

Prologue

It is remarkable that Harry Marshall Ward reached the pinnacle of his profession, became a Fellow of the Royal Society of London, was Professor of Botany in the University of Cambridge, and guided a King. Although he was born in 1854 into a family which prized education, the arts and learning, his parents struggled financially. They belonged to the genteel, lower middle-classes. And class was important because, in mid-Victorian Britain, few succeeded in moving upwards, crossing boundaries marked by differences in wealth and education, in a society where reputation and personal contacts counted heavily. Harry had a fine intellect and, as his later life demonstrated, an exceptional capacity to work passionately and single-mindedly towards a goal. However, his prospects were limited because his father was a poorly paid music teacher who, when Harry was a teenager, contrived to lose what little capital the family possessed. Neither his family nor their friends were in a position to help the young man. Whatever he was to achieve in life he would have to achieve through his own efforts.

Luck was on young Harry's side, however, because by the time he had reached his teens the nation had recognised that, for its continued prosperity, it needed more schoolteachers and it needed more science to be taught. A scheme had recently been introduced which took the brightest students, irrespective of background, and trained them at South Kensington, in London, to become schoolteachers of science. He spotted his opportunity, studied in whatever time he had spare from working to supplement the family income, and won a coveted training place.

At first it was enough for him to think that one day he would be able to teach science, especially his first love, biology, but as he settled into his new life in London he realised that he wanted more. He wanted to take a degree and to become a researcher. And then good luck intervened for a second time, turning his dream into a reality. He had made friends with Louis Lucas, a young man of his own age who occasionally dropped into the classes at South Kensington. Lucas was interested in biology but, coming from an extremely rich family, he had no need of a teaching qualification. He did, however, recognise Harry's outstanding ability as a biologist and, believing that such a talent should not be wasted, he guaranteed to finance Harry's studies at university, if he could pass the entrance exams. Harry did, of course, pass the exam and went on to earn a first class degree from the University of Cambridge. It was the beginning of a brilliant career.

The structure of the universities – what was taught and by whom – mirrored, indeed it helped to underpin, the unchanging, rigid society of the mid-Victorian age. The way botany was taught was a paradigm for the sciences. Little new knowledge was generated and it was held that that which was discovered should be allowed to stand the test of time before being introduced to students. Whereas observations of the anatomy and familial relationships of plants were begun by the Ancient Greeks, and continued in the following centuries, *experiments* on plants were very rare. Textbooks went unchallenged and hypotheses went untested. In continental Europe the position was much the same but, by 1850, the first signs of change were detectable in French and, more particularly, German universities. In the ‘New Botany’ that developed, students were encouraged to challenge accepted wisdom: research was prized and students were taught to rely not on textbooks but upon their own observations and experiments. Harry and many of his generation of young botanists determined to visit Germany to study with the leading professors, Julius Sachs in Würzburg and Anton De Bary in Strassburg. Inspired by his experiences in Germany, Harry decided to devote his life to what he and his friends called ‘The Cause’, the establishment of a vigorous botanical school in Britain, independent of Germany.

Harry was The Cause’s most passionate disciple – his friends thought too passionate, for over-work may have contributed to his early death – but after much frustration and many setbacks he eventually achieved his goal. As professor of botany in the University of Cambridge, and through the new teaching and research that he fostered, he established there the new botany that was so dear to him. The intellectual energy that had fired the German universities was slowly extinguished by stifling political changes. Leadership of the new botany passed to Britain where Harry was tireless in his support of those young scientists and new disciplines that would carry it forward. For a generation after his early death, the Cambridge Botany School was at the forefront of the world of plant sciences.

At branching points in the history of a science we often find extraordinary men. In the history of plant pathology, Harry was among the first to study the physiology and biochemistry of the struggle between host and pathogen. He was a pioneer in emphasising the effect of the environment on the outcome of that struggle. By example, he helped to found a whole new sub-discipline, physiological plant pathology, which has sought to explain in physical and chemical terms the interactions between plants, their pathogens and the environment. In retrospect we can see that, in attempting to explain the mechanisms whereby infections can be prevented or halted, the subject has occupied the middle ground of plant pathology and has dominated the parent discipline.

Harry Marshall Ward’s reputation has until now rested on discoveries about the transmission of plant disease that he made while studying coffee leaf disease in Ceylon, during his first employment after graduation. Important as these were, both biologically and in establishing his reputation

as a researcher, historical perspective shows that they are much less significant than his role in establishing the pre-eminence of British botany in the early years of the 20th century and his part in the origins of physiological plant pathology. Neither of these has been properly recognised before and they will form the core of this biography.

The book traces Harry's development both as a scientist and, in order that the scale of his achievements can be appreciated, as a man of his times. It begins with his time in Ceylon, for this was a period when, living far away from everything that was familiar, he was forced to come to terms with his own ambitions and abilities. This process, sometimes painful, is revealed in a series of letters he wrote to his family at home. What emerged from these formative years in Ceylon was a man able to build a career of the highest distinction, a scientist whose rich legacies are our inheritance.