
Ralph Alexander Raphael*

by Dudley H. Williams

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A number of years ago, Ralph Raphael attended a university committee meeting during which he proposed a strategy which he believed would have a favourable outcome for certain science departments. The plan was opposed by someone who regarded the proposal as less than 100% altruistic. Ralph paused briefly and then intoned, "Well, if you wish to pursue the politics of Byzantium in decline..." This statement encapsulates that mixture of pragmatic yet civilised behaviour which made him successful as the Head of various chemistry departments during his academic career.

Ralph was born on New Year's Day in 1921, and attended school at Wesley College, Dublin and Tottenham, London. By 1941, he had graduated in Chemistry from Imperial College with First Class Honours, and also had received the Hofmann Prize. But the bland facts do not convey the realities of the time. The winter of 1940–1941 was a tough time to be living in London—air raids were almost continuous from September 1940 until May 1941, and thousands were killed. In the midst of the carnage, life went on, and Ralph took half of

* Much of this article is based upon details of RAR's career which were collected at the time of his 65th birthday. The author wishes to thank George Buchanan, Joe Connolly, Jim Roberts, Tim Jones, Andy Holmes, Basil Weedon and Karl Overton for providing reminiscences.



Ralph A. Raphael (1921–1998)

the final papers in February 1941 and the other half in June. He was one of five who obtained a First Class degree and, by courtesy of his then (and later) mentor, Sir Ewart Jones, his marks (%) were disclosed on the occasion of his 65th birthday: Inorganic, 78; General and Physical, 62; Physical, 68; Course Work, 82; Organic, 78; Practical Organic, 83 and Analytical, 85. Ralph was narrowly beaten in the competition for top position by Geoffrey Wilkinson (who was later to receive the Nobel Prize for Chemistry). There then followed postgraduate research, also at Imperial, and he was awarded his PhD in 1943.

Ralph's first paper, co-authored with Sir Ian Heilbron and (now) Sir Ewart Jones, stems from this period, and appeared in the *Journal of the Chemical Society* in 1943. The work, the long-term goal of which was the synthesis of polyene alcohols related to vitamin A, makes interesting reading today. Imperial College was justly proud of its UV spectrometer, and large pictures of the spectra grace the pages. The young Raphael not only meticulously prepared crystalline 3,5-dinitrobenzoates and α -naphthylurethanes of his alcohols, and semicarbazones of his carbonyl compounds, but also showed that his alcohols really had one OH per molecule by measuring the volume of methane evolved in the Zerewitinoff determination. The seeds of a life-long interest in acetylene chemistry had already been sown.

At the ripe age of 22, Ralph moved to May and Baker to head the chemotherapeutic research unit, working on the chemistry and synthesis of penicillin. Despite the rather grandiose title, there was still some time to work at the bench and, on at least one occasion, with well documented catastrophic results. Ralph was in the process of isolating a carboxylic acid by the time-honoured procedure of acidifying an aqueous solution of the sodium salt in dilute sodium carbonate, and then extracting the liberated acid into ether. He gave the separatory funnel a couple of good shakes and was left holding the stopper whilst the funnel shot upwards and burst against the wall of the laboratory, precisely above the swing door through which the Assistant Director was entering. The poor man was drenched with its contents and, relatedly or not, Ralph left May and Baker in 1946.

The enticement which took him from May and Baker was an ICI Fellowship which took him back to Imperial College. Do not conclude that the young Raphael was narrow, but rather that Imperial was an obvious centre of excellence in his chosen field at that time. Ralph's days (1946–1949) as an ICI Research Fellow were happy days of great chemical activity, recognised in his receipt of the Meldola Medal of the Royal Institute of Chemistry in 1948. Basil Weedon (later Professor of Organic Chemistry at Queen Mary College, and subsequently Vice Chancellor at the University of Nottingham) recalled of the Imperial College days that Ralph did some of the preliminary work which he later took over—this was the development of the reaction which is now generally known as the "Jones oxidation". He also recounted that following Ralph's marriage to Prudence, it was not uncommon to enter the departmental library and find Ralph surrounded by journals, but at the same time minding their baby in a pram. He added that "this does

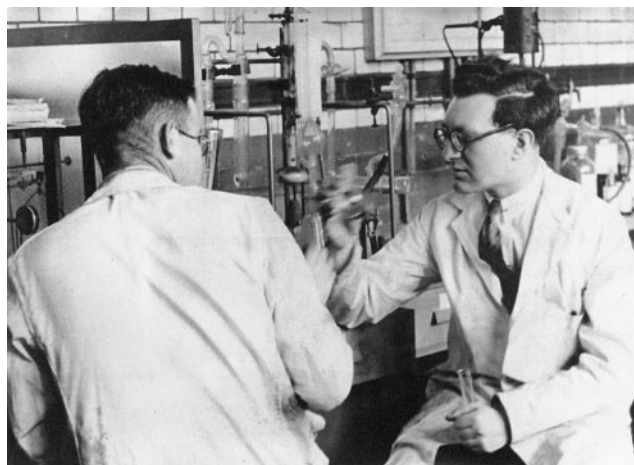


Fig. 1 Ralph (right) and Franz Sondheimer at Imperial College.

not sound very significant these days, but I can assure you it made quite an impact on that male-dominated community of that time." In this period, Ralph also formed a close friendship with Franz Sondheimer (Fig. 1). Their first joint paper appeared in *Nature* in 1949, and was followed by no less than four others in the next year. By a curious quirk of fate, I was also to form a close friendship with Franz when we arrived in Cambridge simultaneously in 1964. Having known this warm, gentle and sensitive man, himself a great acetylene chemist, it was easy to understand Ralph's great sense of loss upon Franz's untimely death.

In 1949, he became lecturer at Glasgow University. His colleagues recall his phenomenal powers of concentration; he would read demanding papers in a noisy room, totally unaware of those around him. Perhaps "concentration" explains the incident when, on a wet day, he was found walking along one of the department's long corridors still holding his umbrella over his head. His colleagues knew then he soon would be Professor Raphael. The tenure of his Glasgow lectureship (1949–1954) proved to be one of the most productive periods of his life, and included such notable achievements as the synthesis of tropolones, and the synthesis of carbohydrates and histamine from acetylenic precursors. Ian Scott, himself to become distinguished for his work on the biosynthesis of alkaloids and of vitamin B12, was among his students at this time.

Ralph also had a great sense of fun, and occasionally delivered spoof lectures. One began with serious chemistry and gradually—almost imperceptibly—became less credible; it culminated in the description of molecules with their absorption spectra in the audible region. Yet his excellence triumphed over his lack of reverence, and he was elected as the first Professor of Organic Chemistry at Queen's University, Belfast in 1954. His stay in Belfast was to prove relatively short (1954–1957), and in 1957 he returned to Glasgow, this time as Regius Professor of Chemistry, and remained there for fifteen years. The story is told that his promotion had been so rapid that initially he was observed to knock at his new office door and wait for his predecessor to ask him in.

As always with Ralph, "non-chemical" memories abound along with the science. When he appeared on the bowling green during a departmental outing, he had to be warned for "body-line" bowling, and remains on the record books as the only person who ever managed to bounce a bowl right across the green, over the ditch, across the path, and into the neighbouring bowling green. The happy image of the department spread throughout the world, not least through the mouths of peripatetic Scots whom I had the good fortune to meet in various parts of the world. The stories that they would invent about their professors after imbibing a few glasses of malt whiskey are so scurrilous that I can only tell the mild ones and attribute them to Glasgow Professors X, Y and Z:

Long-standing Professor X: *That tie looks vaguely familiar.*
Student: *Yes, it's the tie of the Glasgow Chemical Society.*

Professor Y: *Have I met you before?*
Student: *No, I'm one of your final-year research students.*

Professor Z: *Was I going up or down these steps prior to our conversation?*

Student: *Up*

Professor Z: *Ah, in that case, I have had my lunch.*

However, Ralph fitted the image of dreamy professor only when it suited him. More commonly, he was master of the economical and appropriate phrase. In Glasgow, a manufacturer of expensive instruments had been leading the department a dance over a period of months in relation to the malfunction of a relatively new machine. Patience having passed breaking point, Ralph's letter to the managing director opened: "Like the Borgias, Nameless Ltd. have experienced everything and learnt nothing." Students were treated with the same open manner as the instrument manufacturer. When senior university officials visited the Chemistry Department, some students attempted to douse them. Ralph was not amused, and the students were duly carpeted. "Well," he enquired, "which of you missed the Vice-Chancellor?"

During this second period in Glasgow, the science blossomed as before. In 1959, he published with Parker and Wilkinson the structure and synthesis of bullatenone; in 1960, a stereospecific synthesis of D-(–)-shikimic acid (with McCrindle and Overton); and in 1961, a new synthesis (with Kennedy and McCorkingdale) of queen bee substance, a compound secreted by the queen honeybee to inhibit ovary development in the worker bees and further queen rearing within the colony. In recognition of this and much other outstanding synthetic work, he was the Tilden Lecturer of the Chemical Society in 1960, and was elected a Fellow of the Royal Society in 1962. His wider services to the chemical community in this period were also expressed through his membership of the Chemistry Committee of the Science Research Council, and in his role as Vice-President (1963–1966) and Council Member of the Chemical Society.

It was perhaps inevitable that his talents would lead other institutions to entice him to move on. In 1973, he moved to Cambridge as Professor of Organic Chemistry and Head of the Department of Organic and Inorganic Chemistry. In Cambridge, he carried out more elegant synthetic work. Strigol is the germination stimulant of witchweed, a troublesome semi-parasitic plant which damages corn, rice and sugar cane crops. The seeds of the witchweed can lie dormant in the soil for many years; their germination is triggered by contact with the stimulant strigol, exuded from the roots of the growing "victim" plant. Since, in principle, a synthetic substitute for natural strigol would render witchweed seed germination possible in the absence of standing crops, the synthesis of strigol was an important goal. The successful synthesis¹ epitomised Ralph's love of acetylene chemistry, and the vigour with which he was attacking synthesis in the early 70's. Further notable syntheses were those of steganacin (a compound of significant anti-leukaemic activity),² and of pseudomonic acid A.³ These syntheses carry the hallmarks of efficiency and elegance of strategy.

His lectures to Cambridge undergraduates were not only clear, but laced with humour and examples of the relevance of synthesis to society. Most undergraduates are aware of Murphy's Law, one statement of which is, "What can go wrong, will." But Ralph frequently made them sit up in puzzlement with O'Brien's Law (sometimes also known as O'Reilly's Corollary), concisely stated as "Murphy was an optimist." The humour which he demonstrated in the lecture theatre carried over into his daily life, and particularly to the dinner table—either when he was an after-dinner speaker, or at home

following Prudence's superb cuisine. He was an excellent raconteur, and used a measured delivery in his deeply resonant voice to good effect. In a busy life, bridge and appreciation of music were some of his pastimes. In music, as in many things, Prudence and Ralph formed the perfect complementary pair; Ralph made a study of materials which give violins an attractive resonance, and Prudence—a former professional musician—brought the point home by demonstration.

Doing research, lecturing, and maintaining a sense of humour, were but a small part of Ralph's Cambridge position. In view of the large size of the department, a considerable portion of his time was inevitably spent on administration. He had a very characteristic administrative style: early arrival in the department, responses to paperwork first drafted out in his attractive and flamboyant handwriting, an open-door policy to anybody who felt like a chat, and Raphaelesque phrases at organic staff meetings—"This lecture course should undergo a root and branch reappraisal", "the Old Schools† in their wisdom . . ." Not only did he cope with the administrative load almost single-handedly, but he also lent his broad shoulders to other institutions. He sat on sufficient professional appointment committees to become affectionately known as "the Godfather" in some institutions. Following his arrival in Cambridge, his talents were tapped as a Member of the Council of the Royal Society and President of the Organic Chemistry Division of the Royal Society of Chemistry. Additionally, he was a Pedler Lecturer of the Chemical Society in 1973, received their Ciba-Geigy Award for Synthetic Chemistry in 1975, and was Davy Medallist of the Royal Society in 1981. All his services to chemistry were recognised when he received a CBE in the Queen's Birthday Honours List in 1982 (Fig. 2).

A new experience when Ralph arrived in Cambridge was to be a Fellow of a Cambridge College. This experience can be educational, frustrating, and pleasurable; and gives exposure to the eccentricities that occasionally go with long-established tradition. Upon election to a Fellowship at Christ's College he found himself, although a senior member of the University, the most junior Fellow of the College. As such, he was "Mr. Nib", with the duty to pour after-dinner drinks for other Fellows of the College and their guests. This can be an exacting task; the great statistician R. A. Fisher, when at Caius College, would raise a quizzical eyebrow if his glass was not filled within a few

† Part of the central administration of the University of Cambridge.



Fig. 2 Ralph and Prudence at Buckingham Palace on the occasion of his receiving the CBE in 1982.

millimetres of the top; the signal meant "carry on pouring". I have a feeling that with Ralph, he might have soon needed a new suit, with a consequent consideration by Fisher of the probability of error as a function of the size of the error. In any event, he seems to have performed his duties with a suitably traditional style, for the entry in Christ's Wine-Book for 26 June, 1972, reads: "Professor Raphael presented a bottle of Sauternes to celebrate the first occasion he had occupied Mr. Nib's chair, and to express his appreciation of the friendly forbearance of the Room."

In the passing of Ralph, science lost a distinguished synthetic chemist, and a popular administrator: his warmth, humour, and humanity are sorely missed.

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