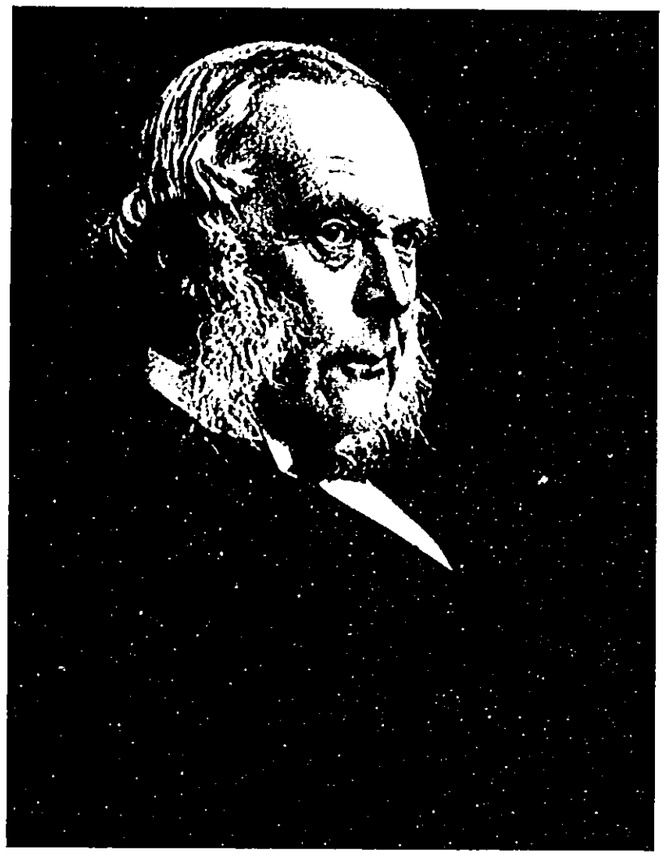
LORD LISTER, O.M., F.R.S.

1ST BARON OF LYME REGIS

1827-1912

THE great name of Lister is familiar to us all. He has so recently passed from us and, since in his lifetime he enjoyed the fame which too often is only accorded to the great when they are gone beyond its reach, his work must be fresh in our memories. Yet, because it is easy for a generation born to all the benefits science can give, to take their heritage for granted, and to ignore the infinite labours which went to achieve it, we do well to look back sometimes. The word "hospitalism" is not familiar to the present generation, but in Lister's young days it was coined "to signify the morbid conditions arising from the gathering of diseased persons in a hospital," and Sir James Young Simpson, the first surgeon to use chloroform as an anæsthetic, discussing the subject at that time, said: "A man laid on the operating table in one of our surgical hospitals is exposed to more chances of death than the English soldier on the field of Waterloo." Those were the days before the introduction of the antiseptic system, and to Lister we owe it that the whole outlook of surgery was changed.

Joseph Lister's parents were Quakers of Yorkshire origin. His father, Joseph Jackson Lister, was a London merchant by profession, but also a man of



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From a photograph by Mr R. A. Bickersteth, F.R.C.S.

scientific interests, whose invention of special lenses for the achromatic microscope first made of that instrument a powerful weapon in research. He was a Fellow of the Royal Society, and his work on the microscope, besides proving of inestimable value in his son's researches in after years, directed the boy's attention at a very early age to the minute animal life that the microscope revealed. The Listers lived at Upton in Essex, a place only five miles from London, but in those days quite in the country, and the resort of many Quaker families. Their home, Upton House, an old Queen Anne residence, lay in the midst of a green park with attractive gardens. It is now the Vicarage of St Peter's Church, its once beautiful surroundings immersed in London's industrial dwellings. Here Joseph Lister was born on the 5th of April 1827, the second son of a family of seven. His boyhood was a happy one, his family being much attached to one another and sharing to a great extent the same interests. From his father he learnt to use the microscope and to cut sections. He was sent to the Quaker School of Grove House, Tottenham, where he remained until his seventeenth year, and showed considerable aptitude for Classics and for languages, especially French and German. He was able in later years to make public speeches in both of these languages.

In 1844 he entered University College, London, first taking a course in the Faculty of Arts, though he intended to follow the profession of Medicine. At that time, as now, there were distinguished men in the Medical Faculty of University College, for Sharpey held the Chair of Physiology, Wharton Jones was Professor

of Ophthalmic Medicine and Surgery, and Thomas Graham, who did distinguished work on the colloids, occupied the Chair of Chemistry. Wharton Jones's work on the circulation proved very stimulating to Lister. He was the first to describe the rhythmic contractions of the veins in the frog's web and bat's wing, and his researches directed Lister to the study of inflammation. But to Sharpey, the great physiologist, Lister owed most of the inspiration of his College days. Sharpey's lectures awoke in him a love of physiology that remained all his life, and "aided by a first-rate achromatic microscope given him by his father, he worked out the details of histology" to which his attention had been drawn by this great master. During his student days, Lister did some remarkable physiological researches. His first published paper, on the "Muscular Tissue of the Iris," appeared in the *Quarterly Journal of Microscopical Science* for 1853, his second on the "Small Muscles of the Hairs," which had been discovered by Kölliker, showed the attachments of these muscles to the skin, and appeared in the same journal, and the third on the "Involuntary Muscular Fibre," bringing evidence in support of Kölliker's account of this variety of muscle, was published in the *Transactions of the Royal Society of Edinburgh*, in 1857. All of these papers threw some new light on the subjects under observation, and referring to the last research, Professor Engelmann, Professor of Physiology at Utrecht, writing to Lister in 1895, when he hoped to repeat Lister's observations, said: "I fear I shall not come much further than you have already been, nearly forty years ago."

When Robert Liston, the Edinburgh surgeon, did the first operation ever performed under ether in this country in the theatre of University College Hospital, Lister was present. By the introduction of chloroform surgery received a great impetus, and many operations were undertaken which before would have been considered to entail too much risk. But, as the number of operations increased, so in proportion did the number of deaths, for, however skilful the surgeons might be, and the art of surgery had attained a very high level in manipulative skill in the days before chloroform had lessened the necessity for saving time and pain, there stalked through all the hospitals of Europe and America the dread ogre of blood-poisoning. Septicæmia, erysipelas, hospital gangrene, following suppuration of the wound, were the common lot of the patient who had undergone a surgical operation, and the mortality from these was appalling. This fact deeply impressed Lister and greatly distressed him as he walked the wards of University College Hospital and saw how every effort of the surgeon was overshadowed by the grim spectre of death. Thenceforth he resolved to devote all his scientific powers to the solution of this problem.

In 1852 he graduated M.B. of the University of London, and was elected a Fellow of the Royal College of Surgeons, and in 1853 he went, on the advice of Professor Sharpey, to study under the famous surgeon, James Syme, of Edinburgh, intending later to settle in London as a consulting surgeon. The fates, however, decided otherwise, for Syme was not slow to mark a good man, and in 1854, his house-surgeoncy falling vacant, he appointed Lister to fill it. Two years later Lister sealed his connection

with Edinburgh by marrying Syme's eldest daughter, to whose constant and devoted help throughout his life he owed a great deal. She acted as his assistant and amanuensis, and shared with him his love of natural history, the pursuit of which on their holidays was one of their chief recreations. Their honeymoon was spent visiting the Continental hospitals and medical schools, and Lister made the acquaintance of many famous European surgeons. On his return, he was appointed Assistant-Surgeon to the Royal Infirmary of Edinburgh. The wards of the Old Infirmary were in no way exempt from the terrible scourge of septicæmia, and, while his fame as a surgeon and scientific worker grew, he became more and more occupied with the problem of the cause of suppuration in wounds. "He was staggered," as Sir Rickman Godlee, his biographer, says, "at the universal ignorance about the first and most fundamental subject he would have to teach, namely, inflammation." His experiments and observations on inflammation were continued over the next five years. His paper on the "Early Stages of Inflammation" was read before the Royal Society on the 18th of June 1857, and published in the *Philosophical Transactions* for 1858, as was also a remarkable series of observations he made on the "Cutaneous Pigmentary System of the Frog," and his observations on the coagulation of the blood were read before the Medico-Chirurgical Society of Edinburgh in 1859, and finally formed the subject of his Croonian Lecture, delivered in June 1863, before the Royal Society. Lister was confident that decomposition and suppuration were brought about by the air in some unknown way; but he was equally sure that the gases of the

air, which were generally suspected of being the cause of putrefaction in wounds, were not the causative agents.

In 1860, when the Regius Professorship of Surgery in the University of Glasgow became vacant, the Crown appointed Lister to fill the Chair. And here again, in spite of the fact that the wards occupied by the new professor in Glasgow Royal Infirmary were in new buildings, which it had been hoped would be free of all infection, the prevalence of septicæmia was just as great, if not greater, than in Edinburgh. So bad were the conditions, that Lister was obliged to admit that he considered it "a questionable privilege to be connected with the Institution." Public opinion had been attracted to the subject, and so great was the alarm that the question of pulling down the existing hospitals and substituting temporary huts had even been considered. But Lister fought on in pursuit of the enemy, never allowing himself to be disheartened nor losing sight of the goal. He noticed that septicæmia only followed in wounds where the skin was broken: it was unknown in wounds where the skin remained intact. He concluded, therefore, that the cause must be sought not in the blood, nor in the body, but in some outside agency. "Gentlemen," he said to his students in the Glasgow Royal Infirmary, "it is a common observation that when severe injuries are received without the skin being broken, the patients usually recover, and do so without any severe illness. On the other hand, trouble—often of the gravest kind—is always apt to follow, even in the trivial injuries, where a wound of the skin is present. How is this? I cannot help thinking that the man who

is able to explain this problem will be the one who will gain for himself undying fame."

At last the day dawned when Louis Pasteur, the chemist, announced the results of his experiments in fermentation to the French *Académie des Sciences*, and the bubble of Spontaneous Generation, a theory which had been long and hotly debated in scientific circles, was burst. Pasteur showed that fermentation was not the result of chemical action as had been suspected, but of contact with tiny living germs, or micro-organisms, which fill the air around us. Kill these germs in any substance by heating it up to a point at which they cannot live, and it will remain pure and fresh for any length of time, provided the dust in the air is excluded from it. Admit the air again with its living microbes and your material begins to teem with life.

When Joseph Lister heard this news, he saw at once its meaning for surgery. He saw that the germs of the air were the cause of putrefaction in wounds; an outside cause, as he had suspected. It was, however, one thing to recognise the cause of suppuration and quite another to apply the knowledge to a living subject with success. The first experiment he made in March 1865 was unsuccessful. His next case in August of the same year did well, and he went on working to improve his technique. His first care was to disinfect the wound and the skin, for which purpose he used carbolic acid lotion, and then to apply his dressing of carbolised lint. These primitive dressings have long since been superseded, and were much criticised at the time on account of the destructive action on the tissues of the carbolic lotion; but with the knowledge then available, it is difficult to see how

a better method could have been invented, and Lister continued to improve his technique as he gained more experience, and to a large extent did away with many of the objections to the first form of dressing. By 1867 he was able to publish in the *Lancet* an account of eleven compound fractures treated successfully by his antiseptic surgery, and between the years 1867 and 1870 he published seven papers describing the improvements in his methods of treatment. In his wards in Glasgow Infirmary a revolution was in progress: pyæmia, hospital gangrene and erysipelas following operation were vanishing before the onslaught of his antiseptic system. But every man who sets himself to introduce new methods, contrary to accepted opinion, must lay his account with scorn and derision. In spite of the fact that an unceasing warfare had been waged in vain against the spectres of blood-poisoning which for years had haunted surgery; in spite of the failure of the demolition of old buildings and the erection of new ones to reduce the mortality, Lister's successes were greeted with hostile criticism. The theory of spontaneous generation died hard, and the germ theory to most surgeons of Lister's day was almost unbelievable. Few of his colleagues came to his wards to see for themselves the results of his work, and for a long time, incredible though it now seems, the old methods of treatment were carried on in wards alongside his own, and all the old diseases flourished.

In 1869 Syme resigned the Chair of Clinical Surgery in Edinburgh, and Lister was appointed in his place. He was warmly welcomed by enthusiastic students who filled his lecture rooms, but here, as in Glasgow, he encountered much opposition both from those who could not, and from those who would not

believe his new doctrine. But he worked steadily on, improving his technique as more and more complicated operations, such as the surgeons of that day would never have contemplated attempting, were undertaken, and instructing the young men who would eventually carry his system to the ends of the earth. All those who came in contact with him fell under the spell of his rich personality, becoming devoted and enthusiastic disciples. The Sunday afternoon visits to his wards at the Royal Infirmary were one of the most looked-forward-to events of the week. When the time approached, his assembled staff would wait eagerly for the advent of "the Chief." A man of powerful build and very handsome, Lister's charm of manner, his courtesy, his singleness of aim, his humility, and, above all, his benevolent smile made a strong appeal to all, but to his students and to his patients he was little less than a god, the well-beloved master in whose service their greatest joy was found. The enthusiasm he inspired in those who had the privilege of working with him is well described by one of them: "It was made clear to us," he said, "that the whole atmosphere of class-room and of wards was imbued with the spirit of the great cause, to be carried through with enthusiasm." Thus they would follow him round the wards on those Sunday afternoons, when he would visit every patient, dressing with his own hands the severe cases, explaining with infinite patience every difficulty, showing them how what was "æsthetically impure" could be made by antiseptics "surgically pure," until a full four hours would have passed as if by magic.

His occupancy of the Chair of Clinical Surgery in Edinburgh was perhaps the most brilliant period of

Lister's career. In the face of the revolution he accomplished in the surgical wards of the Royal Infirmary, the opposition to his methods could not long be maintained, and his fame spread till it was well established throughout Scotland and abroad. When the British Medical Association met in Edinburgh in 1875, four or five hundred members of the medical profession, physicians and surgeons, filled the large theatre in the old Royal Infirmary to hear and to see Lister's demonstrations of antiseptic surgery. Having addressed his audience, his first patient was brought in, and he performed the operation before the eyes of the believers and the incredulous alike. That audience left the theatre having seen such things as they had never before witnessed. Lister's Address to the British Medical Association on this occasion was published in the *Edinburgh Medical Journal*, vol. xxi., 1875-76.

In 1877 Lister was invited to fill the Chair of Clinical Surgery at King's College in London. This invitation he readily accepted, being anxious to introduce his antiseptic system to the metropolis, where as yet it had made no impression. He took with him his house-surgeon, Sir Watson Cheyne, and his assistant, John Stewart. On his arrival at King's College, his classes were sparsely attended and his wards were by no means full. The disappointment this entailed must have been bitter. His fame on the Continent, where his antiseptic system had been adopted, was by this time widespread. Foreign surgeons had come to Edinburgh to see his work and learn his technique. When he toured the European hospitals in 1875, the *Lancet* reported, that "The progress of Professor Lister has assumed

the character of a triumphal march." Again, at the International Medical Congress at Amsterdam in 1879, the *British Medical Journal* said: "He was received with an enthusiasm which knew no bounds." Yet London, his *alma mater*, remained sceptical. With all the courage which faith in his cause inspired, Lister addressed himself once more to the task of converting the unbelievers. His inaugural lecture at King's College, to an audience composed not only of students but of many distinguished doctors and scientists, was a war-like gesture, for he chose for his subject "something which should have interest and, if possible, even instruction, not only for the student but also for the eminent men whom he had the honour to see around him," the *Nature of Fermentation*. So he entered the lists immediately, and by degrees his great ability as a teacher made itself felt, his fame as an operator grew, and the success which followed the adoption of his antiseptic methods in hospital could no more be ignored in the metropolis than it could in Edinburgh. London, the last "stronghold of the opposition" had to fall into line, and accept nothing less than the revolution in surgery Lister's genius had made.

In 1880 honours began to come to him. He received the honorary degrees of Oxford and Cambridge and of many foreign universities. In 1883 a baronetcy was conferred upon him, and in 1892, after fifteen years at King's College, he resigned the Chair of Clinical Surgery owing to the age limit. He was appointed Foreign Secretary to the Royal Society, and held this post till 1895 when he was elected President, an office which he occupied till 1900. In 1897 he was raised to the peerage and took the

title of Baron Lister of Lyme Regis, and in 1902 he received the Order of Merit, being one of the first recipients of this new order.

In 1903, when he was seventy-six years of age, Lister had a serious illness when he was at Buxton, which left him an invalid for the remainder of his life. Up till then his health had been good for one of his years, allowing him to take an active part in all public affairs, though the death of Lady Lister in 1893 had been a severe blow to him. He now left London for Walmer, and lived in great retirement for his remaining years, and there he died on the 10th of February 1912, at the great age of eighty-four, crowned with every honour a grateful nation could bestow. A public funeral service was held in Westminster Abbey, where a medallion portrait of him was afterwards placed among a group of eminent scientists of his time. He was buried by his own wish in West Hampstead Cemetery beside his wife. He left no heirs, but bequeathed many gifts of surgical interest to Edinburgh University, with all his medals from learned societies, including the documents of the Freedom of the Cities of London and Edinburgh, in token of his regard for the Edinburgh School of Medicine, where his devoted service in the cause of humanity began.

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