

*Paley Johnson celebrated his ninetieth birthday. Speech delivered on 15 July 2007*

## **PALEY JOHNSON**

Master, Fellows and Friends,

I should begin by apologising for the extended interval between my actual birthday and this evening. However, I think it is well known that around my actual birthday I was in no fit state to deliver a talk and my prospects were anything but rosy. However, medical science has come to my rescue and through the clearing of a carotid artery my medical specialist has recently informed me that he has given me an extra ten years which should mean that I will be able to receive a letter of congratulation from Her Majesty if she also manages the extra 10 years.

Just about 10 years ago, I spoke, around my 80th birthday, to an audience similar to this. Several of you here tonight were also present then so that some of what I say tonight you will already have heard. I beg your tolerance but hope you have forgotten.

I was born towards the end of the 1st World War in a small village, Middlestone Village, about 7 miles S.W. of Durham City – also 3-4 miles from Bishop Auckland, probably best-known for its park in which the Bishop of Durham has his palace. It was also famous for its amateur football team – in the days when amateur football existed. The eastern side of Durham county was littered with coal fields in my youth (extending even under the sea) but now these with their ugly pit-head gear have disappeared completely and the countryside is now much restored and quite pleasant. This applies also to the coastline which I understand has now been cleaned up well and is now very agreeable.

I went to the local village school and thankfully it did not then have piles of paper work or targets to meet. After the usual 11-plus (in 1928) I moved to the nearest Grammar School at Spennymoor – this name seems to amuse people – it means an ancient waste or common – which it really was until local iron ore was found and with its plentiful supply of local coal it became a prominent steel-making area in the mid 19th century and gave rise to massive slag heaps in the area. These still remained in my grammar school days (1928-35) but their ugliness was transformed when they were covered in snow – they then really looked like the Alps. A remnant of the steel making days is the many local pub and street names e.g. Puddlers Arms, Bessamer Street.

My grammar schools full name was the Alderman Wraith School – several schools in the area were named after local politicians. At the time (1928-35) there was much unemployment amongst the teaching profession and extremely well-qualified teachers were obliged to take up posts in dubious areas like the ‘backwoods’ of Durham. I profited much from this. I had a Cambridge Ph.D. for Chemistry, 1st class degree men for Physics and Maths and similarly qualified teachers in most subjects. The only lack was a complete absence of Biology but shortly after I left, this defect was remedied. However, there was no 3rd year Sixth Form at all so I did not have the opportunity of preparation for Cambridge Scholarship examinations which were normal for better

endowed schools. I took Higher School (A-levels) Certificate after 2 years in the 6th Form in 1935 and was awarded a State Scholarship. There were 300 of these scholarships each year throughout the country. They were worth (at the time) £80 plus fees: usually County Authorities would add a further £80. These scholarships no longer exist – maybe they should be introduced again rather than expect students to incur debts of £21,000 or thereabouts. Anyhow in my case then, in 1935, £160 + fees was sufficient to see me through my undergraduate career.

My chemistry master, an old Christ's man encouraged me to apply to Trinity – he himself wrote to Kitson Clark (then a tutor) with my record, Kitson took me immediately (Aug. 1935), even without interview for admission in Oct. 1935 – I owe Kitson much. This kind of entry would seem to be quite impossible now.

Thus I came up to Trinity in Oct. 1935 and even then found a very substantial fraction ( $\approx 45\%$ ) of former grammar school students, who were naturally drawn together. A group of 4 of us kept in touch as undergraduates and later in the outside world – even at the old boys gathering of 2000. However, at the annual gathering in July 2006 I was the sole remnant of the four and from a total intake of 220 or so in 1935, there were only 6 present.

J. J. Thomson was Master at the time (1935), though in his late 70's and somewhat absent-minded. We would often see him wandering through Great Court on a nice day and maybe even walking down Trinity Street. On one such occasion he saw a pair of trousers which he liked in one of the shop windows there and immediately went in, was measured and bought the trousers. He was so keen on them that he immediately returned to his bedroom in the lodge, changed into the new trousers and went out again, putting the old trousers over a chair. He then went out again and continued his walk. In the meantime Lady Thomson came into the bedroom, saw the trousers over a chair and feared the worst. In the Master's Lodge she enquired if the servants had seen the Master but no one had and in desperation she even went to the Porters Lodge and enquired there. 'Was he alright' she enquired.

I well remember him at a meeting of the undergraduate Natural Sciences Society at which Sir Arthur Eddington was speaking on recent advances in his subject. The uncertainty principle, relatively new in 1935, was much to the fore but it was very clear that J.J., the discoverer of the electron, would have none of this "new-fangled undeterminacy rubbish". Undergraduates were usually invited once to lunch in the Lodge and I remember J.J.'s funny story concerning the University boat crew. This was in the days when Jesus was a very strong rowing College. Apparently it was thought that the crew would improve in performance if they knew each other better. Accordingly it was decided to start play-reading sessions. The play was chosen and reading began. All went well until they came to a Jesus man and they found he couldn't read.

F. G. Mann, a distinguished organic chemist, was my director of studies and a very efficient teacher of the old subject he was. But I'd become more interested in physical side of the subject and I chose 'Reaction Kinetics' as my first subject of research with a Welshman, E. A. Moelwyn-Hughes, as my supervisor. However, this was in 1938 and I had spent barely a year on this topic before the 2nd World War began. Moelwyn-Hughes was called away to manage a war factory and I joined a

neighbouring laboratory, Colloid Science, where Eric K. Rideal was looking for people to work on a range of topics of use in the war effort. The chair of Colloid Science was founded specifically for Rideal about 1933 with the aim of bridging the Biological and Physical Sciences. In so many ways this is still a worthy object but the General Board, in its wisdom, suppressed the department around 1970.

For the younger people here, I should mention the official register of Technically-qualified people which was drawn up just before the war so that their employment could be most beneficial to the war effort. I remember being called up for interviews at the Admiralty when they were looking for personnel to carry out de-Gaussing of ships – to combat magnetic mines. But being more of a chemist than physicist, they recommended me to go back to Cambridge until a more chemical opening came up. Rideal had a range of problems on hand and I joined him. In the early days of the war, Rideal and his lab. sought out their own problems e.g. sticky bombs (that would stick on tanks), new incendiary mixtures, utilisation of novel foodstuffs (e.g. peanut residues for food or as a wool substitute). But soon the Ministry of Supply and Air Ministry came along with more urgent specific problems and the activities of the lab. were largely devoted to them. My particular problem concerned Rockets – particularly anti-aircraft. At the beginning of the war, little was known of such weapons. I remember, as Rideal put it, the Russians put a piece of cordite in a tin can, knocked a hole in the end of the can, lit the cordite – that was a rocket. When we did this rather more carefully, the rocket worked but with varying performance. Some of this variation might be due to the burning performance of the cordite. A major constituent of cordite is nitrocellulose – actually cellulose in the form of rolls of paper nitrated with a mixture of nitric and sulphuric acids. It was my job to investigate the nitrocellulose component and check on the variations to be expected from the manufacturing process. That kept me busy for almost two years – it was eventually decided that the nitrocellulose was not to blame. Most of you will know that towards the end of the war, rocket anti-aircraft batteries were used throughout the war zones, even by the Home Guard, and are now an accepted alternative to artillery. The nitrocellulose is a macromolecule – i.e. compound of large numbers of identical small units – and I was thus introduced to, for me, a new type of work which was to employ me for much of my later working life: - In my later work however, I mostly concentrated on macromolecules occurring in living systems, e.g. proteins, viruses, blood substances. In this work, I frequently collaborated with biologists and biochemists in and around Cambridge. At this time Rideal had built up a laboratory with extremely wide-ranging problems – from pure medicine right through chemistry and physics to engineering. And since the laboratory was set up to explore the area between the physical and biological, he was indeed fulfilling the stated aims of his department.

However, in 1947 he was invited to become director of the Royal Institution, in central London which had rather stagnated during the war years. This was a prestigious offer and he, surprisingly, succumbed to it. He invited me to go with him and continue my lines of work there but this proved to be a short interlude. He and his wife were expected to do so much entertaining of the numerous visitors to the Institution that after only 3 years he resigned. I believe there were political factors involved also and some of you will remember that the R.I. affairs were discussed in 'Picture Post' magazine. But eventually peace was restored when the younger Bragg, Lawrence, took over the reins. His father had been in the same post before the war

and had been highly respected.

I took the opportunity to return to Colloid Science where F.J.W. Roughton, a well-known Fellow of Trinity, had taken up the chair. He was really a physiologist, working particularly on the reactions of haemoglobin, mainly with gases. He and Hartridge had developed a new and powerful method of investigating rapid reactions in such systems, so that he fitted in well with the stated aims of the department. His work was well-known internationally, and because of the development of high altitude flying, his work became important in the USA air force. As head of department he was completely different from Rideal. Whilst the latter was interested in almost anything to which physical methods could be applied, Roughton concentrated on his haemoglobin problems and let everyone else continue in their own way. However, Roughton was not astute as a University politician and rashly suggested to the General Board that the future of the department should be considered. This was done by a committee of the General Board, who recommended that the department be 'suppressed'. That was the language used at the time and in spite of almost overwhelming opposition in a Senate House vote, the department did slowly disappear. However, the subject did not die.

Sir Sam Edwards, at the Cavendish Laboratory, was very interested in the field and on official retirement from my University post in 1984 he invited me to join him in his 'Colloid and Polymer Group'. I spent a fruitful 9 years there in which I carried on in the same general field as in my previous 40 years. I might have been there still – but my wife became very ill and needed me at home.

During my long years at Trinity I've got to know many remarkable Fellows of the College. Sir Geoffrey Taylor (G.I. as he was known) was one such who I often met walking from the New Museums site back to Trinity for lunch. He used me as his tame chemist as he himself was no chemist. He was doing experiments well into his 70's as well as interpreting them mathematically. He was concerned with liquid flow in pipes, usually water; and to make it easily visible he would add permanganate. To control viscosity he would add glycerol (glycerine). On one occasion he mixed water with permanganate and then glycerol in a large tube; to be used when needed. But after standing on the bench for a few minutes it exploded shattering the tube. He just did not understand. The mixture was almost a recipe for gunpowder – as every 1st year chemist would know.

I also got to know Nicholas, our centenarian one-time a Senior Bursar, quite well. He is now chiefly remembered for his acquisition of the Felixstowe Dock area for the College. He told a remarkable story relating to his fellowship admission dinner in about 1912. After the dinner he went out of the Hall on to the steps to get a breath of fresh air. He was joined by the Master at the time, Montagu Butler (Great Uncle of RAB), who said he had done the same thing when he was admitted 50 years before. He also said that he had been joined by Adam Sedgwick who said "I remember this night 50 years ago. The newsboys were shouting on the streets. Defeat of the Emperor Napoleon in Russia". Two long lifetimes take us well back into history.

Roughton has a similar story from his schooldays. His father had been a G.P. in the Kettering area and had gone around his practice in a pony and trap, sometimes taking the young Roughton with him. On one such occasion (about 1906) they visited an old

unmarried brother and sister. While Roughton senior was attending to the brother, the sister took young Roughton on one side and said she would tell him a story which he should try to remember. When she was young, she was taken to a dance and was asked to dance by an old man who told her that he used to be in the army and had served in France in his youth. Whilst in Paris he attended a grand ball at which he danced with Marie Antoinette. Roughton's visit must have been around 1906 and if the officer and the old lady had each reached 85 years of age, the dance could have taken place 130 years before i.e. around 1776. As with the Nicholas story, two long lives take us back many years.

Finally, as I promised 10 years ago, I want to go back a little in my own history. My ancestors on my mother's side were the Paleys who had migrated to the Durham area from West Burton (in Wensleydale) probably for employment in the coal and steel industrial areas in the mid 1800's. I never knew my grandfather, John Paley, for he died in 1916, a year before I was born, aged 66. So he was born about 1850. Other Paley members had preceded John to the Durham area. Now, in my youth I'd often been told of the well-known William Paley, the theologian and philosopher, and of a book (a copy of which I still have) of his published works. My copy has been handed down to me through various members of the clan. Some of you will recall that Paley's 'Evidences of Christianity' used to be part of the 'little-go' entrance examination. But this was a very small fraction of his published work. Another part, his 'Natural Theology', first published in 1802, is of particular interest. It is a detailed anatomical description with diagrams of many plants and animals – a sort of generalized Gray's 'Anatomy'. He used this in a major way in support of his views on the existence of a designer God and of Christianity. Recall the date of publication, 1802, was more than 50 years before Darwin dared to publish his 'On the Origin of Species'. Dawkins of Oxford, that well-known 'anti-religion' writer states that if he had lived in Paley's time, he would have drawn similar conclusions. Paley dates are 1743-1805 – so that most of his studies in the field were probably in the 1790's or earlier.

Paley was for many years a vicar in the Carlisle area, where his children were born (8 children – 4 of each) but his later works were from Bishop Wearmouth (now part of Sunderland). The second son Edmund, born around 1780 seemed to have his fathers ecclesiastical leanings and became vicar of Easingwold Parish church, some 30 miles from West Burton. Edmund Paley could well I thought be the grandfather of my grandfather but that was only a guess, which it now seems is incorrect.

With the help of my daughter, Helen, and the internet, we have been able to trace my ancestry back to 1561 to a Thomas Paley of Giggleswick (where William Paley's father was headmaster of the well-known school). William Paley does not occur in this chain of ancestry but the fact that my ancestors and William Paley lived in the same village, point to a common origin from an earlier date. Apparently the Paley clan originated in the Giggleswick area from an Adam de Palay (from France) as early as 1246. But there is now a gap and my earliest known ancestor is Thomas Paley whose dates are 1540 to 1592.

Maybe I will have more to tell you in the next lecture of this series.