas about memes proliferate is worth exploring. Memes about germs exist and influence people's behavior.

The next chapter explores the psychological nature of contagious entities, emphasizing empirical research and the prominent place these beliefs have in the psyche.