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Bill Hayes came to Edinburgh in 1968 when he moved his MRC Microbial Genetics from Hammersmith Hospital to the newly formed Department of Molecular Biology which he and Martin Pollock had established together. He was delightful to know, a charming and always courteous colleague, an outstanding scholar and teacher, and his discovery of the sex factor in the bacterium *Escherichia coli* had established him as one of the great pioneers of modern molecular genetics.

Professor William Hayes was born on 18 January 1913 at Rathfarnham, Co Dublin, the only son of William Hayes, a very successful Dublin Pharmacist, and his second wife, Miriam, née Harris. The young William was still a child when his father died and he lived with his mother and grandmother and was educated at home by a governess, before going to a preparatory school in Dalkey and then to St Columba's College at Rathfarnham, where his early interest in science began to develop through an experimental hobby in electronics, rather than in the classroom.

A vignette of those early years is provided by Coakley (*Irish Masters of Medicine*, D Coakely 1992, Town House, Dublin, pp 345-357) recalling the impact of a school education in literature and the classics, rather than science, the dividends of which were lifelong. An essay on The Irish Free State in his penultimate year at school resulted in a visit to the USA to represent his country in an oratorical contest in which he addressed a much larger audience than any he would encounter later as a University teacher and one that included President Hoover and the ambassadors of the countries involved in the contest. Apparently resisting the temptations of Hollywood, he opted to read medicine at Trinity College and subsequently became interested in biochemistry and bacteriology, the field in which he was later to make such far-reaching contributions. After graduating with a first class honours BA in Natural Science in 1936, he qualified in medicine the following year (MB, BCh, University of Dublin) and completed internships at the Victoria Hospital, Blackpool and Sir Patrick Dunn's Hospital, Dublin, before becoming an Assistant to his mentor, Professor J W Bigger, in the Department of Bacteriology at Trinity College. Here his work included routine diagnostic bacteriology and serology and in the latter the arrival of Hans Sachs, a refugee from Germany, brought invaluable expertise which was soon to find application in studies of phase variation in *Salmonella*.

1941 was a particularly important year for Hayes. He married Honora (Nora) Lee, and joined the Royal Army Medical Corps in which he became a Major and served with the Indian Army Medical Corps. Here he began work on penicillin, wrote a book on penicillin therapy and published some of his work on *Salmonella* infection in the Army in India, which was the beginning of his active interest in bacterial genetics.

In 1947, Hayes returned to a Lectureship at Trinity College, Dublin where he continued his studies with Salmonella, developing his enthusiasm for bacterial genetics, and being awarded the ScD degree.

Hayes moved to a senior Lectureship in bacteriology at the University of London Postgraduate Medical School at Hammersmith in 1950 and began the work on bacterial mating which was to have such a dramatic and far-reaching influence on the development of bacterial genetics. Participation in a summer school on bacterial chemistry at Cambridge led to a fruitful meeting with Cavalli-Sforza, a colleague of the Lederbergs who had recently described conjugation in *Escherichia coli,* which catalysed his interest in genetic recombination in bacteria. While the mechanism of bacterial mating was not understood, it had been assumed that both bacterial parents contributed equally to the genetic complement of their progeny. Hayes, however, found that only one of the parental strains needed to remain viable and hence developed the concept of a donor–recipient partnership with uni-directional transfer of genetic material (*Nature* **169**, 118, 1952). The importance of this discovery was quickly emphasised and widely recognised when he found that only a part of the genetic material was transferred from the donor strain (male) to the recipient.

The announcement of these spectacular results at a meeting at Pallanza in 1952 firmly established Hayes internationally as a leader in one of the most exciting and fast-moving areas of biological research at that time. At the Italian meeting he had first met Jim Watson who was immensely excited by the implications of the bacterial work, and the following year he was invited to the celebrated Symposium at Cold Spring Harbor where he met Max Delbruck. This led to a very profitable sabbatical year at California Institute of Technology and a life-long friendship.

At Cal Tech, Hayes was responsible for another very significant innovation in his experiments on interrupted mating. This work continued with Elie Wollman and François Jacob, and provided the basis for the genetic map of *E. coli* (Cold Spring Harbor Symp. *Quant. Biol*. **21**:141, 1956). Central to all of this work had been Hayes' isolation, a year or two earlier, of a new variant of *E. coli* K12 producing a very High Frequency of Recombinants and this strain was very appropriately named HfrH (for Hayes) and quickly became the workhorse of bacterial genetics.

In 1957 Hayes became the Director of a new MRC Microbial Genetics Unit and rapidly built up an outstanding group at the Hammersmith, which was immediately recognised as a major influence on the subject's development, and was to productively infect a number of Britain's academic centres. An arguably greater influence on the development of the subject was Hayes' classic text book *The Genetics of Bacteria and their Viruses* published by Blackwells in 1964. This outstandingly successful text, a truly scholarly work, elegantly written with a lucidity that is its author's hallmark, has received wide acclaim and many of the following generation of microbial geneticists have attributed their conversion to the subject to this book, or its second edition published in 1968.

Perhaps the completion of the book in 1963 and his outstanding ability as a communicator influenced Hayes' decision to join forces with Martin Pollock in setting up a University Department of Molecular Biology. Their original plan for a postgraduate department did not readily materialise, but discussions with Michael Swann led to the formation of the Department of Molecular Biology at Edinburgh. Pollock and his MRC group moved from Mill Hill to Edinburgh in 1965 and on completion of a new building, (the Darwin Building) in 1968, Hayes with his MRC Unit, now renamed the Molecular Genetics Unit, joined them to begin a very fruitful partnership. Hayes and Pollock, as joint heads of the new department, led the planning of the new undergraduate courses that formed the basis of the UK's first honours degree in molecular biology. More importantly, their leadership moulded the three groups (their own MRC-supported groups and a smaller group of newly appointed University staff members) into a unified University department, in which all participated and Hayes' Unit played a key role in organising a third year course in molecular genetics and the corresponding part of the honours course. It was an exciting time for all involved and its influence and legacy continue to be felt in Edinburgh and beyond to this day.

With the new Department at Edinburgh firmly established, Hayes, possibly in a restless phase, accepted an invitation to the Chair of Genetics at the Australian National University (ANU), Canberra, at the end of 1973 and moved to a lighter administrative task and a return to experimental work - still in bacterial genetics, of course, and his last research papers described the phenotypic instability of a mutant in *E. coli* which impaired ribosome function.

On his retirement from the chair in 1978, Hayes spent a year with his friend and colleague Delbruck at Cal Tech as the Sherman Fairchild distinguished scholar before returning to Canberra in 1980 as Visiting Fellow in the Department of Botany at ANU, where he remained until 1986. In declining health, he moved to Sydney, where his son Michael held a medical appointment, and was nursed by Nora whose love had supported him for over 50 years until his death on 7 January, 1994.

Bill Hayes spent only five years in Edinburgh, but his influence was profound and long-lasting. Those who knew him here and were fortunate enough to work with him will always recall these years with pleasure, affection and gratitude. They will have fond memories too of Nora's constant support, and the warmth and generous hospitality of the Hayes to their colleagues and the many visitors to the Department and their home.

KENNETH & NOREEN E MURRAY