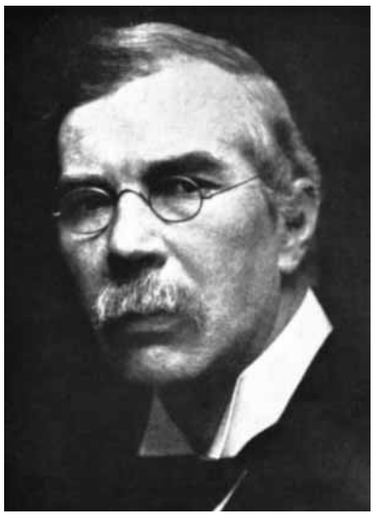
# Edward Almroth Wright

**NM Walker**

Department of Trauma and Orthopaedics, Queen Alexandra Hospital, Portsmouth PO6 3LY

## Abstract

**Sixty years ago saw the passing of Edward Almroth Wright, Professor of Pathology at the Army Medical College between 1892 and 1902. Wright secured his place in the medical pantheon, and significant fame, with the discovery of an effective vaccine for typhoid in 1897. This article examine show he earned his place in medical history**.



Edward Almroth Wright was born in Middleton Tyas, Yorkshire in 1861, the son of an Irish evangelical protestant preacher, and the maternal grandson of Nils Almroth, Professor of Chemistry at the Karolinska Medico-Surgical Institute in Stockholm. Following schooling in Yorkshire, Wright followed his father to Trinity College, Dublin in 1878. Fluent in French, German and Spanish, he enrolled on a degree course in modern languages but, such was his intellectual ability, he was able to combine his arts studies with a concurrent course in medicine. At the end of four years he finished his language course with a first class honours degree and the gold medal. A year later he graduated in medicine and, making use of a travelling scholarship, moved to Leipzig to continue his medical education. This money eventually ran out and, as he could obtain no other medical fellowships or grants, he returned to England in 1884 to embark on a paid law studentship, using his spare time to study for the Civil Service entry exams. A year later he started work as an Admiralty clerk where, once again, he was afforded much spare time, this time utilised for research at the Brown Animal Sanctuary Institution in London.

Two years later, he moved to Cambridge University, where he worked initially as a demonstrator in the pathology department, but subsequently transferred to physiology. Obtaining another scholarship, he returned to Europe, to work in the Universities of Marburg and Strasbourg, before continuing his travels in Australia, demonstrating in physiology at the University of Sydney Medical School.

In 1889, he returned to London to work for the conjoint research Laboratories of the Royal Colleges of Physicians and Surgeons. The superintendent under whom he worked, Dr German Sims Woodhead, was also the advisor on pathology to the British Army. It was he who recommended Wright for the vacant Chair of Pathology at the Army Medical College, then based at the Royal Victoria Hospital at Netley on Southampton Water. Wright was appointed to the Army in 1892, although as a civil servant, never taking on an army rank.

Having a civilian appointed to the Chair of Pathology in the Army was never likely to go down well in Forces circles, but Wright's appointment was especially contentious, as there was already a well-qualified contender in the Army. David Bruce was well regarded for describing the causative organism of Malta fever, initially named as Micrococcus melitensis, but renamed Brucella melitensis-with the human form of the disease named Brucellosis-in his honour twenty years previously. Bruce had an excellent reputation as a pathologist, was more experienced and had better scientific credentials than Wright, but was generally unpopular within the Corps. Bruce was appointed Wright's assistant professor; perhaps inevitably, they didn't get on.

Wright's interest was in immunity and, following some work on Brucella melitensis, during which he contracted Malta fever after injecting himself with what he believed to be *attenuated* Brucella bacteria, he turned his attention to typhoid. The symptoms differentiating typhoid from other enteric fevers had been described by Louis in 1829, with the water borne manner of contracting the disease demonstrated by Budd in 1873. The causative organism, Salmonella typhi, was first identified by Eberth in 1880, and isolated from the spleens of affected patients by Gaffky in 1884. Gruber, Pfeiffer, Kolle and Widal subsequently showed that in the serum of patients who had recovered from typhoid, there existed substances which caused the agglutination of typhoid bacilli *in vitro*. This test gave rise to the term 'agglutinins' and application of this result produced the classic serological test for typhoid and paratyphoid antigens.

In 1896, Wright and his co-worker Semple successfully produced immunity to typhoid by injecting denatured typhoid bacteria, firstly in guinea pigs, then in human volunteers. In a paper published in the British Medical Journal in 1897, Wright was able to show that active immunity to typhoid could be induced in humans using dead Salmonella typhi. The first experiments were conducted on Wright and Semple themselves, then on volunteers from the Indian Medical Corps, although initially with unpleasant side effects.

As is frequently the case, many groups were working concurrently, though separately, on a vaccine for typhoid. Richard Pfeiffer, a former student of Robert Koch, tried to claim the credit for the vaccine with a paper published in

Correspondence to: Maj NM Walker
SHO in Trauma and Orthopaedics, Queen Alexandra Hospital, Portsmouth PO6 3LY

November 1896. Despite Pfeiffer's paper coming several months before Wright's, Wright always maintained his primacy as he had already described the use of inoculation with dead S. typhi in the Lancet in September 1896, although proof of human immunity had waited until the following year.

The vaccine was later tested on almost 3000 volunteer soldiers, with the results encouraging enough to persuade the British authorities to vaccinate troops for the Boer War in 1899. Although Wright advocated the treatment for all, the Government limited it to volunteers; only 14 000 of the 448,000 imperial and colonial troops sent to South Africa opted for vaccination. Of the 22 000 British soldiers who died during the war, 14 000 succumbed to illness-9000 of these the result of typhoid. Typhoid had once again claimed more lives than enemy action. Despite this, there was significant opposition to the programme, not least amongst the scientific community, with an entire cargo of the vaccine being thrown into Southampton Water. At the end of the war, a Medical Advisory Board was established by the British Government to investigate typhoid vaccination. The appointed sub-committee, which included David Bruce, found that it was ineffective, and the programme was suspended. Wright was incensed and resigned his post at Netley. Following an appeal by Wright to the Secretary of State for War, an inquiry, overseen by William Leishman, Wright's successor as Professor of Pathology for the Army was set up. British troops posted overseas were used as guinea pigs for the re-evaluation of the vaccine's efficacy. The tests were a resounding success, confirming that the vaccine gave a six-fold advantage in typhoid protection, and fully vindicating Wright's faith. Voluntary inoculation was re-started in 1910, and continues to this day.

Following his resignation form the Army, Wright applied for the posts of pathologist and bacteriologist at St. Mary's Hospital Medical School in London. The posts had been advertised separately, but Wright was successful in gaining appointment to both, perhaps as combining the posts would save the indebted college £100 per year. Wright remained at St Mary's for the rest of his life, and was later joined at the laboratories in Praed Street by a young researcher named Alexander Fleming. It was at these laboratories, subsequently named the Wright-Fleming Institute, that Fleming was to discover both lysozyme and penicillin, and to follow Wright as departmental director.

Nobel Prize-winning work by Metchnikoff had shown that cells in the blood, including leucocytes, engage in phagocytosis of invading microbes. Buchner later demonstrated that serum acquired new properties following bacterial infection, increasing future resistance. Experimental work by Wright and Dr. S R Douglas, a former Army captain, who had worked with Wright both at Netley and in India, was successful in showing that, following exposure to infection, *'the body fluids modify bacteria in a manner which renders them a ready prey to phagocytes*.' We know this process today as opsonisation, so named by Wright, after the Greek opsono meaning 'I prepare victuals for'.

At the outbreak of World War 1, Wright sought a meeting with Lord Kitchener to discuss the Army's typhoid vaccination policy. Despite resistance from some in the medical fraternity, including in the Royal Army Medical Corps, Kitchener ordered that all soldiers were to undergo vaccination for typhoid prior to deployment to the Front. Thanks to the ten million vaccine doses produced by the Inoculation Department at St. Mary's, Britain was the sole combatant with troops immunised against typhoid at the start of World War I. Evidence of the value of Kitchener's decision is apparent from the casualty figures. The French Army, with no vaccination policy, reported 69 000 cases of typhoid in 1915; the British Army reported only 1000 cases over the same time period. The French were later to introduce systematic immunisation during the Great War, the first war in which fewer British soldiers died of infection than from injury.

Despite his burgeoning reputation, Wright was frequently hindered by a lack of funding for his research. He suggested the creation of a national medical research facility, similar to ones established in France and Germany, and was supported in this by Lord Moulton, a former Liberal MP and an influence on Lloyd George. As a consequence, finance for medical research was explicitly provided for in Lloyd George's National Insurance Act of 1911. This led to the creation of the Medical Research Committee in 1913, which subsequently became the Medical Research Council in 1920.

Contemporary advice, during the Great War, for the management of infected wounds, was to treat wounds with stronger and stronger antiseptics, utilising the doctrine of Lister from the previous century. This approach was particularly, and vociferously, propounded by Sir William Watson Cheyne, incumbent president of the Royal College of Surgeons of England. It is worth noting that Watson Cheyne had worked as house surgeon under Lister in Edinburgh, and again at King's College Hospital in London. Wright and Fleming came out in opposition, and earned the censure of Watson Cheyne, by advocating primary debridement and thorough irrigation of wounds with saline. Although agreeing with the principle of antiseptic use in sterilising instruments, Wright believed that that the use of antiseptics killed more leucocytes than it did bacteria. By the end of the war, Wright's views had largely been accepted, although he himself received little credit. With the advent of aseptic practice, and the widespread use of antibiotics, they have largely remained in favour since.

An opinionated man, Wright sullied his reputation by being overly aggressive in propounding his views. One such issue was that of female suffrage, an idea Wright vehemently opposed. Not for the first time, he became embroiled in a bitter public debate, this time with his friend, and advocate of female rights, George Bernard Shaw. Bernard Shaw later immortalised Wright by basing the character of Sir Colenso Rigeon on him in his play The Doctor's Dilemma.

In addition to his work on typhoid, Wright also developed vaccines for pneumonia and tuberculosis. He was knighted in 1906, and elected Fellow of the Royal Society in recognition of his work. Almroth Wright remained active to the end, working almost to the day of his death from a heart attack, at the age of 85, in April 1947.

## Further Reading

**Michael Dunnill.** The Plato of Praed Street: the life and times of Almroth Wright. Royal Society of Medicine Press Ltd, 2000, ISBN 1-85315-477-6, pp269, £17.50

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