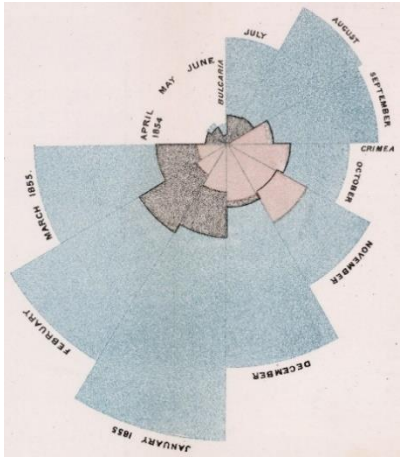
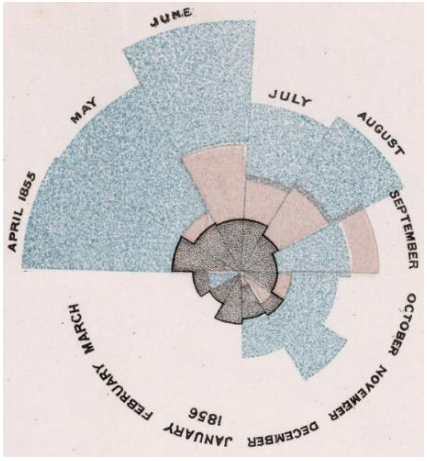
FLORENCE NIGHTINGALE (May 12, 1820 – August 13, 1910)

by HEINZ KLAUS STRICK , Germany

Finding a calendar page about FLORENCE NIGHTINGALE in the series about famous or less famous mathematicians may seem confusing, but the famous Englishwoman's contributions to social statistics were of particular importance; especially her invention of the so-called *polar area diagram*.
Scottish engineer WILLIAM PLAYFAIRS used a *pie chart* to illustrate statistical data in 1801. In 1858, FLORENCE NIGHTINGALE invented a special variant called a *coxcomb* (= a cock's comb).





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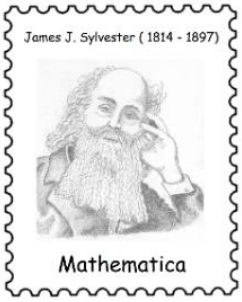
The two graphs show the relative monthly mortality rate (number per 1,000 soldiers) among British troops in connection with the Crimean War, as well as the reasons for the deaths – for the individual months in the period from April 1854 to March 1855 (figure left) and from April 1855 to March 1856 (figure right). The area of the circle sectors – each measured from the center of the circle – corresponds to the number of deaths caused by preventable diseases (in blue), by injuries (in red) and by other causes (in black).

How did FLORENCE NIGHTINGALE come to make these diagrams and present them to QUEEN VICTORIA?

FLORENCE NIGHTINGALE was born into a very wealthy English family: her parents WILLIAM EDWARD NIGHTINGALE and FRANCES SMITH chose the name of her daughter's birthplace: *Florence*.
At that time, the parents were still on their extended honeymoon; the year before, their first daughter had been born in Naples. (She was named PARTHENOPE which was the original name of the city on Vesuvius, founded by Greek settlers around 700 BC.)

The two girls were brought up by governesses, as befitted their status – on the family estate in Derbyshire or Hampshire, depending on the time of year – until their father, who had studied at Cambridge, took over the lessons himself and taught his daughters everything that was otherwise offered at elite schools for boys: history, literature and philosophy, Latin and Greek, also French, German and Italian.



FLORENCE showed a particular interest in mathematics, however, and when she was 20, she asked her parents to intensify her lessons in this subject - instead of ballroom dancing and textile work. Her parents were reluctant to give in to their insistence, and she finally received more comprehensive specialist instruction from trained teachers, including (presumably) JAMES SYLVESTER.

FLORENCE NIGHTINGALE's religious upbringing took place within the *Church of England*, but she had doubts about the traditional teachings of the church from a young age. She felt confirmed in her doubts after she met ADOLPHE QUETELET and his writings. In 1834, QUETELET had supported the *British Association for the Advancement of Science* in setting up a department for statistics. His work *Sur l'homme et le développement de ses facultés,* published in 1835, is today considered the beginning of modern social statistics.

NIGHTINGALE came to the conclusion that there was no point in praying to God, the Creator of the world, for example to help in an emergency situation, but that one should instead deal with how one can prevent such impending disasters. From suitable statistical data, such as that recorded in QUETELET's social statistics, people could learn what must be done to support God's creative work and thus to be a fellow combatant of God.

Against this background, NIGHTINGALE developed an increasing interest in social work and could imagine working in the care of the sick. However, this met with massive rejection in her family, as this type of work was usually only done by women from the lower classes and was therefore not suitable for women from her social background.

In 1849 she went on a study trip through European countries as far as Egypt, taking every opportunity to visit hospitals and learn about different care systems. An initial internship in a hospital in Alexandria was followed by others, including at the deaconess institution run by the Protestant pastor THEODOR FLIEDNER in Kaiserswerth (near Düsseldorf).

After her return to her homeland in 1853, she felt sufficiently prepared to take on the honorary position of director of the *Institute for the Care of Sick Gentlewomen* in London. When Great Britain and France declared war on the Russian Tsar in March 1854 to curb his expansionist drive southwards, a new type of war broke out, with enormous use of materials and high losses of personnel on both sides. Thanks to the invention of the telegraph, the whole of Europe was constantly informed.

This so-called *Crimean War* ended in September with the victory of the Allied troops after the capture of Sevastopol, but catastrophic conditions in the hospitals continued to prevail, as reporters from *The Times* reported daily. This prompted the British Secretary of State for War SIDNEY HERBERT to ask FLORENCE NIGHTINGALE for help: she should take over the leadership of a group of nurses for the British hospital in Skutari (now a district of Istanbul).

At the beginning of November she arrived with 38 volunteers and found "*a kingdom of hell*". NIGHTINGALE took care of everything: the hopelessly overcrowded hospital wards were cleaned and drainage systems installed, patients with infectious diseases (such as cholera and typhus) were separated from the rest, the wounded were washed, given clean bandages and new clothing and finally received enough food again – financially made possible by appeals for donations from *The Times. The Lady with the Lamp* – as she was affectionately called – did not allow herself a break at night either, going from bed to bed comforting the patients.

NIGHTINGALE recorded all the details in detail: In her report, which she submitted to QUEEN VICTORIA , PRINCE ALBERT and Prime Minister LORD PALMERSTON , she was able to use her graphics to illustrate how her strict measures had led to an improvement in the situation. Alarmed by her experiences in the hospital, she also investigated the mortality rates in the barracks at home and in India, both of which were significantly higher than those of the normal civilian population, which led to comprehensive reforms by the *Royal Commission on the Health of the Army*. For her enlightening statistical work (development of standardized data collection, particularly in the health sector), NIGHTINGALE was elected as the first woman to the *Royal Statistical Society*.

In 1860, thanks to leftover donations, NIGHTINGALE was able to set up the first *Training School and Home for Nurses*, a hospital school with an attached nurses' residence – a model for general hospital reform and the profession of nursing received a significant social upgrade.

During her stay in the war zone, NIGHTINGALE contracted brucellosis from spoiled food and she suffered the effects (chronic pain and recurring bouts of fever) for the rest of her life. Despite this, she wrote numerous works, including the bestsellers *Notes on Nursing* and *Notes on Hospitals*, which were also translated into other languages, but was prevented from attending international statisticians' congresses. She never made a fuss about her achievements; she always modestly pointed out that she was only carrying out a command from God. This was also the reason why she ruled out the idea of getting married. For her life's achievements, she was awarded the *Royal Red Cross* by QUEEN VICTORIA, the *Order of Merit* by KING EDWARD VII and honorary membership of the *American Statistical Society*.

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She died at the age of 90 having declined a funeral service in Westminster Abbey during her lifetime.

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https://www.spektrum.de/wissen/die-lebensrettenden-diagramme-von-florence-nightingale/2214589

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