Harry Arthur Willis (1922-1990)

Harry Willis will long be remembered by the scientific community for his cheerful enthusiasm for his subject. This enthusiasm appeared, not just in laboratory work or discussion, but in dedication to ideals and causes. His 20 years as Chairman of the Infrared and Raman Discussion Group, his very active participation on numerous conference committees, and his heavy involvement in collaboration between academic and industrial concerns over several decades, all bear witness to this. He will be missed greatly.

A full appreciation of Harry requires knowledge of his early history. He was born on 27th May 1922 as the son of a Lowestoft bus driver. His father was the eldest of 12 children and finished any formal education at 10 years of age when he went to work, first on a nearby farm, then into 'service' with the households of English gentlemen. He later went to find his fortune in Canada, failed and returned to enrol at a motoring school where he studied engine mechanics and driving and then became a chauffeur. Harry's mother's life ran parallel - in service and 'below stairs'. The parents were married in 1911.

Harry was born to a mother whose love of books made her an avid reader, and to a father bursting with untrained educational abilities. The father was an amateur radio enthusiast from the cat's whisker' stage, an amateur photographer, and as soon as electricity cables were in the Street he wired his house. He was also a splendid allotment gardener; he built bicycles and three speed gear systems, and built and flew kites. He taught his children to be interested and skilled. Meanwhile he scoured the second hand bookshops for books of learning, and the children were brought up on Pear's Encyclopaedia, Whittaker's Almanac and every grain of learning he could find for them. Coupled with their mother's urge for them to read, it was never dull for them.

Harry passed a scholarship at 10 and graduated to the Lowestoft Secondary School. He learned quickly and was outstanding in English, mathematics and the sciences. With World War II he was evacuated to Worksop. In 1940 Harry was at an age to enter the war or university. For someone from such a humble background the latter was an improbable route at this stage with both financial and war pressures. However he won a County Major Scholarship, and it reflects well on the dedication of his parents that a loan was raised with the assistance of the local butcher. He entered Queen Mary College, London, entering the second year of the course by merit of his pre-university examination results. Instead of being in London during the blitz however he went to Cambridge where QMC had been evacuated into King's College (Cambridge).

His studies proceeded well and on graduation in 1942 he continued in Cambridge , enrolled in the task of deducing the source and nature of the Luftwaffe's aviation fuel by the, as yet, primitive technique of infrared spectroscopy. 223 tri-methyl pentane was a key compound, giving information about whether the fuels were synthetic or natural in origin. The group was led by Gordon Sutherland (later Sir Gordon, and Master of Emanuel College), and consisted of Harry together with Frank Daly, Peter Felgett, Tony Philpotts, Bill Price, Norman Sheppard and Delia Simpson. Harry's practical upbringing served him well during this - and subsequent periods. As remarked already the equipment was very primitive. Readings were initially made point by point using a galvanometer to measure the i.r. signal with a 'cell in, cell out' technique. Often the measurements were made out in the country where neither the rumble of the traffic nor the switching of the Cavendish's cyclotron disturbed the readings on the meter. This equipment was superceded in 1944 with a continuous

scanning single-beam instrument with photographic paper recording the galvanometer deflection. From more than one source I've heard of the rolls of photographic paper drying side by side with 'underwear and socks' . Three publications appeared in 1945 in the Discussions of the Faraday Society (see publication list,(1) to (3)) showing the practical interests of Harry.

It wasn't all scientific work during the Cambridge days. In contrast to the majority of his contemporaries Harry was an avid enthusiast of classical music and enjoyed the opportunities to listen to live concerts as they presented themselves. Jennifer (student of the London School of Economics) appeared on the scene, and together they toured on cycles staying at Youth Hostels - something they continued doing through much of their married life. They were married after the war. Home Guard duty seemed to many (e.g. Peter) as presented in the T.V. series 'Dad's Army' - Not so to Harry who took it very seriously. His practicality extended to giving reassurance to some of the group who were fearful of an impending invasion.

An aspect of Harry which certainly surprised the author on researching his past was his musical participation of a non-classical variety. He used to sing in music hail style - initially as a young teenager at socials. In his Cambridge days he and Peter Felgett devised a spectroscopic version of Flanagan and Allen's 'A for 'orses, B for mutton, C for chips ... 'song.

With the ending of hostilities Felgett and Sheppard submitted their doctorates, but Harry and Tony left to take up industrial appointments. ICI Plastics, Welwyn Garden City acquired the man with whom it was to be inextricably linked for the following 30 years. Publications were not encouraged - to Harry's annoyance - and he took the view that the academic community failed to appreciate the quality of the fundamental work carried out in industry. Nevertheless a number of papers on aspects of spectra of polymers began to appear in the early 5Os, (ref. 4,7).

While the actual written publications were constrained he was able to take an active role in the newly formed Infrared and Raman Discussion Group. By the end of World War II infrared technology was advancing rapidly with the development of continuous scanning instruments with reasonably linearity of recorded signals with respect to input energy. It was recognised that i.r. was taking a major role in analytical chemistry. At an early stage the need was felt for a forum for the dissemination and discussion of this rapidly developing field. In 1950 the IRDG was founded under the chairmanship of Dr A E Martin. The only formal minutes of meetings ever made at the IRDG were of the first two meetings - and these make fascinating reading. It suffices to say at the moment that under the chairmanship of A E Martin and Harry Willis the spirit and objectives laid down in these minutes by K S Tetlow have been remarkably well upheld.

Scanning back through the meeting notices of the early years I was struck forcibly by the magnitude of the contribution by Harry. It wasn't the fact that he stood up and said something (those of us who attended will remember that place of honour went to 'Tommy') - but rather the range and quality of the contributions. Between 1952 and 1963 his contributions covered reflectance spectroscopy, near i.r., difference spectroscopy, characteristic group frequencies and i.r. polarisers.

Due to serious illness of his wife, Dr Martin stood down from his chairmanship in 1970 after 19 years at the helm. His place was taken by Harry, who held the position till his death 20 years on. The activities of the group developed steadily under his chairmanship; the number of meetings increasing from 3 per year to an average of about 6; and industrial sponsorship - especially of the

Christmas meeting, became established. The one failure has been in not achieving a strong Northern membership capable of maintaining its own meeting programmes.

A further highly successful innovation was the introduction of an annual industrially based meeting. This had a remarkably difficult birth, as industries appeared in the 60's and early 70's to have a phobia about permitting those from other firms- especially competitors to enter their sites- even in pure conference areas. After all, one never knew what scientists might say to one another! I believe the scientists themselves would unanimously claim that such discussions, held with a sense of corporate responsibility, were to everyone's advantage. Anyhow common sense finally prevailed- and with the help of Ian Degen, the first meetings were held at Kodak L Laboratories. Subsequent years saw meetings being held at BP (Sunbury), Castrol (Whitchurch), AEA (Harwell), Smith, Klyne and French (Welwyn Garden City), ICI Plastics (Welwyn), ICI (Runcorn), GEC (Wembley) and ICI (Harrogate). These popular meetings owe their existence to Harry. The introduction of industrial sponsorship of Christmas meetings arose from discussions with Mike Ford of Perkin Elmer. By serendipity the 25th year of PE (UK) and the 100th meeting of the IRDG coincided at Christmas 1983, and a further tradition was born. Excellent support for these meetings has been given by the instrument manufacturers, and they have always been held at King's, London, thanks to the support of Bill Price, George Wilkinson, and now Bill Sherman.

Jennifer and Harry married immediately after the War. They had six children, the second of whom died of pneumonia - and the fourth, Tony, was killed in a car crash. These were not the only tragedies to strike the family. Two of the others suffer from ailments which could have been disastrous, but which they have admirably fought to lead full and constructive lives. Michael suffers from petit mal and yet is a qualified catering manager and Nancy who suffers from muscular dystrophy - went to Roehampton to study art and is now living in East London and working in Hammersmith Hospital.

Harry's strength of character and intrinsic cheerfulness stood him and the family in good stead and of course his family supported Harry well in his career. Jennifer has frequently accompanied Harry especially in the latter years when he visited such as the USA, China and Mexico on visits to lecture.

To return to Harry the scientist, spectral interpretation is as much an art as a science, and it was natural that Harry should become heavily involved in passing on his expertise to the growing spectroscopic community. Courses were set up in the UK (Royal Institute of Chemistry) and in the USA (MIT), and Harry was involved in both from an early stage. The MIT summer school eventually moved to Bowdoin College, and the courses were exported to other parts of the world via the Bowdoin International Schools. On addition to the above, interpretational and spectroscopic technique courses were run at the Polytechnic of Wales (with Bill George), at Royal Holloway College, under the auspices of the IRDG (with the author , and at the University of East Anglia (with Norman Sheppard and colleagues). Following Harry's early retirement from ICI he became busier than ever, and was heavily involved in collaboration with many research centres, including the National Physical Laboratory, the University of East Anglia and the University of Southampton. In 1974 he had been awarded a D.Sc. by the University of London, and later as a result of his involvement in UEA and Southampton he was given the title of Visiting Professor.

Amongst the consulting work carried out, Harry acted as advisor to Heyden Publishing, who have had a long association with the spectroscopy world. He was one of the editorial team for the journal 'European Spectroscopy News (ESN). This incorporated the Association of British Spectroscopist's

News Letter. When the scientific publishing interests of Heyden's were sold to John Wiley and Sons, HAW went with ESN. In 1988 Wileys decided to terminate their interests in this publication, and December '89 saw the restart of this publication under new management, but familiar names, including H.A.Willis (editor), and a new name, 'Spectroscopy World'. The introduction of Spectroscopy International into the European field at this time might have led to a difficult situation. That it was received with remarkable equanimity was due in no small measure to the common sense of Harry as the ABS chairman. He saw the roles of the two journals as largely complementary and he helped to establish a sound working relationship of the ABS with both.

The ABS was another of Harry's adopted interests. This association, which consists of the chairmen and secretaries of all spectroscopic groups which wish to affiliate, seeks to coordinate activities and protect the interests of member groups. A number of members felt that the role of the group could be much strengthened if some funds existed which could be used to further the aims of the group. By successful conferences organised by member groups, a Charitable Trust was set up which is now able to assist graduate students with bursaries, prime the funds required to initiate conferences, fund the expenses of special speakers from abroad, etc. Naturally Harry has served the body in several capacities, including chairman, and played no small apart in helping the ABS to achieve its present status.

All the while, his publications continued at an accelerating pace. A search by the author produced 125 publications, including 3 books. Much of this work naturally focussed on aspects of polymers- but all were on very practical aspects of spectroscopy.

Despite encouragement to slow down towards a real retirement, Harry's enthusiasm appeared to result in ever expanding activities. His sudden unexpected death of a coronary thrombosis in December, 1990 left a grieving family and a spectroscopic fraternity who suddenly found the need to attempt to fill the many gaps left by Harry. They are gaps which, in many cases, will never be filled by anyone with the same sense of enthusiasm and dedication.

D Steele.