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Florence Nightingale: Anticipating the Germ Theory of Disease

Samuel "Yana" Davis

Introduction

Paradox defined the life of Florence Nightingale. A child of upper-class English country gentry, Nightingale spent most of her life working to improve the health of the working and other subaltern classes of Great Britain. Her early career, which gained her international celebrity as "the Lady with the Lamp," centered on saving the lives of common soldiers in the Crimean War in the middle 1850s. Nightingale believed God had called her to service. Later, she realized the service as nursing. The example of Catholic nuns who engaged in nursing provided a model for her. Nightingale's near-obsession with statistics, organization, and both professional and sanitary standards coalesced to change both the perception and reality of nursing. Prior to Nightingale, the public viewed the profession as low-skilled, practiced by poor women who were little better than prostitutes. Nightingale not only changed the public's view, she changed the role of nursing in society. As a result of her efforts, nursing evolved as a highly-skilled profession, with rigorous standards.

Among the other paradoxes of Nightingale's life, her attitude toward disease stood out. Nightingale, as many medical professionals until the middle and late nineteenth century, did not agree with the germ theory of disease advanced by physicians and scientists such as Joseph Lister, Robert Koch and Louis Pasteur. (She later grudgingly admitted the truth of the theory.)¹

Until well into the 1870s, at least, Nightingale held the "miasma" theory of disease. This ideology laid responsibility for infection on "bad air" and spontaneous processes of the human body. The paradox in that conviction rested in the results of her own work, particularly in the Crimea and afterward in London, where she founded the Nightingale School of Nursing and became what today

¹Barbara Montgomery Dossey, Louise C. Selanders, Deva-Marie Beck, and Alex Attewell. *Florence Nightingale Today: Healing, Leadership, Global Action* (Silver Spring, MD: The Publishing Program of the American Nurses Association, 2005), 113.

would be called a public policy advocate.²

This paper seeks to show that Nightingale, through the use of statistics and personal observation, and the sanitary standards she developed as a result, anticipated the germ theory of disease by a decade or more. She accomplished this within the context of her greatest achievement, the professionalization of nursing and modernization of hospitals.

Nightingale demonstrated high standards of sanitation in hospitals and direct patient care improved survival rates. She unwittingly provided significant anecdotal evidence supporting the germ theory. However, she refused to embrace the theory until much later in life. Her stubbornness regarding this likely resulted from her early commitment to the miasma theory and to results that seemed to her proof of the theory's validity.

Early Life, Education

Born in 1820, Nightingale grew up in exceptionally privileged circumstances. An English country squire with two estates, a London townhome and income-producing investments, Florence's father, William Nightingale (affectionately known by his initials, rendered as a name – "WEN" – by family and friends), did not have the burden of working for a living. Instead, he devoted his time to social rounds and travels and educating both Parthenope, their oldest daughter, and Florence. WEN's wife and the children's mother, Frances "Fanny" Nightingale, planned and managed the family's activities.

Since WEN previously studied at Oxford, the home schooling afforded to the two Nightingale girls was superb. Yet, only Florence took full advantage of it. The Nightingales' social milieu also contributed mightily to her education. Family life involved frequent travel abroad, seasons in London at their townhome, and

²F. B. Smith. *Florence Nightingale: Reputation and Power* (New York: St. Martin's Press, 1982), 72-108. Smith recounts Nightingale's leading, albeit behind-the-scenes, role in the campaign for sanitary reform in the British Army; and Cecil Woodham-Smith. *Florence Nightingale, 1820-1910* (New York: McGraw Hill, 1951), 295-338. Woodham-Smith provides a more comprehensive account of Nightingale's life during the period roughly following the end of the Crimean War and the early 1870s. She devoted most of her time to establishing sanitation as a government priority, for working classes, the Army and to some extent in India and the colonies. She oversaw the nursing school that bore her name from a distance, reigning much in the same fashion as her friend Queen Victoria, but ruling nonetheless as well with her indomitable intellect and determination.

an unending round of societal events which included the wealthiest and most influential families in Britain.³

At home, WEN provided Florence with the equivalent of a full liberal arts and sciences education, at a collegiate level by today's standards. Opposition to her course of studies with her father arose when she requested further training in mathematics. That resistance came from her mother Fanny. Like many early Victorian matrons of her class, she felt girls and young women should be educated enough to be excellent hostesses and conversationalists, perhaps to paint landscapes, compose poetry and play piano. But Fanny saw no need for young women to study subjects such as mathematics, since young women, not destined for the professions, would have no practical use for the subject. With some subterfuge, WEN, unable to resist his daughter's steely determination to learn all she could, taught Florence mathematics anyway.⁴

To a large extent, beyond the superb classical education WEN gave Florence, she taught herself. She read the many journals to which WEN subscribed, as well as a wide range of books. In particular, Florence absorbed information about the advancing art of medicine and the closely-associated technology of sanitation. Both her background in the fastidious world of Victorian gentry, and her studies, convinced her that disease resulted from unsanitary conditions. She modified this conviction when germ theory became widely accepted in medicine in the last quarter of the nineteenth century.

Nightingale loved statistics from the beginning of her mathematical education. As early as the age of ten, young Florence wrote letters that focused on numerical details of her experiences. While on a visit to her cousins, she penned this note to WEN:

...have made a little tool house in our larder, in which we keep, viz. 1 spade, 2 rakes, 2 hoes, 4 baskets... Our quarrels are worse than ever. A few days ago, he [cousin Jack Carter] began an accusation before Uncle Carter but we made out

³Woodham-Smith, 6-13.

⁴Gillian Gill. *Nightingales: The Extraordinary Upbringing and Curious Life of Miss Florence Nightingale* (New York: Random House, Inc., 2005), 57-134.

5 formal accusations viz. 1. Breaking 2 carts.
2. Hurting [cousin] Hillary's hand. 3. Accusing
us of doing it. 4. Beating my legs, and 5. Hurting me.⁵

In Search of Her Mission

Nightingale experienced her call to an unspecified mission from God at age sixteen. Several years passed before she settled on nursing. The ten years after 1837 could be characterized as a "long dark night" for Nightingale. She deftly deflected marriage proposals but attended the constant round of social events the Nightingale family organized. Privately, she despaired of ever being useful, of ever answering her calling.

Fanny Nightingale groomed both Parthenope and Florence for marriage to eligible young men of their social class – the affluent and essentially indolent gentry. Additionally, she offered training for "careers" as social directors for the new parts of the extended family they would create through having children. While Parthenope took to this role with relish, marrying Lord Verney, Florence detested having that role in life. For many years, to the consternation of her family, Florence resisted the marriage proposal made to her by Monckton Milnes. Apparently she felt certain affection for Milnes, but as she confided to Parthenope:

I have an intellectual nature which requires satisfaction and that would find it in [Milnes].

I have a passionate nature which requires satisfaction and that would find it in him. I have a moral, an active, nature which requires satisfaction and that would not find it in his life...I could not satisfy [my] nature by spending a life with him in making society and arranging domestic things.⁶

An entry in her diary from December 5, 1845, just after she determined she would pursue nursing as her calling, revealed the depth of her agony as she struggled to find a way to break free of her family's plans for her. Nightingale wrote, "God has something

⁵ Florence Nightingale to William Nightingale, February 24, 1830, in *Ever Yours, Florence Nightingale: Selected Letters*, ed. Martha Vicinus and Bea Neugaard (Cambridge, MA: Harvard University Press, 1990), 15. Cited afterward as *Nightingale 1990*.

⁶ Florence Nightingale to Parthenope Nightingale, June 1849 in *Nightingale 1990*, 40.

for me to do – or he would have let me die some time ago. I hope to do it by living... Oh, for some great thing to sweep this loathsome life into the past.” She despaired about the role women played in contemporary society. She confided in a private note, “Women don’t consider themselves as human beings at all. There is absolutely no God, no country, no duty to them at all, except family... I know nothing like the petty grinding tyranny of a good English family.”⁷

Young gentlewomen acted as Fanny and Parthenope did. They married and presided over lovely and cultured families and homes, relieving their husbands of most, if not all domestic responsibilities. They did not go out and associate with working class people. They might have made the occasional trip to provide poor people with charity services, almost always accompanied by clergy and several other ladies of equal standing. They certainly did not avoid marriage and pursue independent careers ministering to the sick. But Florence Nightingale did precisely that. Nightingale proposed her plan to the family in December 1845. Initially, her mother Fanny vehemently opposed. A series of highly dramatic scenes involving Fanny, Parthenope, and Florence followed. About her mother’s reaction, Nightingale wrote to Hillary Bonham Carter, “Mama was terrified... [the reason was] not the physically revolting parts of a hospital but things about the surgeons and nurses which you may guess.”⁸

Nightingale’s veritable “force of nature” personality eventually won her reluctant permission from Fanny to pursue her dream. Within a few years, Fanny became (in another of the many paradoxes associated with Florence Nightingale) her younger daughter’s most ardent booster and “publicist.”⁹

Formative Training

Even as Nightingale prepared to begin her self-directed training, she entertained self-doubt and fought the emotional pull of family demands. Parthenope Nightingale developed a chronic, but not

⁷Florence Nightingale’s diary entry, December 5, 1845, and private note, *Nightingale 1990*, 28, 54.

⁸Florence Nightingale to Hillary Bonham Carter, December 1845, in Woodham-Smith, 38.

⁹Gill, 203.

serious, illness in 1851. Fanny and WEN wished Florence to spend a few months attending to her older sister. Florence wanted to continue with her training. She thought her sister's condition would worsen, in fact, if she stayed close at hand. She wrote the Reverend Henry Manning, whom she had adopted as a mentor:

Under these circumstances, I have but one course to pursue. No one will act but me... I hope that they will not blame me for withdrawing from taking part in a way of life in which I must either yield to my sister... or by opposition to her wishes & ideas I must be perpetually increasing her nervous excitement...¹⁰

The attempt by family to keep Nightingale close at hand to minister to Parthenope proved their last serious effort to delay her from fulfilling her mission. Nightingale sought out the scanty training available, which consisted mainly of visits to hospitals abroad. Today her studies look surprisingly limited in view of the four years now usually required to become a nurse. But at the time, no formal educational curriculum existed for nurses. Nightingale, to a very large extent, invented it along the way, with her first student being herself. She trained at Kaiserswerth briefly, more by way of observation than doing, in 1851. She also spent a few weeks at hospitals in Dublin and Paris the following year.¹¹

Although the intensity of family opposition to her plans gradually receded, Nightingale wrote in 1852, "I was in disgrace with them for a twelvemonth for going to Kaiserswerth... there is a persecution from those we love... which grinds one's very heart out..."¹² This pattern repeated constantly in Nightingale's life from teenage years until she reached her early thirties and finally broke free of conventional Victorian social strictures governing her gender and class.

About her short stay at Kaiserswerth, many decades later Nightingale recalled her time there in a letter to Mrs. Charles

¹⁰Florence Nightingale to the Reverend Henry Manning, 1852, in *Nightingale 1990*, 60-61.

¹¹Gill, 294.

¹²Florence Nightingale to the Reverend Henry Manning, July, 1853, *Florence Nightingale in Egypt and Greece: Her Diary and Visions*, ed. Michael D. Calabria (Albany, NY: State University of New York Press, 1997), 145.

Roundell:

The Nursing [at Kaiserswerth] was nil. The Hygiene horrible. But the tone was excellent, admirable... I took all the training that was to be had – there was none to be had in England. So far from Kaiserswerth having trained me, after having seen some of the best hospitals on the Continent, saw the Augustinian sisters there, who were not so good as the best-trained English nurses are now but like saints to savages then.¹³

Put another way, Nightingale surmised that no one institution had very much to teach her -- in the end she would invent her own system of nursing grounded in scientific observation and common sense.

Back in Great Britain, Nightingale used family connections and her own formidable persona to win appointment as the unpaid superintendent of the Institution for the Care of Sick Gentlemen on Harley Street in London in 1853. WEN provided her with an annual stipend of 500 pounds, much of which she used to purchase supplies and even provide small loans to her impoverished patients. She won great praise, even from among those on the Institution's governing committee who had initially opposed her. Barely into her thirties, Nightingale appeared as a minor celebrity in the Victorian pantheon of inventors, scientists and reformers. This was no small achievement for a woman, even one from the upper classes.¹⁴

At Harley Street, Nightingale demonstrated, for the first time, her ability to get things done in the way she wished them. A committee of donors, known as the Ladies Committee, governed the private institution. However, attending physicians, or "Medical Men" as Nightingale called them, theoretically outranked her. In order to function effectively as superintendent, Nightingale played

¹³Florence Nightingale to Mrs. Charles Roundell, August 4, 1896, *Florence Nightingale on Public Health Care: The Collected Works of Florence Nightingale*, vol. 6, ed. Lynn McDonald (Waterloo: Wilfrid Laurier University Press, 2004), 307, Cited afterward as *Nightingale 2004*; and Lucy R. Seymer, "Florence Nightingale at Kaiserswerth," *The American Journal of Nursing* 51, no. 7 (1951): 424-426.

¹⁴Colleen A Hobbs, *Florence Nightingale* (New York: Twayne Publishers, 1997), 49-50.

the committee and doctors against one another with no small amount of success. In a letter to WEN during the winter of 1853, Nightingale fairly gloated about having things her way:

... [W]hen I entered into service here, I determined that, happen what would, I *never* would intrigue among the Com'tee. [Now] I propose in private to A, B or C the resolution I think A, B, or C most capable of carrying in Com'tee & then leave it to them – & I always win. I am now in the hey-day of my power... Last General Committee, I executed a Series of resolutions on five subjects, & presented them as coming from the Medical Men... All these I proposed and carried in Com'tee, without telling them that they came from me & not from the Medical Men – & then & not till then, I shewed them to the Medical Men without telling *them* that were already passed in Com'tee.¹⁵

Crimean War

In 1853, Great Britain (allied with France and the Ottoman Empire) went to war with imperial Russia over the latter's designs to control the Balkans and the Dardanelles and Bosphorus straits. The British Army – poorly organized, saddled with an unprofessional officer corps, and plagued with competing bureaucracies that, more often than not, sabotaged each other – barely held on through the first year of the war, despite weapons superiority. By late 1854, the British Army in Crimea faced catastrophe brought on by a nearly-complete lack of medical care, supplies, and poor sanitation in field hospitals. Diseases took as many as a third or more of enlisted soldiers out of action for weeks or months at a time. A report from the Medical Department of the British Army in the Crimea drew this accompanying comment from editors of the *Association Medical Journal* in January, 1855:

In a previous number...we recorded the opinion

¹⁵Florence Nightingale to W. E. Nightingale, December 3, 1853, in *Nightingale 1990*, 74-75 (Italics are Nightingale's).

of the correspondent of a French Medical Journal, that the medical service of the British army was in a state of great inefficiency... [we] hope that the medical profession, the British public, and the British Parliament, will not rest satisfied till the disgraceful state of the medical service of the army is traced to its true source.¹⁶

Cholera, the chief culprit not wearing a uniform, took down many times the number of British soldiers as did Russian bullets and swords. Reports in the *Times* (London) of the poor medical treatment for wounded and ill common soldiers drew public attention away from initial victories by British forces.¹⁷ For the first time in history, thanks to telegraph lines that extended across Europe into the Balkans, journalists from London, notably W. H. Russell of the *Times*, filed reports carried on the front pages of the next day's newspapers in Britain. Also for the first time in history, an immediate public outcry regarding the disastrous state of medical care for British soldiers forced Her Majesty's government to take action.¹⁸

Enter Florence Nightingale, who organized a crew of volunteers, including nurses from her Institution, Catholic Sisters of Mercy, and a few gentlewomen who volunteered their services and money. She lobbied the British government to allow her and her charges to proceed to the front and nurse the ill and wounded. Nurses other than Catholic nuns were treated with the same status as prostitutes at this point in British history (something Nightingale changed single-handedly). Ergo, the effort required all the skill and "high profile" allies Nightingale could muster. It helped that she personally knew the war minister Sidney Herbert. Perhaps prompted by personal lobbying by his wife Lady Herbert on Nightingale's behalf, the minister tirelessly advocated for her proposal with the cabinet. It did not hurt Nightingale's cause that

¹⁶Medical Department of the British Army in the Crimea, *Association Medical Journal* 3, no. 106 (1855): 30. This publication, *Association Medical Journal*, preceded the *British Medical Journal*, also known as *Lancet*, which began publication some two decades later.

¹⁷Rosalind Nightingale Nash, *A Short Life of Florence Nightingale, abridged from The Life of Florence Nightingale by Sir Edward Cook with additional matter* (New York: The Macmillan Company, 1925), 69.

¹⁸*Ibid.*, 69-70.

she raised her own funding. All she planned to do would not cost the cash-strapped British government a pence. Illustrating her confidence the venture would move ahead, Nightingale wrote Lady Herbert the day before the British cabinet formally accepted the offer,

A small private expedition of nurses has been organized for Scutari [in the Crimea] & I have been asked to command it. I take myself out & one Nurse. Lady Maria Forester has given 200 pounds to take out three others. We feed and lodge ourselves there, & are to be no expence whatever to the country... Dr. Andrew Smith of the Army Medical Board, whom I have seen, authorizes us... We start on Tuesday if we go, to catch the Marseilles boat of the 21st for Constantinople, where I leave my nurses, thinking the Medical Staff at Scutari will be more frightened than amused at being bombarded by a parcel of women, & I cross over to Scutari... to present my credentials...¹⁹

An unquestionably upper-class young lady, Nightingale provided the critical leadership figure that the British government needed to make this unprecedented mission acceptable to Parliament and the public. After her work at the Institution on Harley Street received wide popular acclaim in the years leading up to Crimea, Nightingale finally won over even her mother and sister to her life's mission. Dozens of family friends and business associates, all of them wealthy and influential, believed her a miracle-worker, and communicated this directly with prominent government officials. This combination sealed the deal. On October 21, 1854, with the approval of Herbert and Her Majesty's government, Nightingale and a handpicked crew of 38 nurses, many more than planned at first, sailed for the Crimea. Her year and a half there earned her national, as well as international celebrity as "the Lady with the Lamp." It also brought recognition for her care of common soldiers who, until that point in British history, at least, had been the subject

¹⁹Florence Nightingale to Elizabeth Herbert, October 14, 1854, *Nightingale 1990*, 79.

²⁰Hobbs, 53-55.

of scorn and derision.²⁰

At the hospital at Scutari, Nightingale and a tight inner circle of nurses, including the Catholic Sisters of Mercy, quickly reorganized, sanitized and humanized conditions for the wounded and sick common soldiers. She wrote later that of the original 38, including the Catholic Sisters, only about a dozen were trustworthy. Nightingale imposed a sort of benevolent dictatorship on the nurses and orderlies to ensure the best possible chance of recovery for ill and wounded soldiers. Nightingale wrote a description of the conditions she and her nurses encountered on arrival at Scutari for Harriet Martineau's *England and Her Soldiers*:

The orderlies did not understand their business... they did not know that their own lives and those of their comrades depended on [discipline]... The nurses therefore entered among a mob of sufferers and had to establish discipline in the wards before they could do much more... The orderlies had never been trained to clean and air the wards... Unless the men asked to be washed, they were left dirty; their wounds were not cleansed and dressed... Poultices were left on when they were cold and hard, and then not washed off.²¹

Nightingale's disciplinary agenda went hand in hand with leading through example. Her nightly patrols of the wards at Scutari, lamp in hand, both to check up on the nurses and to care for the soldiers herself, resulted in the iconic lithographs of her as "the Lady with the Lamp" which appeared in British newspapers and magazines.

Along the way, she constantly fought turf battles with less sympathetic doctors, army officers, and on occasion other nurses. Chain of command issues surfaced frequently as Nightingale resisted army field commanders' efforts to control her and her nurses. She did not hesitate to write directly to Herbert, the minister of war, when she needed supplies or thought an officer should be reprimanded. A civilian, Nightingale frustrated and

²¹Florence Nightingale in *England and Her Soldiers*, ed. Harriet Martineau. (London: Smith, Elder Co., 1859) in Nash, 110-111. Author cites Nightingale from Martineau without footnote or endnote

angered some of the military officers with whom she worked. She pleased others who welcomed her commitment to ordinary soldiers and their rapid recovery from wounds and illness. No obstacles got in the way of her work. Nightingale envisioned nurses as subordinate to physicians, but broke this rule herself countless times when doctors failed to requisition needed supplies and medicines. She retained “operational command” of her nurses and refused to allow army officers or physicians to subvert her authority.²²

Nightingale’s toughness often disguised her compassion and her willingness to sacrifice personally on behalf of her patients. For example, she spent a great deal of time and effort, often using her own money or contributions by wealthy friends, to buy supplies and medicines for her own hospital wards, and for other army hospitals at the front. She often wrote privately to supporters both to inform them of conditions at the Scutari and indirectly to ask for more funds. In late 1855 Nightingale described her procurement efforts in a letter to Lady Charlotte Canning, a leading financial supporter:

I have made it a rule in these Hospitals of Scutari to answer [find a way to fill] all the Requisitions of Medical Officers, having first ascertained that such Article does not exist in the Purveyor’s store. I have then procured it either from Constantinople, Malta or England, if it did not exist in the Free Gift Store. I have thus spent upward of 3000 pounds in Constantinople alone – part of which has been repaid me by the Government, part has come out of my own & other private funds. This is wholly independent of the ‘Times’ fund. To other [army] Hospitals [in Crimea] I have sent all... that was required of me... I have invariably sent, when asked, to all other Hospitals in the East, whether I possessed the Article actually in store or not – & I possess an exact record of what has been sent.²³

²²Gill, 323-352. Gill’s account of Nightingale’s herculean efforts at Scutari during the Crimean War is the clearest and most personable of the accounts given in several of the books referenced in this paper. Even though Gill writes at the distance of 150 years, she seems to capture the persona of Nightingale and the story of her life in a much more readable, human way.

²³Florence Nightingale to Lady Charlotte Canning, October 1, 1855, *Nightingale 1990*, 129.

When Nightingale arrived in the Crimea, one-third or more of the troops were found in hospital, nearly all of them sick with cholera. As she noted in several letters, this fact alone accounted for much of the British Army's outstanding lack of success in the initial years of the campaign. Measures she took to deal specifically with cholera included the obsessive sanitizing and cleaning standards imposed in hospital wards, and cutting off the source of the epidemics, namely the practice of digging latrines upland from sources of drinking water. She predicated her regimen on the "sanitarian" idea of filth promoting disease; neither Nightingale nor most physicians believed fouled water (and other venues such as linen and even the air) actually contained germs that caused disease. Yet her methods uniformly attacked germs all the same. Her nurses and army orderlies washed and boiled bed linens -- the best way to get rid of lice, which could be seen. They regularly washed patients' wounds with hot soapy water. They opened windows daily to provide fresh air ventilation. Staff also scrubbed all ward floors and walls with hot soapy water, sometimes with salt added.²⁴

Nightingale became one of the first health professionals to rely on statistics to correlate the incidence of disease to poor sanitary conditions. She demonstrated how high standards of sanitation led to dramatic improvement in health outcomes, particularly in hospitals. Nightingale used statistics to demonstrate the grim state of care for soldiers when she arrived, and to make the case that her conditions were for the better.²⁵

In one of her many letters to Herbert from Crimea, Nightingale sketched a grim picture of circumstances there, citing the lack of critical items. She kept statistics about every aspect of the Scutari hospital's operation, using them to reinforce her nearly constant demands to the military high command in London for funds and supplies. No one associated with the British Army had kept track of field hospital inventories (or much of anything else related to wounded or ill soldiers) before she arrived in Scutari. No head

²⁴Woodham-Smith, 99-140; and Gill, 324-346.

²⁵L. R.C. Agnew, "Florence Nightingale: Statistician," *The American Journal of Nursing* 58, no. 5 (1958): 664-665.

nurse would fail to do so afterward. She informed Herbert:

[N]ot one single hospital dress [patient's gown] is now left in store, and I have substituted Turkish dressing gowns from Stamboul (three bales in the passage are marked Hospital Gowns, but they have not yet been 'sat upon'). To purvey [supply] this Hospital is like pouring water into a sieve... But let this Hospital be furnished at once, as has already been described in former letters. If 2000 beds exist, let these 2000 beds have their appropriate complement of furniture and clothing, stationary... Let an inventory hang on the door of each ward to shew what ought to be found there.²⁶

Doubtless, her class background also provided context for her affection for sanitation, since the English gentry had been given over to personal hygiene and household cleanliness for the better part of a century. Pamphlets in the Cowen Tracts demonstrate information about sanitation and diet had already found its way into the hands of the working class of the early Victorian era, courtesy the educated folk in the middle classes and gentry. Nightingale built on this foundation and expanded it.²⁷

By the time her tour of duty in the Crimea ended in 1856, Florence Nightingale completely revolutionized the practice of nursing, in-patient care and hospital organization. She proved her system worked. Michael D. Calabria wrote, "A brilliant organizer, [Nightingale] created order amid the chaos of the ill-equipped army hospital at Scutari and introduced sweeping sanitary reforms, thereby reducing the mortality rate from 42 to 2 percent."²⁸

Immediately following her return from Crimea, Nightingale produced two books which became standards of the profession for nearly a half-century. She published *Notes on Nursing* in 1859

²⁶Florence Nightingale to Sidney Herbert, January 28, 1855, Nash, 122-123.

²⁷The Cowen Tracts, Newcastle University, U.K. The Metropolitan Working Classes' Association, For Improving the Public Health. *On Household Cleanliness*. (London: John Churchill, Publisher. Two editions, 1800 and 1847). Pamphlets from the personal collection of Joseph Cowen (1829-1900). The pamphlets demonstrate the awareness of educated Britons, by the turn of the nineteenth century at the latest, of the connection between unsanitary living and working conditions and disease.

²⁸Michael D. Calabria, Introduction in *Florence Nightingale in Egypt and Greece: Her Diary and Visions* (Albany, NY: State University of New York Press, 1997), 1.

and *Notes on Hospitals* the following year, as well as several subsequent revised editions of both. Nightingale overcame the horrible challenges of treating the ill and wounded in a war zone with only a few allies among the officer corps of her own army. She had few resources other than her own and what she could raise from sympathetic sources at home. Additionally, her nurses presented her with continuous management problems. Despite the obstacles, Nightingale achieved considerable success.

Anticipating the Germ Theory

Nightingale succeeded in demonstrating sanitary conditions and compassionate treatment improved the chances for her soldier-patients to survive. She subsequently disseminated these views to the British public through a number of books and reports. As an unofficial health policy expert, another first for the “Lady with the Lamp,” she arm-twisted the cautious politicians of Her Majesty’s government to initiate reforms both at home and in the military throughout the last four decades of the nineteenth century.²⁹

The germ theory of disease did not find an early advocate in Nightingale. Like many in the medical community at the time, she believed diseases, especially “hospital” diseases such as gangrene following surgery, arose more or less spontaneously from the workings of the body trying to cure itself. In a letter to Edwin Chadwick in 1858, Nightingale wrote:

Sanitary experience has so completely disproved the invisible ‘seminal’ Contagions... With regard to ‘Infection,’ I believe in it just as much as I do the emanations from sewage, and put them on the same footing, But I say, where there is ‘Infection’, the fault is in those who have charge of the disease not in the disease. Give cubic space, keep your patients clean, ventilate your wards and there is no Infection.³⁰

Brilliant and uncannily observant, Nightingale did not make the connection between sanitation and antiseptics until many years

²⁹F. B. Smith, 72-108; and Gill, 414-434.

³⁰Florence Nightingale to Edwin Chadwick, November 6, 1858, *Nightingale 1990*, 200.

later. But as early as 1860, Nightingale instructed nurses to behave as if the germ theory of disease had become settled science, writing that nurses should wash their hands many times a day.³¹

Nightingale fully explicated her two-edged approach to care, anticipating the germ theory while not agreeing with it, in *Notes on Nursing* and *Notes on Hospitals*. If she had written nothing else, these two books alone would likely set her apart as the premier founding theorist of modern nursing care. She drew on statistics and personal observation as well as a keen sense of how all the factors she considered should be integrated. For instance, Nightingale believed disease arose from the body's attempt to repair itself.

"The reparative process which Nature has instituted, and which we call disease, has been hindered by some want of knowledge or attention, in one or all of these things, and pain, suffering or interruption of the whole process [disease] sets in," Nightingale wrote in *Notes on Nursing*. She then offered, chapter by chapter, her prescriptions. In chapter one, she defined the importance of proper ventilation and heating. She also called for the safe collection and removal of bodily waste, important in a time when most homes, hospitals and other buildings did not have indoor plumbing. In chapter two, she discussed the "Health of Houses." Her list included the necessity of pure water, something understood by her and other sanitarians as helping to prevent or cure disease. However, the connection with germs had not yet been proven. She covered a wide range of topics in a holistic approach. This included negative influence of noise, proper diet, advisability of clean linen, advisability of clean walls and surfaces particularly in sickrooms, and directions for observation and care of the sick. Although *Notes on Nursing* offered few statistics, doubtless Nightingale drew on her experiences at the Institution on Harley Street and at the Scutari hospital in the Crimea to support her contentions.³²

Statistics appeared as the basis for *Notes on Hospitals* more clearly. In the Preface, Nightingale wrote:

³¹Florence Nightingale, *Notes on Nursing: What It Is, and What It Is Not*, 3rd ed. (London: Harrison and Sons Publishers, 1860), 53.

³²*Ibid.*, 1-182.

It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm. It is quite necessary, nevertheless, to lay down such a principle, because the actual mortality *in* hospitals, especially those of large crowded cities, is very much higher than any calculation founded on the same mortality of the same class of diseases among patients treated *out of* hospital would lead us to expect. (*Italics are Nightingale's*)³³

Elaborating, Nightingale cited the “high death rate in hospitals in large towns,” “hospital diseases,” and proceeded to outline the deficits, and her proposed remedies. She provided guidelines for renovating hospitals, and constructing new ones, that offered light, good ventilation, more space for each patient in a ward (private rooms had not yet made their appearance in public hospitals). She insisted on spurring patient recovery with clean linens, floors, surfaces and the like. She ventured an opinion on convalescent homes (which should be “like homes” and not like hospitals) and hospitals for children.

Chapter nine was devoted to “Hospital Statistics” in which Nightingale contended:

These [statistical record-keeping] methods, if generally used, would enable us to ascertain the mortality in different hospitals, as well as from different diseases and injuries at the same and at different ages, the relative frequency of different diseases and injuries among the classes which enter hospitals in different countries...³⁴

Then, Nightingale provided a remarkably detailed outline of what statistics should be kept and why, proposed forms to use to keep them, and defined how the information can be used to make determinations about the effectiveness of patient care.³⁵

Nightingale helped to create a nearly modern hospital environment. Her prescriptions called for hospitals characterized

³³Florence Nightingale. *Notes on Hospitals*, 3rd ed. (London: Green, Longman, Roberts & Green Publishers, 1863), iii.

³⁴*Ibid.*, 159.

³⁵*Ibid.*, 160-189.

by high standards of sanitation and healthful design factors. She insisted tracking disease outcomes through statistics and taking appropriate countermeasures were vital to the best outcome for patients. Ironically, all these measures worked to eliminate the germs Nightingale herself did not believe caused disease until later in her career. Above all, she believed nurses who were trained according to Nightingale's own exacting standards, represented the most important improvement for hospitals. When the opportunity came to reorganize the Liverpool Workhouse Infirmary in 1864, Nightingale energetically took action. In a letter to Sir John Lawrence, she outlined her plans:

I am sure that you will be glad to hear that one of my life-long wishes, viz., the nursing of Workhouse Infirmarys by proper Nurses, is about to be fulfilled. By the munificence of a Liverpool man, (who actually gives 1200 pounds a year for the object, but desires not to be named) we undertake next month the Liverpool Workhouse Infirmary (of 1000 beds) – the first Workhouse that ever has been nursed – with 15 Head Nurses, trained by ourselves, and a lady (Volunteer) Matron, who underwent a most serious course of training at our Nurses School... 15 Assistants, and 52 ex-pauper women whom we are to train as Nurses.³⁶

Nightingale's sanitary regime and comprehensive professional training for nurses represented a veritable light-year's advance in care despite her stubbornness on the germ theory. In *Notes on Nursing for the Labouring Classes*, an expanded version of the original *Notes on Nursing*, Nightingale showed she still believed in the early 1860s, that infections arose from poor sanitation and bad air:

If [a nurse] allows her ward to become filled with the peculiar close fetid smell, sop apt to be produced in surgical cases, especially where there is great suppuration and discharge, she may see a vigorous

³⁶Florence Nightingale to Sir John Lawrence, September 26, 1864, in *Nightingale 1990*, 257-258.

person in the prime of life gradually sink and where, according to all human probability, he ought to have recovered. The [surgical] nurse must ever be on the watch, ever on her guard, against want of cleanliness, foul air, want of light and of warmth.³⁷

But nothing in Nightingale's nursing standards worked against the new theory of antiseptic treatment for wounds infected by germs developed by surgeon Sir Joseph Lister. In 1867, Lister published his groundbreaking paper, "On The Antiseptic Principle In The Practice Of Surgery," attributing surgical infection to germs and describing how he had eliminated such infections using carbolic acid as a disinfectant. Yet, many years passed before Nightingale warmed to Lister's conclusions.³⁸

Most of the foundation for modern nursing, and hospital organization and design came from Nightingale. In that regard, *Notes on Nursing* and *Notes on Hospitals* can be read as more than textbooks. Instead, they form a basic organizational philosophy for modern health care, at least as it pertains to sanitation and in-hospital patient care. The fact that Nightingale waited until late in life to admit the truth of the germ theory of disease makes her work no less important; none of it contradicts the germ theory and all of her practical prescriptions work with that theory. At last in her seventies, Nightingale conceded the correctness of the germ theory, albeit a bit grudgingly:

Absolute cleanliness is the true disinfectant but chlorinated soda, if disinfectants are to be used is about the best. Always have chlorinated soda for nurses to wash their hands, especially after dressing or handling suspicious case...Boil [linens], wash, scour with much soap and water and, say, chlorinated lime; then dry and expose to air all bed ticking, blankets, cover lids, etc.³⁹

By this time, Lister's pioneering work in antiseptics following

³⁷Florence Nightingale, *Notes on Nursing for the Labouring Classes*, Nightingale 2004, 151.

³⁸Joseph Lister, "On The Antiseptic Principle In The Practice Of Surgery," *The British Medical Journal* 2, no. 351 (1867): 246-248, and Ellie Metchnikoff, *The Founders of Modern Medicine* (Freeport, NY: Books for Libraries Press, 1939), 106-111.

³⁹Florence Nightingale, "Sick-Nursing and Health-Nursing," *Women's mission: A series of congress papers of the philanthropic work of women by eminent writers*, Edited by Angela Burdett-Coutts. (New York: Charles Scribner & Sons, 1893), 240.

surgery had long since been accepted by most of the medical community. Nightingale must have realized as committed as she had been to the miasma theory, overwhelming evidence supporting Lister existed by the early 1890s. As a scientist, she could do nothing else but concede in the face of that evidence, although her tone in the above quote suggests she did not particularly enjoy making the concession.

Later Years

A subscription campaign – in today's terminology a fundraising campaign – allowed Nightingale to establish a school of nursing in London in 1860. Thereafter, she worked mainly as an administrator, often absent from the premises. Nightingale also spent time as an unofficial policy expert. Her ideas found their way into the reports and laws of the British government indirectly, or through popular pressure when published independently. She spent a good deal of time making recommendations for the reform of sanitary conditions both for the working classes of England and for the British India Army, although she never traveled there. One more paradox that, from statistics and first-hand narrative accounts to which she had access, Nightingale arrived at amazingly accurate recommendations, although she lacked personal familiarity with conditions in India, for example. Throughout the latter two-thirds of the nineteenth century, Nightingale enjoyed the status of mother superior for the nursing profession, which she continued to guide and develop. She did this principally as a lawgiver for nurse training through her position as founding matron of her nursing school.⁴⁰

Conclusion

Nightingale developed her ideas about health care synthesizing experiences from her home life, her education, particularly the self-directed training she gave herself, and from her direct experience caring for the sick and injured. Although she spent only a few years

⁴⁰Gill, 435-442.

as a hands-on nurse, she continued as leader of the profession as an administrator and unofficial public policy expert throughout the remainder of her life. Paradoxically again, Nightingale advocated a holistic approach to health care, more than a century before the approach became widespread. This method encompassed what amounted to antiseptic measures and anticipated the germ theory of disease. When germ theory prevailed in the late nineteenth century, nothing Nightingale had prescribed conflicted with it.

Nightingale's prescriptions also dovetail with modern holistic health practices. "The Lady with the Lamp" wanted to limit the "stressors" she thought promoted disease, particularly in the hospital setting. Her prescriptions for total patient care included diet, personal interaction with nurses and other staff, the hospital environment itself and other related factors, thus eliminating or reducing stress factors and promoting the total recovery and health of the patient.⁴¹

Unwittingly, perhaps, Nightingale's pioneering use of statistics to back up her contentions about sanitation, disease prevention and mortality rate reduction would also indirectly provide evidence to reinforce the germ theory. Nightingale gave specific instructions to nurses regarding washing hands, cleanliness of bed linens, floors and other surfaces, proper ventilation of hospital wards, and the like. Implementing her standards created better results, as she expected, but also pointed to the truth of the germ theory.

Nightingale's career also illustrated for observant public officials, educators and health professionals the necessity for a high level of training for all those who directly provide care for the sick. Until Nightingale virtually invented the field of nursing education, only physicians and surgeons had formal training. Florence Nightingale trained herself first, tested her training through actual experience, and then refined the principles to formulate an entirely new standardized profession. In so doing, she marched with the drummers of the time – other forms of vocational education sprang up during the middle and late nineteenth century. The difference in Nightingale's efforts remained in the tremendous improvement in health, and indeed the saving of many lives that otherwise would have been lost, not just in Great Britain but throughout the world.

⁴¹Dossey, 2-9 and 110-113.