

Biographical Sketch

Baron Joseph Lister, FRCS, 1827–1912

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Abstract This biographical sketch on Baron Joseph Lister corresponds to the historic text, *The Classic: On the Antiseptic Principle in the Practice of Surgery* (1867), available at DOI [10.1007/s11999-010-1320-x](https://doi.org/10.1007/s11999-010-1320-x).

Joseph Lister was born in Upton, Essex, England, on April 5, 1827, into a prosperous Quaker family [2]. His father, Joseph Jackson Lister, was a successful wine merchant with a deep interest in science. The elder Lister's invention of a microscope that did not distort color (the "achromatic" microscope) afforded him a fellowship in the Royal Society. Lister assumed his father's interest in microscopes as serious scientific instruments (they had often been used rather more as hobby tools for amateur scientists). He took a degree at the University of London in 1847, and then after recovering from smallpox completed a medical degree. He pursued further training in medicine at the same institution, famous for its physiology, and was mentored by Wharton Jones and William Sharpey (Sharpey's fibers) and completed his degree with honors in 1852. The latter recommended him to the Scottish Surgeon, James Syme (who for a short time had been Professor at the University of London, but had returned to Edinburgh). He intended to spend but four weeks, but decided to stay on as Syme's assistant, and three years later married Syme's daughter, Agnes, who also had a deep interest in science and was Lister's partner in the laboratory. (His marriage to a non-Quaker required him to leave the Society of Friends and he

joined the Scottish Episcopal Church.) In 1860, he was appointed Professor at the Royal Infirmary, Glasgow, and was also made a member of the Royal Society for his anatomical research. After Syme developed a serious illness in 1869, Lister returned to Edinburgh to succeed Syme. He remained there until 1877, when he accepted the Chair in Clinical Surgery at King's College, London. He retired from that post in 1893, after the death of his wife during a holiday in Italy. Lister received many national and international awards during his lifetime and served as President of the Royal Society. In 1883, Queen Victoria elevated him to the peerage and in 1897 he was given the title Lord Lister of Lyme Regis [3]. In 1902, he was awarded the Order of Merit, and made a Privy Councillor. He died at his country home in Walmer, Kent in February 1912 at the age of 84.

The influence and importance of Lister's work cannot be understated: his principles of aseptic surgery made surgery practical, and perhaps no other single development was so important for surgery other than anesthesia. We reproduce this month one of his earliest articles on the topic, "On the Antiseptic Principle in the Practice of Surgery" [5]. He had in fact published another paper, "On a New Method of Treating Compound Fracture, Abscess, Etc. With Observations on the Conditions of Suppuration" some months earlier [4]. In that article, he describes the background of his work: the decomposition of organic substances.

"Turning now to the question how the atmosphere produces decomposition of organic substances, we find that a flood of light has been thrown upon this most important subject by the philosophic researches of M. Pasteur, who has demonstrated by thoroughly convincing evidence that it is not to its oxygen or to any of its gaseous constituents that the air owes this

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property, but to minute particles suspended in it, which are the germs of various low forms of life, long since revealed by the microscope, and regarded as merely accidental concomitants of putrescence, but now shown by Pasteur to be its essential cause, resolving the complex organic compounds into substances of simpler chemical constitution, just as the yeast plant converts sugar into alcohol.”

Lister, as all brilliant scientists, was able to “connect the dots.”

“In the course of the year 1864 I was much struck with an account of the remarkable effects produced by carbolic acid upon the sewage of the town of Carlisle, the admixture of a very small proportion not only preventing all odour from the lands irrigated with the refuse material, but, as it was stated, destroying the entozoan which usually infest cattle fed upon such pastures.”

He recognized the process of decaying garbage was essentially the same as that for decaying (putrefying) tissue, and presumed a chemical that would prevent the odor of decomposition might serve as a powerful antiseptic. His first attempt was in March 1865 and, as he noted, it was unsuccessful: “in consequence, as I now believe, of improper management; but subsequent trials have more than realized my most sanguine anticipations.”

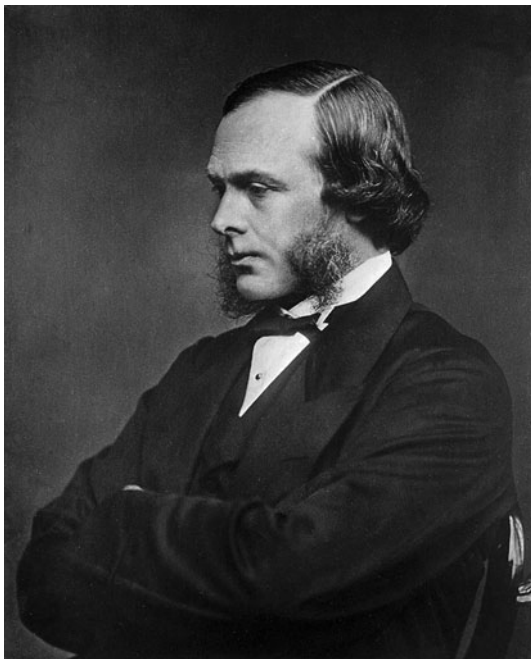


Fig. 1 Joseph Lister, 1st Baron Lister (1827–1912), surgeon, in his younger years. Image provided with courtesy and permission of the Wellcome Library, London.

“Carbolic acid proved in various ways well adapted for the purpose. It exercises a local sedative influence upon the sensory nerves; and hence is not only almost painless in its immediate action on a raw surface, but speedily renders a wound previously painful entirely free from uneasiness. When employed in compound fracture its caustic properties are mitigated so as to be unobjectionable by admixture with the blood, with which it forms a tenacious mass that hardens into a dense crust, which long retains its antiseptic virtue...”

He experimented with differing concentrations of liquid carbolic acid in various organic liquids such as olive oil or linseed oil (liquid carbolic acid, he noted, was nearly insoluble in water although a crystalline form was), and various sorts of dressings (eg, linen, oiled silk, gutta percha – the resin of a tree from which a sort of latex may be made). His work was not limited to clinical experiments, but rather was complemented with various sorts of bench experiments [6].

For treating abscesses he described several approaches, both used with drainage. In some cases he first sterilized the skin with a dressing of carbolic acid, then made the incision while having an assistant lift the dressing, and after ensuring complete drainage, packed a “piece of lint” into the incision so it would not close, and then replaced the dressing. Alternatively, to prevent evaporation, he made a paste with carbolic acid, oil, and glazier’s putty (carbonate of lime). After draining the abscess he placed the paste over the wound enclosed in a small tin rim of about 1 inch thickness, and secured it by a bandage. The carbolic acid was sufficiently diluted to prevent the excoriation of the skin that occurred with higher concentrations. Many years later [6], Lister further justified the use of a paste because he believed the admixture of pus and carbolic acid important, and in a



Fig. 2 A page from Lister’s sketchbook, 1832–34. Image provided with courtesy and permission of the Wellcome Library, London.



From a painting made by Mr. R. A. Buchanan, F.R.C.S.
Lister

Fig. 3 Portrait of The Right Honourable Joseph Lister, 1st Baron Lister (1827–1912), British surgeon, in his later years. Image provided with courtesy and permission of the Wellcome Library, London.

wound with little pus, the paste would serve the purpose of a retained admixture. He also began using the purified crystalline form when after some experimentation he found if diluted in about 20 parts water it was “exceedingly potent as an antiseptic” [7].

Lister initially applied his aseptic method to compound fractures (which most likely would have become infected) and to abscesses which were already infected. However, believing the offending organisms came from the air, he extended his techniques to saturate the air with a carbolic acid spray [1]. By the late 60s, he was performing primary operations on bone using the same principles of dressing, since in effect he was converting a closed fracture to an open one. He extended his work to “purifying” the skin not only of the patient, but the surgeon [7]. “I used the 1 to 20 watery solution for rendering the patient’s skin and the hands of myself and my assistants aseptic throughout the 40 years during which I practiced on the antiseptic principle, and I never had any reason to doubt its efficacy. No long time is required for its action.”

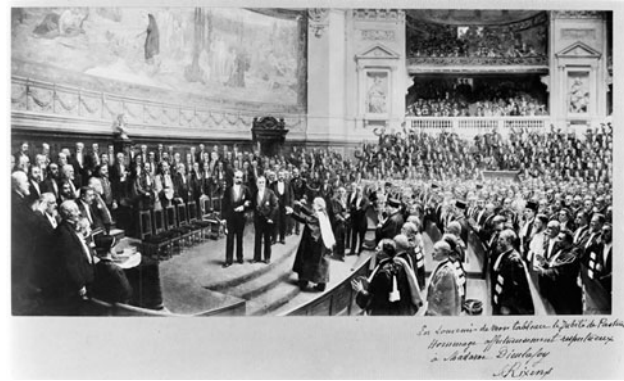


Fig. 4 Joseph Lister, Baron Lister acclaims Louis Pasteur at Pasteur’s Jubilee, Paris, 1892. Pasteur is the shorter of the two men in center stage. Image provided with courtesy and permission of the Wellcome Library, London.

Lister’s advance, as many others, was subject to great criticism, and slow to be introduced in most places [1]. Lister apparently did not let the controversies interfere with his research. According to Bonnin and LeFanu [1], the *Lancet* commented in 1875, “Happily it is no part of the business of a clinical surgeon to bolster up theories be they good or bad, or to make facts rigidly conform to them. The germ theory may be perfectly well founded, but nine surgeons out of ten do not care much whether it is or not, so long as they cure their cases and reduce their mortality to the lowest possible degree.” Human attitudes do not greatly change.

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