

**Celebrating 80 years**  
Presidents and Honorary Fellows  
1991-2021:  
Their Stories and Recollections  
Compiled by Dr Margaret Ashwell OBE

# Celebrating 80 years

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# Preface

My inspiration for this volume came from spotting a book from 1991<sup>(1)</sup> on my bookshelves whilst lying on my Pilates mat on the floor of my office. This was at the start of the January 2021 lockdown for the COVID-19 pandemic. “An update would make a good project for The Nutrition Society’s 80th anniversary”, I thought. Mark Hollingsworth, Nutrition Society CEO and Professor Julie Lovegrove, President, agreed. I’m grateful to them, and also to Cassandra Ellis, Nutrition Society Science Director, who has helped me with this project.



June Schulkes, Executive Secretary  
Nutrition Society, 1967 -1994

I had played a very small role in the previous volume. In 1987, June Schulkes, who ran the Society almost single handedly from 1967 to 1994, alerted me to some cassette tape recordings made by the Society’s archivist, Dr AM (Molly) Copping. Reading the Preface of the previous volume, I have now realised that these early tapes were made at the request of Dr WJ Darby from Vanderbilt University in USA. I mentioned their existence to Elsie Widdowson, and she asked for further transcripts to complete her ‘little book’, as she called it. My part was to get the early tapes transcribed and the originals are now safely in the Society’s archives.



Dr AM (Molly) Copping

I was fascinated by all of these early tapes. One was the joint interview with Robert McCance and Elsie Widdowson made in 1970 by Molly Copping. That tape played a very important part in my life. It was one of the reasons that I decided to ask the famous pair if I could write a book about them<sup>(2)</sup> and I’ve never regretted that decision.

Now back to this volume. I contacted all the people who had been Society Presidents since 1991, together with all those who had been awarded Honorary Fellowships in that time. All 11 Presidents agreed to contribute and 10 of the Fellows too. I asked them to tell us about their careers in nutrition, with special reference to the role that the Society has played. My immense gratitude goes to all of them.

On reading and editing these contributions, I was staggered by all the amazing achievements they recount. Just one word of caution. Don’t read these and think they must have had a charmed existence. I bet every one of them could have also told you about things that went wrong for them. I certainly could have done. My favourite quotation is from the Lebanese writer, Kahlil Gibran: “Your pain is the breaking of the shell that encloses your understanding”. Everyone goes through experiences that are very painful at the time. But once you get over them, you realise just how much you have learned from them. About others. About yourself.

The other thing that has struck me on reading these recollections is the many mentions of the wonderful social events that have always accompanied the Society’s conferences. Why do I sound surprised? They have been amazing and I’m so lucky to have participated in many of them. We have had a strange couple of years since the emergence of the SARS-CoV-2 virus and all our conferences have had to be virtual. There are now plans for the Society to host hybrid events which will not only help to boost inclusivity for those not able to get to the venue, but will also bring back these social interactions for those who want or need them. If you have the opportunity to attend a Society conference in person, do so!



With Elsie Widdowson in 1993 on the occasion of her Companion of Honour award



Elsie ended her preface by hoping that these stories and recollections would inspire present members and others who had been concerned with the history of nutrition over the past 50 years. We now have a Society celebrating its 80th Anniversary. Let's hope that these stories can inspire even more people and that the idea of recording the Presidents' stories continues when the Society is celebrating its 100th anniversary.

Dr Margaret Ashwell OBE



Margaret Ashwell (far right) with three Presidents of The Nutrition Society (L to R: Ann Prentice, Catherine Geissler, Julie Lovegrove) at the unveiling of the blue plaque to Elsie Widdowson in June 2021

## References

- <sup>1</sup> Widdowson E (1991) *The Nutrition Society 1941-1991 Presidents and Honorary Members: Their Stories and Recollections*: CAB International.
- <sup>2</sup> Ashwell MA (editor) (1993) *McCance and Widdowson – A Scientific Partnership of 60 Years*. London: British Nutrition Foundation.





# Nutrition Society Presidents

## Chairmen

**Lord Boyd Orr**  
1942 to 1945

**Sir Joseph Barcroft**  
1945 to 1947

## Presidents

**Sir John Hammond**  
1947 to 1950

**Professor John Conrad Waterlow**  
1983 to 1986

**Professor Robert Campbell Garry**  
1950 to 1953

**Professor David G. Armstrong**  
1986 to 1989

**Dr Leslie Julius Harris**  
1953 to 1956

**Professor Roger G. Whitehead**  
1989 to 1992

**Dame Harriette Chick**  
1956 to 1959

**Professor A. John F. Webster**  
1992 to 1995

**Dr Alfred L. Bacharach**  
1959 to 1962

**Professor Michael Gibney**  
1995 to 1998

**Sir David Cuthbertson**  
1962 to 1965

**Professor Christine M. Williams**  
1998 to 2001

**Professor Stanislas K. Kon**  
1965 to 1968

**Professor John Mathers**  
2001 to 2004

**Dr James Andrew Buchan Smith**  
1968 to 1971

**Professor Ann Prentice**  
2004 to 2007

**Professor Egon H. Kodicek**  
1971 to 1974

**Professor Ian A. Macdonald**  
2007 to 2010

**Sir Kenneth L. Blaxter**  
1974 to 1977

**Professor Sean Strain**  
2010 to 2013

**Dr Elsie M. Widdowson**  
1977 to 1980

**Professor Catherine Geissler**  
2013 to 2016

**Professor Ian Macdonald**  
1980 to 1983

**Professor Philip Calder**  
2016 to 2019

**Professor Julie Lovegrove**  
2019 to date



## Professor Roger G. Whitehead

CBE, PhD, FRSB, hon FRCP, hon FRCPCH, FAFN

### 1989-1992

Like many nutritional scientists of my generation, I have no formal qualifications in the subject. My first degree at the University of Leeds was in biochemistry; the syllabus for which in 1952 was quite different from what it is now! The course was dominated by classical chemistry and physiology plus more medically orientated topics such as microbiology and chemical pathology. In retrospect this was a not too inappropriate background for a future nutritionist considering the multi-disciplinary nature of our profession, but it did mean I ultimately had a lot more to learn 'on the job'.





Like many nutritional scientists of my generation, I have no formal qualifications in the subject. My first degree at the University of Leeds was in biochemistry; the syllabus for which in 1952 was quite different from what it is now! The course was dominated by classical chemistry and physiology plus more medically orientated topics such as microbiology and chemical pathology. In retrospect this was a not too inappropriate background for a future nutritionist considering the multi-disciplinary nature of our profession, but it did mean I ultimately had a lot more to learn 'on the job'. My PhD was funded by the Medical Research Council, located in the dental school and was on mechanisms of calcification. The MRC at that time apparently reasoned that dentistry needed to build up a stronger scientific base and I was to be part of this development. I sometimes feel guilty in not honouring this long-term obligation to dentistry and hard tissue metabolism but I have taken some comfort in the first-class research ultimately initiated at the Dunn by my close colleague Professor Ann Prentice on diet and bone health. In my retirement I was even asked by the British Dental Association to join one of their committees, but as a nutritionist! As my time as a post-graduate student drew to an end, I clearly needed to find a job, and by luck I discovered that a vacancy existed for a biochemist in the MRC Infantile Malnutrition Research Unit in Uganda. Despite having let them down over dental science the MRC still appointed me and thus began a steep learning curve into the multi-faceted complexities that characterise nutritional science. I have gone into this early background as it is the reason for my strong support for 'reorientation' masters' degree courses in nutrition. Although I believe a subject like biochemistry provides a sound academic training in the biological sciences, in no way does it give a person the mental flexibility a nutritionist also needs to have.

### The Uganda years

The MRC Unit at Makerere University in Kampala had been established to study the causes, prevention and treatment of Kwashiorkor and Marasmus. My role centred around identifying metabolic abnormalities that might influence the development of the different clinical features of these two forms of protein-energy malnutrition and, in turn, impede recovery during dietary therapy. Importantly this brought me into close contact with the Director, Professor Rex Dean, a medically qualified protégé of McCance and Widdowson (I came under their influence at an early stage). A series of young and talented registrar paediatricians were also prepared to share with me the complexities of the clinical and dietary therapy of babies and young infants who were close to death. Most important of all, I began to work with people who actually had a degree in nutrition, notably Ann Burgess and Ingrid Rutishauser. It was from them that I also started to learn about the sociological aspects of nutritional science; so critical for a more complete causal understanding and for successful community education programmes.

Because of the accepted close links between protein deficiency, reduced plasma

albumin concentrations and the development of oedema in kwashiorkor, my early biochemical studies understandably concentrated on various aspects of amino acid metabolism. In the severely malnourished children, abnormalities in the utilisation and catabolism of essential amino acids including histidine, lysine, phenylalanine and tyrosine were identified which were gradually rectified only when successful recovery had been achieved. With a relapse in recovery, the abnormalities returned leading to speculation that care might need to be exercised in the quantity of dietary protein being administered to severely malnourished children. Other amino acid studies, on sub-clinically malnourished children initially identified by early growth failure, as might be expected in view of the paucity of protein in their diet, exhibited a disproportionate reduction in the plasma concentrations of certain essential amino acids, notably valine, leucine and isoleucine. The supply of these was diet dependant, as opposed to that of non-essential amino acids such as glycine and alanine which the body could itself synthesise. I developed a simple paper chromatography technique to measure this imbalance, the amino acid ratio test, in the hope it might help in the early identification of children at risk of more serious malnutrition. Following a similar line of reasoning I found that more slowly growing under-nourished children tended to excrete in their urine markedly reduced amounts of collagen related hydroxyproline containing peptides and I proposed another diagnostic test, the hydroxyproline index.

It was during this time, in 1964, my boss Rex Dean died. After a couple of years appointed by the MRC as the Unit 'Officer-in-administrative-charge' it was decided I should return to the UK to work with Elsie Widdowson in Cambridge whilst Professor McCance, on retirement, took up the temporary directorship of the Kampala Unit. This two-year period was pivotal in my scientific development for a number of reasons. Scientifically it enabled me to investigate, under Elsie's guidance, many of the biochemical abnormalities I had observed in malnourished Ugandan children in carefully controlled dietary animal studies, mainly in young rats but also in the famous McCance/Widdowson pigs. These helped to establish they truly reflected primary protein malnutrition. Importantly, I was also able to attend regular meetings of The Nutrition Society. I became aware of how limited the depth of my nutritional knowledge really was. I remember being very impressed by the high scientific standard of many of the animal studies, especially the farm animal ones, and how we needed to improve the quality of our own human nutritional investigations.

My heart was still in Uganda, however, and towards the end of the two years, it was decided by the MRC I could return to Uganda; this time as Director. During my period with Elsie, I had been provided with a small team of supporting post-doc scientists including Bob Grimble and Dr Dorothy Coward. It was through Dot I was also able to recruit her new husband, Dr Andy Coward, a scientist who was to go on to great things with me later when once again, reluctantly, I was forced to return to Cambridge. All three plus my technical officer, Malcolm

Sawyer and my research student, Susanne Cookson, agreed to go to Uganda with me. I now had the beginnings of a powerful scientific team. The all-important paediatric expertise was made possible through my managing to persuade Paget Stanfield to join us. He had previously held a senior registrar position in the Department of Paediatrics at Makerere University in Uganda. He ultimately became their Professor of Paediatrics. The regular supply of younger doctors was achieved by an alliance I was able to establish with the Department of Child Health in the University of Newcastle, famous for its community paediatrics, the Professor of which was Donald Court. His daughter Anthea had worked for us in Uganda as a nurse. This arrangement involved the Newcastle department taking on an extra registrar and began a collaboration with Newcastle which was to be long-lasting, both in Uganda and later in The Gambia. The team was soon further strengthened by the fortunate visit to Uganda of a young paediatrician, Dr Elizabeth Poskitt whose father had just been appointed head of the college that was to become Kyambogo University. We too remained close colleagues for the rest of my career. Later still a young New Zealand surgeon, Roger Hay, whom I had first met in Sweden and wanted to become involved in nutrition, also joined us. I have gone into some detail about this multi-speciality team building as it was always my view that only in this way is it possible to carry out truly fundamental nutritional research into the complex relationships between diet and human health and well-being.

The nutritional research of the renamed MRC Child Nutrition Unit covered a range of practical and scientific topics. Our responsibility for the ward treatment of the most severe cases of malnutrition was always paramount and ways of optimising this through the development of improved dietary and other therapies continued. Ultimately, we established a small plant for the preparation and production of packs of therapeutic milk products for distribution to 'up-country' clinics. This was accompanied by a specially prepared booklet on their administration. Through the multi-disciplinary nature of the team, I became aware of how various infections were influencing the aetiology of the different forms of malnutrition in Uganda. This was also the era when doubt began to develop as to whether there really was a fundamental difference between kwashiorkor, defined as primary protein deficiency and marasmus, primary calorie deprivation and so the generic term protein-energy malnutrition evolved. It was to investigate this that we established a small field station in a more remote and much drier part of Uganda, Karamoja, where marasmus predominated in contrast to the kwashiorkor of the lake region. This field station was set up and the research initiated by one of the Newcastle senior paediatric registrars, Dr Mike Rowland and his wife Dr Suan Goh, also from Newcastle medical school, with both of whom I was to develop a lifelong collaborative relationship. The associated metabolic research programme still continued and, together with Dr Peter Lunn, a biochemical post-doc from my old University of Leeds, we were able to elucidate, through the rural outpatient clinics, how progressive changes in serum cortisol, insulin and growth hormone concentrations were related to the development of the distorted

pattern of serum amino acids observed in subclinical kwashiorkor but not in marasmus. To shed more fundamental information on this metabolic research into the aetiology and pathogenesis of kwashiorkor, Dorothy Coward established an animal research facility in which infant baboons were fed similar plantain based low protein, high energy diets traditionally given to very young children in the rural areas around Kampala. The animals ultimately also developed the oedema and other pathological features typical of the type of kwashiorkor we met in the clinics and in the ward. Although my biochemical training was still obvious, I realised that I was becoming just as interested and stimulated by the more socially based nutrition programmes operated by other colleagues in the Mulago university hospital department of paediatrics and its associated Mwanamugimu and Lutete programmes. I was becoming to become a more balanced nutritionist.

The scientific potential of all these developments was about to be brought to an end, however, with the military coupe d'état organised by Idi Amin. Gradually field work on which much of our work depended became too dangerous to operate. The MRC started to discuss potential closure of the Unit and suggested I ought to think about returning to Cambridge as the future directorship of the Dunn was about to be decided on the retirement of Dr Kodicek. I did not want this post and, three times when approached, said I should not be considered, the last time was over the telephone on the actual day of the directorship interviews! Things in Uganda got worse, however, and in the end the Foreign Office in London advised the MRC to act. I was ordered to repatriate all the wives and children home immediately and then, every two weeks, to return one additional staff member. This gradual procedure was an attempt to disguise from the military government what we were about. In the meantime, the person who had been appointed the Director of the MRC Dunn Nutrition Unit elect decided that he felt unable to take up the position. I was told very firmly it was Head Office opinion that I now had to fulfil this role.

Whilst all this had been going on, there were additional developments of great importance to British nutritional science in general and to the Dunn in particular. It is difficult now to appreciate in the early 1970s there was a significant body of medical science opinion that believed that, since all the essential vitamins and minerals had been identified and their mode of action more or less established, there was little need for specialized nutritional research establishments in the UK. Indeed, it was widely held by much of the medical establishment that medical students needed no specific training in nutrition. All they had to know could be covered in their early years by elementary biochemistry and physiology lectures. It was only in the developing world, they reasoned, were there real problems of primary malnutrition and thus public health and clinical problems to be solved. Fortunately, a research policy subcommittee under the chairmanship of Professor Neuberger, an enlightened biochemist, was able to dispel this concept. In a Report produced by his committee it was emphasised that in a society of rapidly changing national affluence there were likely new dietary related patho-

physiological consequences adversely affecting overall health and well-being. Nutritional research was needed to investigate this. Effectively, it was this Report that projected the Dunn into new and more broadly based fields of nutritional health research. Although still active in Uganda in the early 1970's when this policy review was set up I had been invited to be corresponding member and was asked to provide a position paper which, I was later told, had influenced the final conclusions.

## The Cambridge Years

The recognised need for change was inevitably challenging for a young person but it did raise a major problem. How was I going to be able to do this effectively and still enable my research into frank malnutrition also to go ahead. The answer was clearly to recruit established scientists, especially medically qualified ones, into the Dunn who were capable of initiating and pursuing high quality research with only minor academic input from me being necessary. This was effectively achieved first under the leadership guidance of Professor Philip James and then until my retirement in 1998 by Professor John Cummings.

Initially it was conceived that when things had settled down in Uganda, I might still be able to return regularly to initiate and direct new studies. It soon became obvious this was only a pipe dream and it was suggested I might consider setting up a new field research station in The Gambia where Sir Ian MacGregor directed a large MRC tropical medicine research establishment. I was offered the full-time use of an up-country research facility in the relatively isolated rural village of Keneba which had, until then, been used only periodically mainly for malarial research. The scientific rationale was that the predominant malnutrition that existed there was of the marasmic type in contrast to the kwashiorkor around Kampala in Uganda and thus Keneba might effectively replicate the scientific purpose of the field station Mike Rowland and I had only recently established in Karamoja. Together we visited The Gambia and, with Ian MacGregor's enthusiastic support, decided to go ahead.

The remote location of the clinic and laboratory in Keneba was to have a profound effect on the way our investigative approach evolved. In Kampala, Uganda, our ward, clinic and laboratory had been within a major university hospital campus. In rural Keneba my colleagues were to live and work in close association with the actual people they were studying. Inevitably this was to influence ideas about research priorities. Additionally, Mike Rowland and I would have to integrate the direction of the research via daily amateur radio schedules with only periodic visits from me, probably no more than twice a year. So different from the hands-on scientific life I had previously been used to. Nevertheless, the move to The Gambia did prove to produce valuable metabolic insights into the contrasting clinical features found between the kwashiorkor and marasmic forms of protein-energy malnutrition. Evidence was produced which

supported the view that hormonal balance, particularly cortisol and insulin status can have a profound influence on which organs of the body are preferentially affected by the diet and hence the type of malnutrition which is likely to emerge. This field work was backed up by Peter Lunn, in Cambridge, in cortisone and insulin injected, diet restricted rats. They had different effects on the preferential distribution of amino acids between the muscles and the liver.

Importantly The Gambian fieldwork was pointing more and more to the interaction of diet and infection in the sub-clinically malnourished infant especially the role of diarrhoeal disease. At the request of WHO, we also became involved in scientifically investigating, under controlled rural public health research conditions, the effectiveness of making of salt-sugar solutions readily available at the first sign of loose stools, in minimizing the disastrous effects of chronic diarrhoea. It proved very beneficial. The village-based nutritional field work was rationally becoming more diverse. This was to lead to major additional areas of research into breast milk adequacy and the link with weaning food preparation and practices in mothers conducting heavy manual labour especially during periods when food was in short supply both for them and their young infants. Dietary intake data on the Gambian women, especially during pregnancy and lactation recorded energy intakes well below internationally recommended levels. Furthermore, there was little sign of any increased dietary consumption at these times. We questioned whether this was related to the high prevalence of small-for-dates babies being born at the worst times of the year and perhaps also a reduced lactational capacity. This became investigated in a number of ways. Based on a groundnut-based biscuit, originally developed at our Ugandan unit, a new formulation using locally available food products was developed which could be cooked by the local baker. This biscuit, when given to pregnant and lactating mothers during the first, second and third trimesters of pregnancy, did lead to a reduction in the prevalence of small-for-dates babies and an average increase in birth weight of 300g, arguably giving the young infant a better start in life under the less than ideal conditions into which they were born. This field work was conducted by Professor Andrew Prentice, then a young post-doc, who had just arrived from the Dunn in Cambridge. These studies were backed up by metabolic investigations. They led to an unexpected finding. Peter Lunn in Cambridge discovered that improving maternal diet in the lactating Gambian mothers also led to a return of very much lower plasma prolactin concentrations than those found in un-supplemented mothers once lactation had begun, values in fact the same as those we were finding in well-fed Cambridge mothers. We became concerned this might become associated with a potential problem for mothers without ready access to contraceptive measures. Low plasma prolactin concentrations lead, as a side effect, to a shortened period of lactational amenorrhea and hence earlier post-partum fertility. In the context of countries like The Gambia this might lead to a shortening of natural child birth spacing. In some trepidation we felt it important to warn the mothers and village elders of this problem. Their answer was simple. They had already noticed that our biscuit did

shorten amenorrhea but perhaps for the wrong reasons they decided this was beneficial.

The importance of ensuring the widely held scientific view that a higher energy and nutrient intake was desirable during pregnancy and lactation led to further studies to see whether some degree of protective physiological adaptation in energy metabolism might be possible in diet restricted people. A multicentre study involving various research establishments including Cambridge and Keneba was set up with finance supplied by the Nestle Foundation. Although some adaptation was found in Keneba this was mainly during the first trimester. Subsequently a transportable whole-body respiration chamber (a calorimeter) designed and operated by physiologists from the University of Lausanne was erected in Keneba so that the question of metabolic adaptation could be investigated further. Once again similar investigations were carried out in Cambridge. Parallel studies in the contrasting two health environments became very much the cornerstone of my investigative approach. Keeping the Keneba field station an active source of science respected internationally clearly depended on a succession of dedicated resident 'heads of station'. In my last 5 years as Director of the Dunn this was my colleague from Uganda days, Elizabeth Poskitt and, after my retirement, Andrew Prentice. I owe them all a lot.

Any dreams I might have had about being allowed to pursue more time in Keneba were quickly dispelled by the mushrooming realisation by the health authorities that diet really was an important health factor in the UK. No sooner had I arrived back and taken up the Directorship of the Dunn I was asked to join the Department of Health's Committee on the Medical Aspects of Food Policy (COMA) as well as its Ministry of Agriculture, Fisheries and Food counterpart

known at the time as COMA2. I quickly realised although in tropical nutrition terms I was beginning to be recognised as something of an authority in reality my knowledge of nutrition as a whole was very limited. I clearly had to learn fast. I remember at my first COMA2 meeting listening to a learned discussion on the relative carcinogenic dangers, of the traditional preservation practice, food smoking, and the alternative use of a food additive everyone else seemed well aware of called Brown FK. I subsequently found this name stood for Brown For Kippers! The COMA committee, the chairman of which was no less than the Chief Medical Officer, had a number



With Professor Sean Strain at the Society's 70th anniversary

Throughout my time, especially after I came back from Uganda, I had been indebted to The Nutrition Society for the way their carefully planned scientific meetings and various publications kept me in touch with the wide variety of scientific developments I needed to understand, not only in my own area of speciality but also on the multiplicity of topics our science encompasses.

of sub panels some of which I quickly became asked to join. One was on infant and child nutrition where I felt rather more at home, indeed it provided a stimulus for some of my future research programme. Another panel that tended to become resurrected every 20 years or so was on Recommended Dietary Allowances (RDAs). It was in this context I was increasingly to play a time demanding role both at a national level in the UK and with WHO/FAO. From 1988 to 1991 I was chairman of the Panel which produced the scientifically detailed Report 'Dietary Reference Values for Food Energy and Nutrients for the United Kingdom'. I have been told this Report had a major impact not only in Europe but also in wider international circles.

Being on a number of dietary recommendation committees at the same time was to create embarrassing situations but also was to open up new research challenges, one above all. During the 1980s a controversial question was when did breast feeding by itself start to become inadequate to cover the total dietary energy and nutrient needs of a baby and the introduction of some form of complementary feeding began to become desirable. Among poor populations in the developing world correct advice on this question was a matter of life or death. The time honoured answer to this question was 4-6 months. An unchallenged view of dietary panels had been that energy requirements/kg body weight fell only slowly during infancy and thus milk intake would need to rise steadily over the next 6 months as the infant rapidly grew. On being asked by WHO/FAO/UNU for their re-evaluation of protein and energy requirements, to write a position paper on the subject it became obvious that existing energy requirement recommendations and the weaning advice were scientifically incompatible. Alison Paul and I had re-analysed the accepted first class international data on the total daily breastmilk intake of healthily growing babies and infants. On the basis of this breast-milk intake analysis we suggested dietary energy needs might fall not from just 120 kcal/kg to 110 kcal/kg by 6-8 months but to as low as 85 kcal/kg. At the time this was accepted with some incredulity, understandably so as the supporting breast-milk intake data was all based on test-weighing procedures, notably open to error except when carried out in the most ideal situations. New more scientifically plausible techniques clearly needed to be employed. Fortunately, my close colleague for many years, in Uganda as well



as Cambridge, Andy Coward had just perfected not only his stable isotope method using deuterium oxide for measuring energy requirements but also the doubly-labelled water technique for assessing, under normal free living conditions, the milk intake of babies not only when exclusively breast-fed, but also when given

complementary infant foods as well. Our hypothesis was confirmed and energy requirements for babies were gradually revised downwards by expert committees. Alison Paul and I also had the temerity to go on and suggest to the paediatricians that they had perhaps got their growth reference charts wrong for assessing healthy infant development in that they had largely been based on bottle-fed babies fed according to instructions on milk packets derived from the old energy needs, rather than on the revised ones. Alison Paul and I, in collaboration with our statistician, Tim Cole, were able to go on and produce new reference charts derived from a carefully controlled growth study of breast-fed Cambridge babies. This also found official acceptance.

### The Nutrition Society

Throughout my time, especially after I came back from Uganda, I had been indebted to the Society for the way their carefully planned scientific meetings and various publications kept me in touch with the wide variety of scientific developments I needed to understand, not only in my own area of speciality but also on the multiplicity of topics our science encompasses. Becoming President in 1989 was a real honour. One important development during my time stands out in my memory. Even when I was just President-Elect, the committee asked me to become aware of a problem they were being forced to deal with, the membership of the Society and whether limits might have to be introduced as to who was eligible to join. Apparently certain totally unqualified persons were using membership to bolster their authority as public advisors on healthy nutrition. I mentioned this to Elsie Widdowson and initially her opinion was that the Society that she and McCance had helped to set up was a scientific, not a professional one, and that anyone interested in the science should be welcomed. However, it became clear to me that nutritional science was becoming strategically so important in health planning that something had to be done. A temporary solution was arrived at by the committee. Bob Grimble and I became involved with the then Institute of Biology, now The Royal Society of Biology, that had the statutory authority to authorise the type of academic qualification and training needed for professional recognition. I remember, at the time, wondering whether I myself would meet the requirements in view of my varied academic background!

Another feature I have admired about The Nutrition Society is the way it has always regarded itself as an International organisation, not just a British one. This is emphasised in its name.

Everything is of course now much better organised and operated, especially since the establishment of the Association for Nutrition in 2010, but this historical episode does represent for me an important moment in the evolution of the Society and the growing recognition of its importance. Another feature I have admired about the Society is the way it has always regarded itself as an international organisation, not just a British one. This is emphasised in its name. People from less privileged countries who might otherwise feel academically isolated are able to join and feel part of the general development of our science. It had, of course, a good start in the deliberations of the Founding Fathers (and Mothers), many of whom I am old enough to have known personally. Even in the turbulent days of 1941 the nascent Society was established to cover not only Great Britain, but importantly even with McCance around, an ardent Ulsterman at heart, also the Republic of Ireland.

### Nutrition in retirement

I have now been retired for almost a quarter of a century and much of what I have written might seem old fashioned and out-of-date. It does so even to me at times. I do hope I have managed to impart something of what I have always tried to achieve, linking together assessing practical problems in the community with supporting 'hard' scientific investigation. In retirement I was at last able to get back to Uganda and do something to make amends for having disappeared suddenly from the scene because of Idi Amin. I was asked by Professor Jeya Henry then of Oxford Brookes University to help him assist Professor Joyce Kikafunda of Makerere University to establish a new master's degree in applied human nutrition. This venture was partly funded by the British Council and ultimately obtained extra support from the Nestle Foundation of Switzerland. Once the academic content of the course was agreed to by the university senate I was appointed a member of the international staff of the university and, for



the next three years, visited there for six week periods to give 24 lectures on recommended dietary allowances to the course. It became something of a joke among my friends that although as a 'research man' I had only been invited to give lectures on specific subjects to science and medical students mainly in Cambridge and London, at the age of 70 this was the first time I had had to deliver an actual course of lectures. It was quite an experience!

In your 88th year it is difficult to know whether you have made any meaningful contribution. I have tried to describe the evolution of a theoretical biochemist into a more practically orientated nutritional scientist in the hope it may be of assistance to others thinking of doing a similar thing. I have also given examples of medically qualified colleagues who, potentially, took a greater risk. I have been lucky that the medical profession has been sympathetic to what I have tried to do. Although not medically qualified I was made an Honorary Fellow of both the Royal College of Physicians as well as of the Royal College of Paediatrics and Child Health. In spite of not having any formal nutritional qualification, some years ago I was even made an Honorary Fellow of The Nutrition Society!

#### **A book that inspired me**

Trowell, H.C., Davies, J.N.P., & Dean, R.F.A. (1954). *Kwashiorkor*, London: Edward Arnold.

#### **Publications that summarise something of the range of my interests and activities**

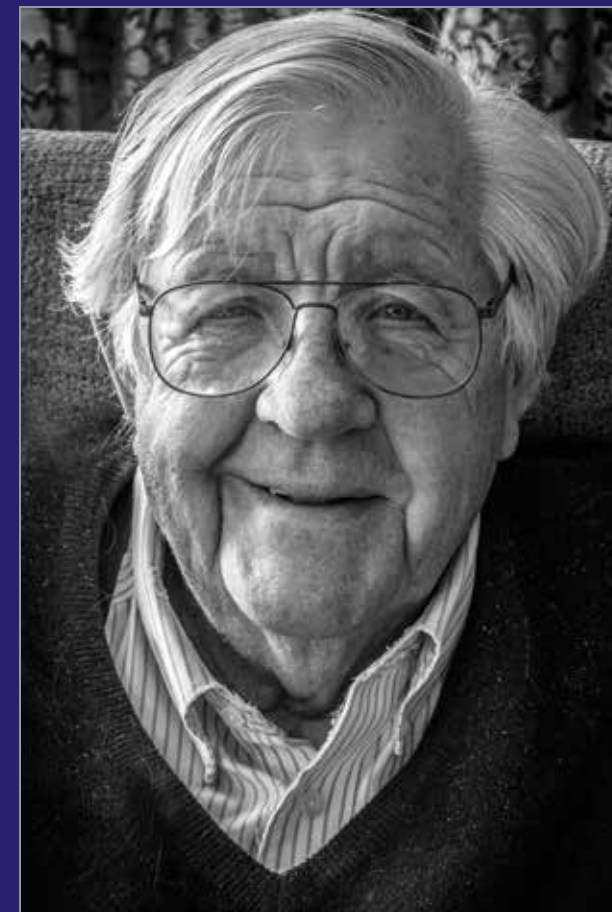
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Although not medically qualified I was made an Honorary Fellow of both the Royal College of Physicians as well as of the Royal College of Paediatrics and Child Health. In spite of not having any formal nutritional qualification, some years ago I was even made an Honorary Fellow of The Nutrition Society!





## Professor John F. Webster

MA, VetMB, PhD, MRCVS, FAFN, DVM (Hons)

### 1992-1995

My aspirations as a child were pretty ordinary. At the age of about ten, having read the Dr Doolittle books, I decided that I wanted to be a vet. I had the great good fortune to become almost the adopted son of Teddy Cook, a 100% farm animal vet, very much in the James Herriot mode, and spent most of my school holidays with him out on farm visits and almost never in the surgery.



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### Early days: brushing shoulders with giants.

When I began my vet studies at St John's College, Cambridge, the limit of my ambition was to spend my life looking after cows. A Part 2 in Physiology, in a class of twelve, brought me into close contact with a spectacular array of scientists, not least Robert McCance and Elsie Widdowson, and I began to think that I was perhaps destined to be an academic. However, it was in year 4 that the spirit of The Nutrition Society entered my soul in the form of a series of guest lectures from our first president, Sir John Hammond. His tale of the application of good science to achieve real improvements to animal production on an international scale struck me as absolutely what I should try to do with my life. I was further advised that if I wanted to make any impact, I would need a PhD first so, shortly after qualifying, I contacted the Hannah Dairy Research Institute in Ayr, to enquire whether there was an opportunity to join the team studying heat stress in cattle. There wasn't, but one Kenneth Blaxter (KB, president no.10) invited me up to join his team studying the energy metabolism of cattle and sheep; my particular brief being to quantify the impact of cold stress. On my first day at work in 1963, I was introduced to his complement of six calorimeters, four of which at the time were involved in an experiment designed to reduce methane production from ruminants; not then because of concerns about climate change but in an attempt to reduce losses of potentially metabolizable energy. Sixty years later, we are still trying.



Holy Cow

In 1964 KB left the Hannah to become Head of the Rowett Research Institute in Aberdeen. This created quite a vacuum in his department at the Hannah that I did my best to fill. The Hannah director, James Andrew Buchan Smith (president no. 8), an unassuming but wonderfully wise man always known as JABS, took over the supervision of my PhD. Two of his remarks stay with me always. Some time in my third year, he quietly commented that I appeared to have six people working for me. When I asked 'Is that a problem?' he said 'Not at all, but remember you are just a graduate student.' KB had invited me to join him at the Rowett when I completed my PhD, but meantime I got an invitation to take up a Post-Doctoral Fellowship and, with oil money to burn, help to develop a major

new laboratory for studying cold stress in cattle at the University of Alberta in Edmonton, the coldest city in Canada. This was a much more exciting offer and carried the potential to do more relevant science. The laboratories at the Hannah were well equipped to study the acute effects of heat and cold but could not address the more important questions of adaptation and acclimatisation, since the climate in the west of Scotland is never either of these things. My second memory of the wit and wisdom of JABS was at my going-away party when he described me as 'a steam engine in trousers'. It got a laugh at the time, but it was about twenty years before I discovered that it was a direct quotation from the description of Daniel Webster by Sydney Smith in 1855.

The internal examiner for my PhD at Glasgow was Professor Robert Campbell Garry (president no.2). My oral examination was my fourth visit to the University, the previous three being for a compulsory chest X-Ray to confirm the absence of TB. Shortly before I was due to leave for Canada, I was informed that the current leader of the cold stress team at the U of A was leaving to take up a post at the University of Victoria on Vancouver Island and would I like to have his job. I said 'why not' so became, in effect, my own boss within a month of completing my PhD. This was a splendid opportunity but also quite a challenge. I arrived at the U of A three weeks before the beginning of autumn term and was informed that I would be responsible for teaching two courses: term one, Animal Science 300, Introductory Physiology, term two 310, Ruminant Physiology. When I asked what this involved, my Head of Department replied, 'You tell me, You're the lecturer'. Fortunately, I had Norman, an excellent laboratory technician, who organised the ten practical classes around which each course was based, and this helped me to stay at least two weeks ahead of my class.

I hugely enjoyed my time in Canada. The research went very well. Probably our most significant finding was the extent to which cattle could acclimatise to the difference in the seasons. We showed that in one extreme winter when air temperature remained below 0°F (-18°C) for 35 days, the thermoneutral zone of cattle living outdoors shifted down 20°C so that their metabolic rate did not increase until still-air temperature fell below -20°C but they experienced unsustainable heat stress with respiration rates of 180/min when brought indoors to room temperature at +20°C. We also had fun building an artificial cow, designed to integrate complex convective and radiant heat exchanges. She became quite famous as 'Moocow' (Model ox observing cold outdoor weather<sup>(1)</sup>). However, the most enjoyable feature of my time in Canada was my contact with students, most of whom were real cowboys, sons of ranchers. During 'Bar None', the Aggie

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students rag week, perhaps one third of them would turn up for lectures in full Western gear, leaving their horses tethered outside the theatre.

After four years KB invited me once again to join him at the Rowett, this time with a much more attractive offer to become the head of what was by now the best equipped Energy Metabolism laboratory in the world. He made this invitation in February, the depth of the Canadian winter, when my Scottish wife, bound indoors by two small children, was understandably experiencing severe cabin fever. At my formal interview for this post, I was asked whether I would be prepared to accept a significant drop in salary, to which my modest reply was that it was my aim to seek honour without profit in my own country.

### High Summer in Aberdeen

On the day of my arrival at the Rowett in September 1970, the Institute was in full fete: banners and buntings everywhere. Not for me. Sir John (Lord) Boyd Orr, first Director of the Rowett, first Head of the Food and Agriculture Organisation (FAO) of the UN, had come to open a new laboratory in his name. I did not get to meet this greatest of the giants but I did later read his autobiography, which contained the imperishable thought, coined while he was at the Rowett in the 1930s, that he would wish to call a two-year moratorium on all new research to enable us to clear up the vast slag heaps of unused data.

My main brief at the Rowett was to improve the characterisation of feeds for ruminants in terms of Metabolizable Energy. I also entered the hot debate on the energetic efficiency of growth, in particular the relative efficiencies of protein and fat deposition. To tackle this problem I sought the help of the congenitally obese Zucker rat. During growth, lean rats deposit approximately 75% of retained energy to protein, 25% to fat. At the same intake fatties proportion approximately 20% to protein, 80% to fat. Given high-quality experimental technique, meticulously carried out by Jim Pullar, it was easy to solve the problem by simultaneous equations, the answer being protein 0.44, fat 0.74<sup>(2)</sup>. The Zucker rats became a particular fascination, so much so that KB informed me that the auditors had suggested that I was spending too much time on rats and not enough on cattle. I altered my timesheets accordingly. In the context of human nutrition and the understanding of obesity, our most important discovery, achieved through the work of my graduate student John Radcliffe, was that the assumption that the congenitally obese fatty rat was obese because of a failure in appetite control was entirely wrong. During growth, fatty rats, congenitally programmed to deposit energy between protein and fat in the ratio 0.2:0.8, controlled their appetite with exquisite precision to grow a lean rat at exactly the same rate as their lean siblings. In a subsequent set of trials, we varied the carbohydrate and protein composition and proportions of the diet over a very wide range and the fatties (during growth) interpreted the message correctly every time. Indeed, on a diet containing 70% high quality protein in the form of casein,

their body composition at 66 days of age was not significantly different from their lean siblings.<sup>(3)</sup>

### Mellower fruits

My time at the Rowett was fruitful, we had a great time in Aberdeen, living up river and out of the haar in Peterculter and making very good friends. However, I was missing teaching, the stimulus of contact with bright young minds and becoming increasingly concerned by the possibility of growing old and dull in a research institute. I applied for and was offered the Chair of Animal Husbandry in the Veterinary School at the University of Bristol, the city of my birth. In the olden days, before Universities acquired democracy, a Professor was normally a Head of Department. Today, of course, the distribution of Chairs has become Gilbertian, most conspicuously since Covid 'when every day upon the news, you can be sure that they will choose, Professors to profess their views, on every situation'. We may have gone too far but we had a long way to go. In 1958, when I was doing my biochemistry course at Cambridge, Frederick Sanger was awarded the first of his two Nobel Prizes for working out the amino-acid sequence of insulin. At that time, his status in the Department of Biochemistry was Demonstrator.

My arrival at the Bristol Vet School coincided with a tidal surge of concern as to the welfare of farm animals, especially those reared in highly intensive conditions: hens confined in battery, pregnant sows in crates and veal calves in wooden boxes. This has been stimulated in large part by the publication of Ruth Harrison's seminal book 'Animal Machines'. This led to the establishment of the Brambell Commission of enquiry, whose main recommendation was that every animal should 'without difficulty, be able to stand up, lie down, turn round, groom itself and stretch its limbs. These recommendation as to minimally acceptable standards for physical comfort and natural behaviour became known as the 'Five Freedoms'<sup>(4)</sup> I had by then had some experience of intensive systems for the production of white veal by calves reared on all-liquid diets, both in practice and at the Rowett, where they were addressing a single issue, namely mineral deficiencies (iron and copper). I was arguing with some force that white veal production was appalling by every measure, improper nutrition, chronic discomfort, an unacceptable prevalence of digestive and respiratory diseases clearly attributable to the production method, extreme behavioural restriction and chronic anxiety attributable to a total absence of conditioning by experience so that the slightest sudden sound could cause mass panic. This led me to propose a more comprehensive set of Five Freedoms: four freedoms from, namely hunger and thirst, physical and thermal discomfort, pain, injury and disease, fear and stress, and one freedom

Looking back on my career, I recognise that I owe a great deal of my good fortune to contacts with some very inspiring people.

to, then described as freedom to perform natural behaviour, but, on reflection, better described as freedom of choice. I was invited to become a founder member of the UK Farm Animal Welfare Council, who adopted these five freedoms that have now become an international standard.

One of my first projects on arrival at Bristol was to establish a unit for the proper scientific study of farm animal welfare, at that time a rather mushy enterprise. I obtained funds for a new lectureship and had the great good fortune to appoint Christine Nicol, then newly emerged from a DPhil in behavioural science with Marian Dawkins at Oxford. Christine's skills were immediately apparent and complementary to mine, which were more concerned with bodies than minds. She has been the major force in the development of the Animal Welfare and Behaviour Unit at Bristol, at the time of our departure one of the biggest in the world. My initial brief to Christine was you do the clever stuff and become famous. Leave the more practical and mundane bits to me, She did and she has.

Ruminant nutrition remained a major interest. With financial assistance from Dalgety and access to a vast slag heap of unpublished data from the Rowett Feed Evaluation Unit, Richard Dewhurst and I developed an improved model for predicting Metabolizable Protein yield from ruminal and post ruminal digestion by considering dietary nitrogen within four compartments: nitrogen (N) that is quickly and slowly degradable within the rumen, N that is undegradable within the rumen but digestible or undigestible downstream<sup>(5)</sup>. Given my fondness for acronyms, we called this Mentor (Metabolism of energy and nitrogen in the rumen).

During my time as President of The Nutrition Society, we rescued the Register of Nutritionists from the hands of the Society for Biology, where it had been lying unnoticed by all but a few of those actually on the register. This set in motion the steps towards the creation of the Association for Nutrition, of which I was a founder member. This meant that I was able to see the process through from start to finish and undoubtedly, collectively, it was a job well done.

Looking back on my career, I recognise that I owe a great deal of my good fortune to contacts with some very inspiring people. Moreover, it probably helped that I never aspired to become *the* expert in one specialist field. I was, and still am, keen to have a go at anything that looked worthwhile. Thus, I was able to step both on and off bandwagons at the right time. I began my career in ruminant nutrition and energy metabolism at a time when this was high priority government policy. At peak, the Agricultural Research Council (as was) was supporting major programmes of research in animal nutrition in seven research institutes. None of these remain, although a few Universities remain active in this area. During the golden years, animal nutrition dominated the contents of the *British Journal of Nutrition*. The demise of the science of animal nutrition has been sad but not surprising. There is no doubt that it contributed greatly to the increased productivity of farm animals in the second half of the 20th century. Lactation

yields from the modern Holstein cow, through a 50:50 mix of nutrition and genetics have increased threefold in the last 50 years. Peak yields of 60l/day are common. (In old money, that is 105 daily pints on your doorstep). These increases have brought their own welfare problems but that's another story. Our improved understanding of the physiology of digestion and metabolism in the ruminant has been put to good practical use and further improvements may be marginal. I realise I am speaking as a very old man, but I suggest that, collectively, we did most of what really mattered and we did it rather well.

Today, of course, the main concern of what was once called agricultural science is the impact of farming systems on the environment. For ruminant nutritionists, the major thrust is to reduce methane production by manipulation of the rumen biome. Methane is about 20 times as potent a long-term greenhouse gas as carbon dioxide, when measured in the long term. It is, in theory, possible to reduce methane production by a much as a half, but this is almost inevitably



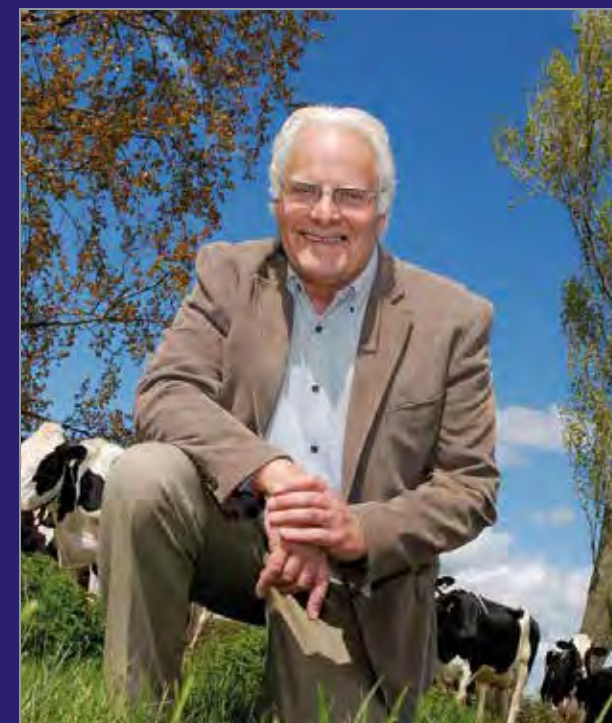
With Professor Sean Strain at the Society's 70th anniversary

accompanied by a significant reduction in fermentation rate and therefore food intake. I am unable to resist a modest proposal, offered in the spirit of Jonathan Swift, that we could solve the problem at a stroke by a switch to the rearing of horses for meat and milk, since hindgut fermenters like the horse excrete most protons from anaerobic fermentation not as methane but hydrogen.

The energy story has progressed to full life-cycle analysis (LCA). Here, I am most impressed by the approach based on 'emergy' analysis, where emergy is a measure of the amount of the original, effectively inexhaustible source of solar energy embedded at each stage of the process <sup>(6)</sup>. This concept expresses all the work processes and resources (sunlight, water, fossil fuels, minerals etc.) used in the generation of a product in terms of a common unit. Like most LCAs it carries a lot of uncertain assumptions but it is, I believe, particularly well suited to the assessment of the efficiency and sustainability of farming the land for food because it can identify, distinguish and quantify the renewable (R) resources of sun, soil and water embedded in farmland from non-renewable sources (NR) such as fuel, fertiliser, labour and imported feeds. The fiendishly complex modelling is a bit too much for me now, but I suggest it may be the future. When I retired from the Bristol Vet School, I was given the best sort of Memorial, i.e. one while I was still alive. Invited at the end to give a brief summary of my career, I did no more than echo a family phrase, first coined by my eight-year-old daughter, Joanne, now a Professor of Infectious Diseases at the Royal Veterinary College, 'It was good fun'.

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## Professor Michael Gibney

BAgrSc, MAgrSc, PhD

1995-1998

I was first introduced to The Nutrition Society as an undergraduate student in agricultural chemistry at University College Dublin. Every Thursday morning, in a series of tutorials, we would review some papers from the *Proceedings of The Nutrition Society*. In 1974 I joined the Society as a PhD student at the University of Sydney Veterinary School. The journals would usually arrive months after publication but, when they did, they were read from cover to cover.





I was first introduced to The Nutrition Society as an undergraduate student in agricultural chemistry at University College Dublin. Every Thursday morning, in a series of tutorials, we would review some papers from the *Proceedings of The Nutrition Society*. In 1974 I joined The Nutrition Society as a PhD student at the University of Sydney Veterinary School. The journals would usually arrive months after publication but, when they did, they were read from cover to cover. I returned to Dublin in 1976 with a Government of Ireland Post- Doctoral Fellowship to take up a research post in the Biochemistry Department of the Agricultural institute. Sadly, internal politics saw me allocated to a beef research centre where the most technical undertaking was to measure the dry matter yield of the grassland meadows or to weigh cattle. To compensate, I started dabbling in human nutrition using existing databases (The Household Budget Survey and the Consumer Price Index Survey) to estimate nutrient intake among Irish adults. Such data had not been gathered since the late 1940s. In December 1976, I travelled to London to contribute a short communication to The Nutrition Society<sup>(1)</sup>.

Back then, the Royal Society of Medicine in Wimpole Street, London was the main venue for the Society's meetings. I was awe struck by the event, the creaking floorboards, the quality of the presentations and the probing questions. My oral communication was the last of the morning and the much rehearsed presentation went smoothly and attracted significant questions from the floor. At the lunch break, an elderly gentleman, with a small eye- catching nasal discharge, approached me and heaped praise on my work, encouraging me to pursue it further. I had no idea who he was. A colleague, who had witnessed the conversation, asked what did Professor Robert McCance have to say to me. I was stunned that so lofty a legend in nutrition research as he, would bother with a total novice like me. And that was when I learned what the Society was all about – collegiality in the pursuit of science.

My miserable time as a post-doc in the dreaded beef research ended when, in 1977, I was offered a lectureship at the School of Biochemistry and Physiology at Southampton University's School of Medicine. The then current research in nutrition at the School was animal based, mostly rabbits and rodents, and my brief was to bring human nutrition research to the group<sup>(2,3,4)</sup>. I had crossed the Rubicon from animal to human nutrition. If the facilities available to me back in Ireland were of the ark era, those at Southampton were of the star ship Enterprise era. From the digestive physiology of new born lambs, I moved to the biology of atherosclerosis at the interface of nutrition and immunology. My fellow

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lecturer Dr. Bob Grimble, was appointed as the Society's Programmes Secretary and I was asked to act as Assistant Programme Secretary. We travelled the length and breadth of pre-digital UK, oiling the machinery of the Society's plenary and oral communications sessions. It was a truly wonderful time.

In the early eighties, higher education in the UK was transformed by the Tory government and it appeared to me as though accountants had taken over. Everything had a cost. I was the third person of what was a mass exodus from our School of Physiology and Biochemistry. I moved back to Ireland in 1984 to take up a post at the Department of Clinical Medicine, Trinity College, Dublin. My base was now in the School of Physic (as in physician) at the medical school at St James Hospital. My collaborative clinical research would now embrace the interface of nutrition with cardiology<sup>(5)</sup>, gerontology<sup>(6)</sup>, paediatrics<sup>(7)</sup>, haematology<sup>(8)</sup> and gastroenterology<sup>(9)</sup> and of course my own personal interest in postprandial lipid metabolism<sup>(10)</sup>. In the eighties sometime, I was "elected" to the Council of The Nutrition Society. In those days, Council nominated all its members and all its officers and no one ever thought of proposing anyone else for election. I served on Council with several presidents, David Armstrong, Roger Whitehead and John Webster.

The nutrition scene in Ireland was beginning to grow with new degrees at University College Cork (UCC), Trinity College Dublin (TCD) and the University of Ulster (UU) and there was a thirst for scientific meetings among staff and graduate students. Several events happened in 1986 which would lead to great changes in nutrition science in Ireland. Professors Gerry McKenna and Seán Strain of the University of Ulster visited me in St James and we discussed how we might collaborate, ending with a commitment to get some tangible cooperation up and running. A second event was following a meeting of the Society in Belfast convened by Professor Kelvin McCracken. On the homeward train journey, we were stopped at some rural station and obliged to complete our journey by bus because of some bomb scare, a common occurrence then. As I took my seat on the bus, I was joined by a gentleman who I recognised from the meeting. It was Dr Fred Andrews from the TCD Department of Physiology. We discussed many things but mostly how we could move nutrition in Ireland, North and South, to a higher level of organisation. Fred and I would meet regularly in Trinity, with all forms of plots and plans and Fred would go on to become a powerhouse in facilitating an eventual Irish Section of The Nutrition Society eventually serving several terms as the Society's Programme Secretary and then as Publications Officer.

In 1987, Professor Gerry McKenna of the University of Ulster Gerry convened a meeting of academics from all three nutrition active universities on the island of Ireland with the intention to develop formal links between UCC, TCD and UU in both research and teaching. He was knocking on open doors and it was agreed that he and the late John Scott from TCD and Pat Morrissey from UCC

would draft a memorandum of understanding between the three universities to promote collaboration at all levels. We needed a name. At the time, a cabal of retired nutrition professors from across Europe met regularly in back slapping and wine slurping sessions of nostalgia. They were known as GEN, Group of European Nutritionists. I suggested that we call ourselves the Group of Irish Nutritionists but, sadly, GIN was deemed not appropriate! We settled on the Irish Universities Nutrition Alliance<sup>(11)</sup>. Since its foundation, not one year has passed without competitively funded bi-lateral or tri-lateral research projects, the largest of which was €25 million for the establishment of large nutrigenomic databases<sup>(12)</sup>.

The then President John Webster approached me and, to my astonishment, he asked me if I would be willing to let my name go forward Council as a proposed 19th President of the Society. I was, of course, deeply honoured and readily agreed.

The Royal Irish Academy (RIA) had a Nutrition Committee of which I was chair and I persuaded the Academy to host some meetings along the lines of The Nutrition Society. We held several such RIA meetings, heavily sponsored by industry and had plenary lectures from Walter Willett and Fred Stare of Harvard University, Ian McDonald of Guys Hospital, John Waterlow of the London School of Hygiene and Tropical Medicine, Roger Whitehead from the Dunn in Cambridge and many other luminaries. We began to introduce oral communications along the lines of the society and all of this served to further nutrition research in Ireland. Several attempts had been made to foster Nutrition Society meetings in Ireland but this posed problems, political, not logistical, and it never took off.

In 1986, a group of us prepared a submission to The Nutrition Society to establish an Irish Section along those of the Scottish Section. John Waterlow was then at the end of his presidency and, having seen at first hand, the success our Academy meetings and the quality of the presentations, he was highly supportive but privately warned me that there would be opposition. With very gentle hints from him, the document, argued that if we did not have an Irish Section we would have to form our own society and we furnished hard evidence that such a Society would be viable. It worked and in 1988 I was honoured to be first Chairman of the Irish Section of the Nutrition.

In August 1994, I attended the Summer meeting of the Society back at my beloved Southampton University. The then President John Webster approached me and, to my astonishment, he asked me if I would be willing to let my name go forward to Council as a proposed 19th President of the Society. I was, of

course, deeply honoured and readily agreed. So, in 1995, at The Nutrition Society Meeting in Aberdeen, I took up my new role. I was not the first Irishman (defined by eligibility to play rugby for Ireland) to hold this role. Sir Joseph Barcroft FRS, born in Newry, County Down, succeed Lord Boyd Orr as the second President of the Society. Sixty plus years later, another son of County Down, Professor Seán Strain, took on that role. Moreover, I was not the first non-UK citizen to be President of the Society. Professor Stanislas Kon (1965-1968), a native of Poland graduated from the University of Warsaw and Professor Egon Kodicek, a native of Czechoslovakia, graduated from Charles University in Prague.

When I sat in the Chair for my first Council meeting, I really did feel incredibly honoured and I went about my business as I envisaged it. I wanted the Society to establish a 5-year strategic plan and I set out my vision for how this would be done. When the meeting was over, Dr Ann Walker from the University of Reading, who was a long-time volunteer minutes secretary of council, called me aside and explained that what she had just witnessed was most unusual. She said that, traditionally, the officers did the moving and shaking and the President was a figurehead, perhaps one who took the glory. Well that wasn't my style.

Council led the process of developing the strategic plan but several non-council members were drafted in to represent the widest interests of the Society's membership. There were two plenary meetings, both at weekends and both at airport hotels in Heathrow and Aberdeen. We began the day with a plenary where I outlined what issues we might tackle and then broke up into working groups, each chaired by an officer of the Society. Over a year we developed such a strategic plan and from recall, we decided on three priorities: (a) to have a greater international presence particularly in Europe, (b) to foster public health nutrition and (c) to establish a register of nutritionists. As regards the first of these, we surveyed all our overseas members as to whether we should change the title of

the British Journal of Nutrition to make it appear more international. The result was a resounding "no". We then set about organising links with the French, Spanish and Dutch Nutrition Societies. In time we held three meetings with L'Association Française de Nutrition in Paris, Lille and Nantes, one of which was also with the Société de Nutrition et de Diététique de Langue Française. We held two meetings with the Sociedad Española de Nutrición in Pamplona in Navarra. At one of these meetings, Professor Phillip James gave a plenary lecture on the first morning of a three day meeting. He presented a second



Professor Michael Gibney, begins his Presidency, Aberdeen 1995

lecture on day 3, but this time by video satellite from Rio de Janeiro – pretty remarkable back then. Drs Jackie Landman and Anne Burgess were given the role of looking after the needs of the Society’s many overseas members.

In 1996, the Society began a review of the competencies that would be needed to create a Register of Nutritionists with a sub-register of Public Health Nutritionists and this process was led by Professor Barrie Margetts from Southampton University and Professor Judy Buttriss from the British Nutrition Foundation. In 1998, at the Royal Society of Medicine, I awarded the first certificate of registration to Professor Margetts who subsequently became the Society’s first Professional Affairs officer. The Society also worked with the Institute of Biology in the area of registration but because of a possible conflict of interest between Society’s role of registration and of representation, the registration was in time moved to an independent legal entity, the Association for Nutrition. Without doubt, the maestro that shaped all of this interest in professional registration was Professor Alan Jackson of Southampton University. In or around 1997, a conversation was started on the possibility of a new Society journal, Public Health Nutrition, again championed by Barrie Margetts. At a Council meeting in Edinburgh, a strategy development meeting, an allocation of £30,000 was set aside for this new journal which broke even in its first year.

Before I retired as President, I persuaded the Council to support the concept of a suite of Nutrition Society Textbooks. I had prepared a lengthy proposal as to how this might be achieved and shortly after my term was up, I was asked to take on the task. My reasons for wanting such a suite of textbooks arose from my long experience in undergraduate nutrition. There was no one textbook I could recommend to my students. I would recommend different chapters from different existing textbooks and still there were significant gaps and so I set out on one of the craziest projects I had ever undertaken. I first put together the editors of each of four new textbooks – introductory, public health, metabolic and clinical. Then having identified the chapters for each book, we set out a series of bullet points which we felt should prompt the authors in the direction we wanted the chapter to go. My vision was to involve authors from around the globe and to have two authors at least for each chapter. Once the authors were identified, my role was ramped up. I contacted each of the authors and explained the project and to my delight, the vast majority accepted the invitation. And then came the whip. I quoted Napoleon from his disastrous Battle of Leipzig. He needed to get word to his western flank and selected two of his finest horsemen sending them off with these words: “Go sirs, gallop. I can give you anything you like but time”. I set out a very strict timetable with clear milestones and deliverable right up to proof reading. I stuck to my word and in time I de-selected five authors and one editor who were not able to reasonably stick to the deadline. It was a huge project that I undertook every evening for over a year. But it paid off and despite initial concerns about costs, the textbooks have flourished and expanded in the capable hands of the present editor-in-Chief, Sue Lanham-New from the University of Surrey.

When my time came to think of a nomination to succeed me as President, I reflected on the process that operated at the time. Traditionally, the presidency rotated between an animal nutritionist and a human nutritionist. Of the 18 presidents that came before me, only two were women, Dame Harriette Chick (1956-1959) and Professor Elsie Widdowson (1977-1980). I decided to break with the rotating interests of animal and human nutrition and, taking account of the growing number of female members of the Society, to seek a female President. I rang Christine Williams of the University of Reading, with whom I had collaborated in an EU funded research consortium, and asked if she would be willing to take on the job. She agreed and then I told her the conditions. Upon her time to depart she would ask a male to succeed her and set out the condition that when his time came to retire, he would nominate a woman and continue with the gender rotating policy. That, I’m happy to say, is how things are today.



Past Presidents: Professor Mike Gibney, Professor Ann Prentice, Professor Christine Williams and Professor John Mathers

I have pondered on what I would do, if I was now elected President of The Nutrition Society. I would set up a task force to examine the science of human nutrition, its strengths and weaknesses, the output of which would be a pathway for future nutrition research. Among the issues I would pursue would be the dreaded phenomenon of energy under-reporting. I would hope that among the recommendations of this initiative would be that any paper or oral communication submitted for publication in any of the Society’s journals, must meet specific standards on data to allow the reader evaluate energy under-reporting. I would set out similar standards for publications that sought to show an epidemiological link between the consumption of a food and some health outcome, which might include (a) an outline of how the study meets the Bradford-Hill criteria for causation<sup>(13)</sup>, (b) a detailed explanation of why particular confounding factors were used or were not considered and (c) how the intake of the target food is correlated with other non-target foods and thus suitable for inclusion as a confounding factor. I would design moon-shot studies which might help establish food consumption patterns with subjects housed in residential human intervention suites and fed multiple diets with biofluids and biopsies taken for metabolomic and proteomic profiling<sup>(14)</sup>. I would hope to foster much stronger links with those sciences such as sensory sciences and behavioural sciences that can help unravel the complexity of food choice. Finally, I would develop an international strategy to integrate hard end points of both nutritional status and anthropometry with ongoing twin studies.



When I first became involved in the Society, there was one administrator, the charming and efficient June Schulkes. In time she would be joined by the equally charming and efficient, Liz Costin. They were the formal faces of the Society that everybody would get to know. Following the first visit of the Society to Dublin for the summer meeting, my wife Jo would help Liz run the front desk at meetings over many years. Now, with increasing complexity and commitments, a team of highly skilled professional staff run the Society and give wonderful service to the Officers and members. Take a bow.

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## Professor Christine M. Williams

OBE, BSc, PhD, FafN, FRSB, FIUNS

### 1998-2001

As I started to write this account I realised that my decision to study nutrition at undergraduate level was made over fifty years ago- and so this seems as good a place as any to begin the story. In retrospect I think this reflected a combination of interests and inclinations that were beginning to form whilst I was a sixth former at a grammar school in Cardiff.



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### The early years

I studied Biology, Chemistry and Physics at A Level and Biology at S Level. We were a keen group of six students (!) with a very adventurous teacher of Biology who taught us many of the traditional areas of the curriculum but in a way that led us to look more closely at some of the new science emerging at that time. The biology of evolution and the findings of Darwin in the Galapagos Islands about how animals can adapt to different environmental exposures were taught against new knowledge about the structure of life-of DNA, RNA and protein synthesis. From this came a life-long love of mechanistic biology and later a keen interest in the study of human metabolism. Some of this teaching must have been a major deviation from the syllabus at the time, but it felt exciting and challenging and made me want to find out more. Herein perhaps lies the origin of the drive to undertake research and later, as a Lecturer and Professor, the wish to take students beyond 'the facts' and into greater understanding of how new knowledge and concepts develop, how to critique the evidence and draw conclusions, and later to make judgements.

On reflection the decision to study nutrition and not a more obviously research-oriented discipline such as biochemistry, might seem surprising. However, as well as my interest in science I was becoming increasingly aware that despite the huge advances made in health and education following the second world war, many inequalities remained in the UK and huge gaps existed elsewhere in the world. Children from working class backgrounds continued to have greater prevalence of infectious and other diseases and problems of growth and poor dentition. My school also had close links with charities involved in fund raising to support families suffering famine in Africa from which we learned how issues of gross malnutrition in children were linked with extreme weather and poor crop production and insecure food supply.

### Queen Elizabeth College

By my second year of A levels I had started to appreciate that studying nutrition would involve not only an understanding of biosciences but a network of interconnected disciplines. This was very appealing to me then and even more so today. In 1969 I looked closely at the curriculum of the BSc Nutrition at Queen Elizabeth College (QEC) in Kensington. As well as nutrition, metabolic biochemistry, physiology, genetics, chemistry and statistics, the course included modules in economic biology, sociology and third world nutrition. So.... in

1970 I found myself at the gates of Queen Elizabeth College on my first day at university. I was excited, nervous, curious and bewildered. The wealthy surroundings of the college, the (then) bohemian atmosphere of Kensington High Street and the opulence of Knightsbridge and the Natural History Museum opposite my halls of residence in Cromwell Road, were very different to my home in South Wales.

In 1970 when I arrived at the college Professor John Yudkin, the visionary responsible for the setting up the first undergraduate programme in nutrition in the UK, was the Head of the Department of Nutrition. He was very well known for his research on links between excess sugar consumption and heart disease; his lectures were fascinating and inspiring for anyone interested in research. After he retired Professor Stewart Truswell became head of the department at QEC having left South Africa due to his opposition to the apartheid regime of the then South African government. Like Yudkin he was a clinician involved in the study of the links between diet and heart disease. Unlike Yudkin, Truswell considered dietary fat to be the main villain in heart disease. These different but well-argued perspectives on diet and heart disease, first introduced to me in the 1970s, continue to be debated 50 years later, with nuanced versions of the same issues emerging and re-emerging in cyclical patterns.

After graduation I went on to work with Professor Don Naismith at QEC as a Research Assistant. Don's teaching and research on the metabolic adaptations of pregnancy and the biphasic anabolic and catabolic stages of lipid and calcium metabolism in the rat



Professor John Yudkin



Professor Stewart Truswell

reinforced my interests in nutritional metabolism. These adaptations of pregnancy directed at supplying essential minerals and fatty acids from the maternal system to the foetus, appealed to my interests in both the empirical and conceptual aspects of nutrition research.

### PhD and post-doctoral research at Guys Hospital Medical School

It was these interests which attracted me when a post for a Research Assistant was advertised at Guys Hospital Medical School in 1974. The project involved investigating the role of changes in adipose tissue metabolism in human pregnancy, for which I could register for a PhD. The aim of the work was to investigate the mechanisms underlying the insulin resistance of human pregnancy

which can lead to pregnancy diabetes. It was not until about ten years later that I realised that this unexpected opportunity had set the direction of my research for the next 30 years or so. Over the next 3 years of a PhD and a 2-year fellowship, I conducted a whole range of experimental studies involving whole body lipid metabolism in volunteers and cell studies on biopsies of adipose tissue and tissue removed during surgery in pregnant and non-pregnant female patients. Collaborations with Dr David Halliday at Northwick Park Hospital involved a sequential study of pregnancy body composition with the use of stable isotopes for estimation of total body water and measurements of lean tissue using potassium 40.

I had no idea at the time how challenging these studies would be, how much work I would have to do and how many things would go wrong, despite careful planning and method development. There was no-one to learn from as this was the first study of its type at Guys and I assume my fearlessness was down to my naivety about the demands of human research. I was surprised to find how large the between-subject variability was for many of the measurements I was making on human subjects compared with the research I had done with Don on rats. Consequently I had to upgrade my statistical know-how and address issues such as power calculations and sample size. I had a hands-off supervisor which meant I pretty much taught myself lipid metabolism and the hormonal aspects of pregnancy over the next 3 years. I also made a number of important mistakes and omissions which I subsequently needed to correct! However I loved the sense of independence research gave me. Being able to design and plan my own experiments, set time schedules, manage a budget and identify generous external researchers who could help me with my methods, were all part of the learning exercise. My first published paper in 1976<sup>(1)</sup>, some 14 months into my 3 year PhD, gave me confidence that I could complete my PhD despite not being part of a traditional nutrition department with the support that such a department provides.

In those early years one area where I found I would have benefitted from more training and advice was in presenting my research to non-experts. Half-way through my first talk to clinical staff I realised I had pitched the content far too high, with too many slides and a pace that made me breathless (and clearly must have been very uncomfortable for my audience). I can still recall this experience with a sense of real pain! It took me a while to learn the essence of a good talk is to plan what you want to say very carefully and have a story to tell that can be adapted to different audiences. Subsequently, supporting my own PhD students to

Subsequently, supporting my own PhD students to give talks at meetings and conferences became a key part of their training and one in which The Nutrition Society meetings played a very important part.

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### Teaching and Research at the University of Surrey 1984-1995

A few years after my post-doctoral position at Guys I took up a lectureship position at what was then the School of Biological Sciences at the University of Surrey where I learned that Nutrition was perceived as a slightly Cinderella discipline. This was surprising to me given that my PhD and post-doctoral work had been pretty much concerned with the biochemistry and endocrinology of lipid metabolism, including adipocyte cell signalling work that was remarkably similar that of colleagues in biochemistry and pharmacology. However my 10 years at Surrey were largely happy and it was certainly a very productive part of my career. This was partly due to the relevance of the research in type 2 diabetes within the School and the collaborations I formed with many colleagues. Much of the work by Professor Vincent Marks and his colleagues focused on the role of insulin and insulinotropic hormones in the regulation of postprandial glycaemia. I was interested in the role of insulin in regulating levels of circulating triglycerides – especially postprandial triglycerides. At the time, most concerns about blood lipids and cardiovascular disease had focused upon levels of cholesterol, notably LDL cholesterol, but data was beginning to emerge which implicated triglyceride-rich lipoproteins in the aetiology of heart disease. I was particularly interested in studying the metabolism of chylomicrons, which are the particles which carry dietary-derived triglycerides from the gut into the circulation. With Dr Barry Gould at Surrey I developed a BBSRC proposal to develop specific antibodies to the chylomicron-specific protein apolipoprotein B-48. We were the first group in the world to be successful in achieving this and soon after developed an ELISA assay which could monitor changes of apo B-48 in the circulation<sup>(2)</sup>. This allowed us to distinguish those triglycerides originating from the diet directly from those synthesised in the liver- and allowed us to investigate aspects of particle size and number which provided insights into mechanistic effects of dietary fats on postprandial lipaemia. It was demanding work as acute test meal studies required long postprandial follow up times which meant a lot of happy days (and some tired nights) spent cannulating volunteers and keeping their spirits up for the next 8-12 hours. The team grew rapidly as grants became more successful, with myself and Drs John Wright, Julie Lovegrove and Kim Jackson forming the core group who kick-started what was to become 25 years of research.



Some of the apoB-48 team at Julie Lovegrove's cottage in Godalming (undergoing renovation!)

As well as BBSRC and MAFF (now DEFRA) funding we obtained a large European grant which supported a very productive collaboration with Professor Mike Gibney at Trinity College, Dublin. We were studying the effects of different types of dietary fats on chylomicron particles and through collaborations with Professor Kafatos at the University of Heraklion, compared the postprandial triglyceride metabolism of subjects habituated to typical UK and Irish diets with those of Cretan volunteers whose diet was high in monounsaturated fats.

A memorable Nutrition Society meeting held in Dublin in 199?, was attended by many staff and students from the Nutrition Department at Surrey. The photograph (below) taken before the meeting banquet includes some of the apo B48 team (myself, Andy Peel and Antonis Zampelas), as well as Margaret Lumbers, Miggy Murphy, Sue Gatenby and Paula Moynihan.



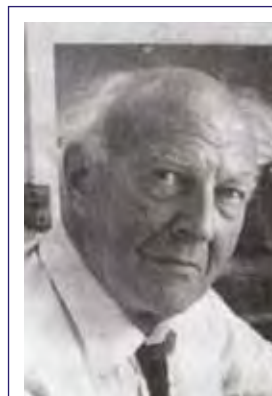
Students and staff of the Department of Nutrition, Surrey  
at The Nutrition Society meeting Dublin 1990s

## University of Reading 1995-now

In early 1995 I received details of a new Chair appointment that was to be advertised at the University of Reading. This appointment, along with 5 other academic posts, were to be funded from an endowment awarded to the university from the estate of Professor Hugh Sinclair. Sinclair was a very well-known lipid biochemist from Oxford who was involved in monitoring the nutritional status of the UK population during the second world war. Subsequently he became well recognised for his work on essential fatty acids, including fish oil fats and was the first person to link dietary fats to the rising prevalence of cardiovascular diseases. Like a number of well recognised nutrition scientists of his time, he was enthusiastic about self-experimentation to the extent that when studying the cardiovascular effects of fish oil consumption on an expedition to Antarctica he became seriously unwell with thrombocytopenia (low platelet levels) and became seriously unwell. A fuller account of Sinclair's life and work can be found from his biography published by Jeanette Ewin<sup>(3)</sup>.



Professor Hugh Sinclair teaching students of  
Food Science at the University of Reading



Professor Hugh Sinclair in  
the early 1990s

The generous endowment from Professor Sinclair's estate allowed the University to set up the Hugh Sinclair Unit of Human Nutrition in 1995 and I was delighted to be offered the post as the first Hugh Sinclair Professor of Human Nutrition later that year. ([www.reading.ac.uk/HSUHN/about-hsuhn/about-us-hsuhn.aspx](http://www.reading.ac.uk/HSUHN/about-hsuhn/about-us-hsuhn.aspx)).

This was a unique opportunity for me to set up a new nutrition group within a university with a very strong reputation for food science and agriculture but with, as yet, limited research and teaching in nutrition. The move to Reading meant I would need to re-build the excellent team which we had formed at Surrey and it also meant a physical move for my family. The travelling distance from our home in Surrey was too far for me to consider with then a young child of 5 who was about to start school. We upped sticks selling our village house in Milford and eventually moving to Winkfield Row near Ascot where we stayed for the next 14 years.

Although it felt like a potentially risky move at the time, the Reading Chair turned out to be just the push I needed to set my research in the direction I wanted to go, with more emphasis on the mechanisms by which different dietary fats alter the concentration and atherogenicity of postprandial lipoproteins. Over the next year Julie Lovegrove and Kim Jackson moved from Surrey to work with me at Reading. John Wright continued to provide clinical support for the more intensive human studies we began to undertake. Our collaborations with Mike Gibney in Dublin continued with new EU project funding and new ones opened up with Professor Philip Calder (Southampton) and Professor Keith Frayn (Oxford). A very successful collaboration with Dr Bruce Griffin a lipid biochemist who had been appointed at Surrey a few years prior to my departure also continued to flourish.



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The early appointments to the new academic posts of Drs Parveen Yaqoob, Anne Minihane, and Gerald Rimbach set the seal on the success and academic reputation of the Hugh Sinclair Unit. Subsequent appointments of Drs Orla Kennedy and Jeremy Spencer strength the group further

and supported new courses in nutrition. Jeremy brought an additional new focus for the Hugh Sinclair Unit with his studies of dietary flavonoids, cell signalling and neurogenesis and his work has been very successful nationally and internationally.

The next 12 years were busy and exciting times for all of us as the Hugh Sinclair Unit grew rapidly with academics, research fellows and PhD students making important contributions to research, teaching and academic leadership. Over the next 10 years Parveen Yaqoob, Julie Lovegrove, Orla Kennedy and Jeremy Spencer established successful research teams and enabled new undergraduate and post graduate courses in nutrition to be set up. They were each appointed to personal Chair positions at Reading and Anne Minihane and Gerald Rimbach to Chair appointments at the Universities of East Anglia and Kiel (Germany), respectively. More recently Parveen Yaqoob was appointed as Pro-Vice-Chancellor Research & Innovation and Deputy Vice Chancellor at the University of Reading.

Since my early days at Reading and despite a very strong research focus on dietary fats and cardiometabolic health I had become very involved in collaborations both within the Department of Food Science and Technology, as well as the departments of Agriculture, Psychology and Biological Sciences. Doors were open everywhere across the campus with colleagues interested and enthusiastic about this new young group and open to the possibilities for research and teaching in nutrition. Cinderella nutrition had flourished in this open environment and in 2004 the university's first cross-disciplinary theme 'Food chain and health' was set up by Glenn Gibson and myself as a means of strengthening these emerging links. Developments such as these fostered my innate attraction to cross disciplinary research and teaching and led me to take on strategic leadership roles at Reading, initially as Dean of Life Sciences (2006) and then as Pro-Vice Chancellor for Research and Innovation (2008-2014).

When I look back at the origins of some of these developments I can see that my early teaching at school and then the diverse range of disciplines that were taught at Queen Elizabeth College in 1970-73, fostered a strong inclination to seek links between what were then highly bounded disciplines. The narrower

and deeper enquiries of my PhD, post-doctoral and early independent were deeply enriched in my later years at Reading. My role as Pro-Vice-Chancellor certainly brought with it plenty of committee work but it also brought me into close contact with scholars across the sciences, arts, humanities and business. I found links with philosophers, politicians, economists, mathematicians and meteorologists, all with real passion and commitment to their research and teaching. One or two of my close colleagues (none named in this account!) who did not see the immediate attraction of 'senior management', reported that 'Christine has gone into administration- what a waste'! From my perspective at least, nothing could be further from the truth as these experiences subsequently fed into my external work on many expert committees, grant panels, strategic boards and in 2014 chairing the REF panel for Agriculture, Veterinary and Food. Today as emeritus Professor at Reading I continue my work as trustee of a number of Boards and committees. I will not list these as they can be seen in my CV but all have been worthwhile and taught me about myself and other people- how we think, work and behave- and how we achieve more by working together than apart. Mostly they have been great fun- and for that I have the University of Reading to thank for the generous way in which they embraced nutrition and supported myself and my colleagues over the past 26 years.

In finishing this account I wish to pay a special tribute to our colleague Dr Ann Walker who at the time of my appointment at Reading was the only nutrition lecturer in the Department of Food Science and Technology. We all owe Ann a great debt of gratitude for her generous nature, wise advice and patience. She was an extremely sound scientist and a compassionate colleague and friend. As well as steering us through the mysteries of a new university, Ann encouraged our active contributions to The Nutrition Society. She had been secretary to the Nutrition Council for many years and in the 1990s was one of a small number of people who had been instrumental in setting up the Register of Nutritionists. She was a quiet unassuming leader but an independent thinker and recognised the vital importance of professional recognition for nutrition.

The Nutrition Society has provided outstanding training and networking opportunities for myself, colleagues and students for over 35 years. In 1998-2001 I was hugely privileged to act as President of during a time of growth and change for the Society and supported by a great team of Officers and Honorary Officers. I was also only the third female President of the Society after Dr Elsie Widdowson whose shoes I walked in with great pride. Today, Professor Julie Lovegrove, my colleague and collaborator at Surrey and Reading, is now the fifth female President of the Society. I know she is learning and contributing a lot during her experience 'In the Time of Covid'.

My own period as President was my first experience of 'managing change'- and at times proved a pretty scary ride. However the experience deepened my

appreciation for all the work the Society does and from a personal view point profoundly influenced how I approached many of my subsequent 'leadership' challenges. Lastly, but not least, I have also made a number of collaborations and friendships for life. As I have mentioned before – those times at the bar were not wasted!

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## Professor John Mathers

BSc, Dip. RNutr, PhD, FAFN

### 2001-2004

Becoming a scientist was not my destiny. As the oldest boy in a farming family in Northern Ireland, the expectation was that I would become a farmer. However, severe allergic rhinitis and asthma, linked to exposure to cereals and pollen, meant that some kinds of farm-work were debilitating. Fortunately, I have a brother who was interested in farming so I was free to continue in school and, in due course, to go to university to study Agricultural Biochemistry in the University of Newcastle upon Tyne.



## Becoming a scientist

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My summer job was to develop a column chromatographic method (long columns and large volumes of organic solvents) for separating and quantifying carotenoids from leaves. My supervisor was of the old school and did not appear often in the lab so I was left to solve problems largely on my own – after being pointed to the library! This was so different from the lab practicals I had experienced as an undergraduate student and I loved it. Being the summer, the undergraduates had gone away and my companions were research students and visiting researchers from across Europe and Asia. The working day was from 07.00 to 15.00 so that we had plenty of time to enjoy the long Nordic summer evenings together. This was my first taste of European (and global) networks and, although I did not realise it at the time, it sparked my lifelong interest in collaborative research.

After graduating, my parents suggested that I should become a teacher but I wanted a job “doing research”. Despite my modest degree, I got a job at the Plant Breeding Institute just outside Cambridge where they had started a new line of research on breeding high protein cereals. The PBI was very well equipped and soon I was running auto-analysers and struggling to get tube gels to work. This is when the hierarchy in research culture started to become apparent to me. At tea and coffee breaks, the scientists with PhDs sat together and “talked science” whereas those of us without those magic letters sat separately and talked about ordinary things.

In due course, I acquired those magic letters. Socially, I had met a postgraduate student who was studying towards the Diploma in Nutrition in Cambridge University and we had long discussions around the nutritional issues about which she was learning. A few months later, I joined that Diploma course run by Dr Kenneth Carpenter (see later). Most of the other students on the course were based

for their research projects in the Dunn Nutrition Laboratory or in the Medical School. I was in the Department of Applied Biology where I was supervised by Dr Eric Miller who also became my PhD supervisor. I had some very stimulating discussions about my research with Eric. Often these conversations began late in the afternoon, after 5pm, when Eric had done his teaching for the day. Some went on for hours. It was not unknown for these discussions to be interrupted around 19:00 by a phone call from Eileen Miller (Eric’s wife) reminding him that his dinner was ready. Studying for the Diploma in Nutrition was a major turning point in my life. Although I undertook research on the nutrition of ruminant animals during my time in Cambridge, I realised that my interests, and the big societal challenges, lay in the human nutrition and health area.

Those interests were stimulated by the many excellent lecturers on the Diploma course who told us about their own research. We also attended the famous Dunn “tea clubs”. Held in the afternoon at the Milton Road site, the “tea clubs” were the seminar programme for the Laboratory. They were a highlight of our week, not only because of the outstanding scientists who presented their work but also because of the delicious array of cakes and pastries from Fitzbillies – the best cake shop in Cambridge. The other attraction was seeing Professor Robert McCance FRS and Dr Elsie Widdowson FRS (President of The Nutrition Society, 1977-1980; see later) in action. They always sat at the front close to the speaker and McCance seemed to nod off to sleep soon after the seminar got going. He woke with a start as the seminar ended and, when the chair invited questions, he was the first with his hand up. I was amazed at the breadth of knowledge of both McCance and Widdowson and at their ability to ask really penetrating questions on almost any topic.

After the Diploma in Nutrition, I was delighted to receive a scholarship from the Ministry (later Department) of Agriculture for Northern Ireland to undertake PhD studies in Cambridge. This project built on the research that I had done for my Diploma thesis. My initial focus was on manipulating one carbon metabolism by the bacteria in the reticulorumen – the first part of the ruminant animal’s “stomach” – in an attempt to reduce methane production. This was decades before current worries about the contribution of methane emissions to global warming and climate change. My work aimed to improve the energetic efficiency of fermentation in the rumen and to make more of the energy in consumed food available to the animal’s tissues. It soon became apparent that it was not possible to see this aspect of metabolism in isolation so my PhD expanded into considerations of interrelationships between energy and protein metabolism in the rumen.

As soon as I had finished the experimental work for my PhD, but before I had written any chapters of my thesis, Eric Miller invited me to take up a Research Assistant post to work with him on methodology for determining the amino acid requirements of ruminants. The previous RA had not made much progress with the project and had left prematurely so I had ground to make up both conceptually



and practically. The challenge was much more difficult than determining amino acids needs of non-ruminants such as mice or humans. This is because everything that the ruminant eats is potentially broken down by the microbes in the rumen. In the end, we showed that the problem could be solved by infusing graded doses of the amino acid under investigation (we used methionine as our exemplar) into the duodenum or directly into the blood via the jugular vein. We then used an isotopic-labelling approach to identify the infused dose at which the animal had a surplus of the amino acid.

After the long slog of experimental work for my PhD, followed immediately by the demanding work on amino acid requirements, writing my thesis was a distinct pleasure. I had time to read and to think. I spent many happy hours in the University Library as well as in various departmental libraries. This, of course, was long before the internet when finding, and then reading, a journal article meant a physical visit to the relevant library, much leafing through indexing systems and wandering through the stacks. One advantage of the delay in writing up my thesis was that a paper appeared describing a “new” mathematical approach that I was able to apply to some of my data.

Although I do not have any particular mathematical ability, I was attracted to the application of mathematical approaches in nutrition and to the idea that at least some aspects of nutrition might evolve from being an empirical science to more of a predictive science. I admired the work of Dr (later Sir) Kenneth Blaxter FRS (Director of the Rowett Research Institute; President of The Nutrition Society, 1974–1977) who treated nutrition as a quantitative science at a time when much nutrition research was descriptive. His book on “*Energy Metabolism in Animals and Man*” remains a *tour de force*. Later, following his retirement from the Rowett, Blaxter was a Visiting Professor at Newcastle University where I had the privilege of sharing with him my emerging ideas for independent research.

After the joy of completing my PhD, I had a couple of difficult years. I had hoped to stay in Cambridge to continue my work on amino acid metabolism and so I applied, unsuccessfully, for fellowships. Fortunately, I got a post at the Centre for Tropical Veterinary Medicine in Edinburgh University where I worked for about 18 months. Although my time in Edinburgh was brief, it was a hugely important time, personally and professionally. I was now married with two small daughters. We lived on the edge of the beautiful Pentland Hills south-west of Edinburgh and started to put down roots. However, my post, like most of the others at the CTVM, was on a year-by-year basis and so I was delighted when I was appointed to a permanent Lectureship in Newcastle University. This was my opportunity to begin an independent research career.

## Learning to communicate

At school, and as an undergraduate, communication was not a priority for those of us studying science. Knowing “stuff”, practical (lab) skills and problem solving were emphasised. However, the longer I have been in science, the more important communication has become. Georg Orwell remains one of my all-time heroes and, at school, I read Orwell’s essay “*Why I write*”. In it, Orwell says “...It is not easy. It raises problems of construction and of language, and it raises in a new way the problem of truthfulness.” Although Orwell was referring to political writing, the issue is the same for scientific writing. Poetry has also been an inspiration for me since it is the form par excellence in which image and truth are conveyed with the greatest impact and fewest words. In a poetry class at school, one of my peers referred to a hedge as “...*Like green icing, finger-poked*”. Nearly 60 years later, I am still in awe of his creativity.

Professor Sir John Burn, one of my long-term collaborators (see later), has a remarkable ability to make complex ideas understandable using analogy, metaphor and imagery. In the inaugural lecture for his Chair, he operated two slide projectors simultaneously, one showing data and the other images illustrating the concepts he was talking about. The audience spent most time viewing the images. Undoubtedly, when well done, less is more. Dr Elsie Widdowson was also a past master in written and oral communication for whom less was always more. She chose her words with care and used deceptively simple language to convey deep understanding.

Telling a good story is always important. Following his move from Cambridge to the University of California, Berkeley, now Professor, Kenneth Carpenter wrote a series of excellent histories of nutrition. One of the best was “*A History of Scurvy and Vitamin C*” which reads like a detective story. In addition, as the reviewer in the *New England Journal of Medicine* wrote, it reveals the reality of scientific research “.... in all its confusion, the wisdom of experience, the blindness of prejudice and authority.” Carpenter was also a humanitarian with a strong understanding of economics from whom I learned to look at the world more holistically.

As I write this, the world is struggling with the COVID-19 pandemic. In that context, Snowden’s “*Epidemics and Society*” is very timely. Based on a lecture course for students of history at Yale University, this is a brilliant, sweeping, highly-readable history of humankind’s interactions with disease-causing microbes. Throughout, Snowden notes the importance of nutrition, especially malnutrition, in paving the way for epidemics. For me, Snowden’s big lessons include our collective failure to learn from history and our continuing failure to plan for foreseeable events. Perhaps more pertinently, he draws attention to our willingness to tolerate an economic system that neglects “negative externalities” which, sooner or later, will exact a heavy cost in terms of public health. We have

seen that play out over the past year in terms of the genesis of COVID-19 and the amplification of its effects in those with obesity. At a more prosaic level, Snowden reminds me of how invaluable having to teach students has been in teaching me how to communicate my science.

## Doing scientific research

My lectureship in Newcastle was within the Department of Agricultural Biochemistry & Nutrition and David Armstrong remained Head of Department. At appointment, it was agreed that I should develop a new line of research and teaching in human nutrition and health to complement the Department's successful work in farm animal biochemistry and nutrition. I embarked on a series of studies using rats as models to investigate the digestion and fermentation in the large bowel of complex carbohydrates in human foods. Here the work that I had done in Cambridge on rumen fermentation was an excellent platform on which to build and, with the help of several talented PhD students, we began to make some progress. However, doing work directly in humans remained a challenge.

When I took up my lectureship in Newcastle (1983), there was very limited interest in nutrition among clinicians and, especially, clinical academics. An exception was the then Professor of Surgery, Professor Ivan Johnson, who was interested in enteral and parenteral nutrition for his patients. Through him, I acquired my first MD student, Mike Bradburn, with whom I have continued to collaborate over the last 30 years. Professor Johnson was also instrumental in my meeting the then Dr John Burn, a clinical geneticist who had recently taken on responsibility for the local NHS Genetics service. John's MD thesis was on the genetic basis of heart malformations but by now he was much more interested in inherited forms of colorectal cancer (CRC) and, in particular, in people with Familial Adenomatous Polyposis (FAP). Fortunately, FAP is relatively rare. However, those with the condition develop multiple adenomatous polyps (pre-neoplastic growths) in their large bowel, often starting around puberty, and by early adulthood, one or more of these polyps will have transformed into a cancer. This is in contrast with sporadic ("ordinary") CRC that occurs usually in later life.

John had a vague idea that we might be able to use research on people with FAP to tell us about CRC, in general. Having been brought up in the coal-mining area of NE England, John was fond of saying that people with FAP were like the canary that miners used to take into the mine tunnels with them. Canaries were more susceptible to dangerous gases e.g. carbon monoxide so that, if the canary became ill, the miners knew to get out immediately. I was interested in testing nutritional interventions that might prevent, or delay, CRC development. So testing our interventions in people with FAP was an exciting way forward.

However, others were much more sceptical. We had extensive criticism from colleagues who believed that the genetic contribution to FAP was so strong that

nutritional or drug interventions were unlikely to be beneficial. When we started our collaboration, the germline gene defect in FAP had not been identified and we did not know that the same gene (APC) was mutated in almost all CRC. We now know that the protein encoded by the APC gene is a key component of the WNT signalling pathway. When the APC gene is mutated and the cell cannot make a functional copy of the APC protein, the WNT signalling pathway is activated and this switches on oncogenes that drive tumorigenesis. Understanding how nutritional factors influence WNT signalling continues to be one of my research interests.

Dietary fibre was a top candidate agent when we were planning our first human intervention study. However, the question was what form of dietary fibre to use? Around that time, I had started working on resistant starch (RS) and, through Dr (now Professor) John Cummings, I had become a partner in a network called EURESTA, an EU-funded FLAIR Concerted Action. EURESTA brought together researchers from about 40 institutions across Europe who were interested in the physiological consequences of RS in humans. The field was developing fast and RS appeared to have multiple health benefits, including reducing CRC risk, so John Burn and I chose RS as our nutritional intervention. We paired RS with aspirin and designed a 2\*2 factorial intervention study (the CAPP1 Study) to be carried out in young people with FAP. Now we needed just two things: i) a means of recruiting these relatively rare individuals into a long-term clinical trial and ii) funds to carry out the work. For the first, we benefitted enormously from collaboration with members of the Leeds Castle Polyposis Group (LCPG), a coalition of researchers and clinicians interested in FAP. Through the LCPG, we recruited our study participants from multiple centres in the UK and across Europe. Our initial funding came from the EU Biomedical and Health research programme (BIOMED 1). Being very naïve trialists, we had little idea about the complexity of the challenge that we were taking on and had underestimated how much money, expertise and effort would be needed to deliver the study. We had also under-estimated how difficult it would be to enrol teenagers in a trial that required them to take pills (aspirin) and to consume sachets of white powder (our RS supplement) every day for at least a year. In the end, through a big dose of optimism, sheer hard work from the research team and extra funding from the Imperial Cancer Research Fund (now Cancer Research UK), the Medical Research Council and others, we finished the trial. We were way over budget and it had taken many more years than we had expected but we had established our credentials in the field.

This led to the much bigger, more expensive, and more informative CAPP2 Study that had a similar 2\*2 factorial design and investigated the same agents (RS and aspirin) but this time in a much more tractable patient group – adults with Lynch syndrome. Lynch syndrome patients carry a germline mutation in one of the genes encoding the DNA mismatch repair system and develop CRC (and cancer at other sites) earlier than the general population. Again, we benefitted enormously from

collaboration with colleagues across the world, facilitated by the International Collaborative Group on Hereditary Non-Polyposis Colorectal Cancer. It took us 10 years to complete the CAPP2 Study but, twenty years later, we continue to make new discoveries using the accumulating data from follow-up of the original participants.

The Food4Me Study is a more recent example of a large-scale, multi-disciplinary study in which collaboration with EU partners was the essential ingredient. The bid for funding was led by the charismatic Professor Mike Gibney (President of The Nutrition Society, 1995 – 1998) who has an enviable track record of attracting EU funding. In preparation for our funding bid, we had a series of one-day meetings in Amsterdam airport with our collaborators. They were slightly surreal days – setting off for the airport in the dark, spending all day in a windowless room and flying home in the dark. In one of those planning meetings, Mike told us that he felt that we had a good chance of getting the funding but that the project itself would not be particularly interesting and that it would be unlikely to lead to many publications. His first prediction was correct but, fortunately, he was way off with the other two. Food4Me was set up to investigate the concept of personalised nutrition and the central element was an intervention study. I led the intervention study that was delivered via the internet to participants in seven European countries. We had excellent collaboration from colleagues in each of these countries and we were able to introduce multiple innovations in both study design and delivery. I benefitted from outstanding support from my then post docs Dr Carlos Celis-Morales (now University of Glasgow) and Dr Katherine Livingstone (now Deakin University, Australia) who drove the data analysis and paper writing. The Food4Me Study has generated dozens of publications and more are in the pipeline. Equally important for me, I have the good fortune to continue to collaborate with Carlos and with Katherine as they develop their independent research careers.

### Building Research Structures

An individual's research may be important but there are opportunities to do more, and to have greater impact, when there is a supportive infrastructure. As I have mentioned earlier, when I was appointed to my first post in Newcastle, there was little interest in human nutrition research across the university. However, I became aware of Professor Andrew Rugg-Gunn who held a Chair in Preventive Dentistry in the Department of Child Dental Health. Andrew had a considerable interest in nutrition, particularly nutritional epidemiology in respect of oral health. At the time, Professor (now Sir) George Alberti (Honorary Fellow of The Nutrition Society) was Professor of Medicine in Newcastle. Importantly, he was also Chair of the Research Committee of the Northern Regional Health Authority. In 1994, George facilitated an award to Andrew Rugg-Gunn and myself to set up the Human Nutrition Research Centre (HNRC) in Newcastle University. This award enabled us to appoint two lecturers – Dr (now Emeritus Professor) Chris

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Seal and Dr (now Professor) Ashley Adamson. Together with a technician, a part-time secretary, and with office space in an area of the Royal Victoria Infirmary dedicated for clinical research, we launched the HNRC.

Our mission was, and continues to be, to use multi-disciplinary approaches to address real-world issues in nutrition and health. George Alberti's initial funding, and his continuing wise counsel, enabled the HNRC to grow and thrive. We adopted the strapline "From molecules to public health" to encapsulate our work on underpinning mechanisms through nutritional epidemiology to the development, implementation and evaluation of interventions. Until his retirement in 2001, Andrew Rugg-Gunn was an excellent co-Director who steered our nutritional epidemiological research, and challenged us to do better research. The HNRC became the focus for nutrition research and attracted collaborations with colleagues from many disciplines within, and beyond, the university.

In 2002, there was a Call from the EU, under the 6th Framework Programme, for applications to establish Networks of Excellence in the area of nutritional genomics. This fitted very well with our emerging strengths in using molecular methods to investigate the mechanisms through which nutrition influences cell function and, ultimately, health. My HNRC colleague Professor John Hesketh and I planned a bid. At the outline stage, it became apparent that we were going head-to-head with another bid led by Dr Ben van Ommen from the TNO Nutrition and Food Research (The Netherlands). After a bit of horse-trading, we joined the van Ommen-led consortium and were successful in attracting a very large award. This facilitated establishment of NuGO – the European Nutrigenomics Organisation – that set the pace for nutrigenomics research globally for many years. NuGO also led to many new collaborations and new research projects including the Food4Me Study (see earlier).

In 2019, the HNRC celebrated its 25th Anniversary and we were delighted to welcome back to Newcastle Professor Sir George Alberti and Professor Andrew Rugg-Gunn, as well several of our alumni. At about this, the University was re-focusing of its research mission and we bid successfully to establish a new Centre of Research Excellence in Healthier Lives. This builds on, and incorporates, the HNRC but has an expanded remit to include other major behaviours

I looked forward to Nutrition Society meetings, big and small, as a time to meet up with, and to make new, friends and colleagues.

notably physical activity and alcohol use. Our new Centre of Healthier Lives is explicitly multi-disciplinary with a vision to provoke a step change in research on interventions to improve public health locally, regionally and globally.

### The Nutrition Society

The Nutrition Society has been a central part of my scientific life. One of my earliest memories is of being in the audience whilst Professor John Webster (President of The Nutrition Society, 1992-1995) described aspects of animal gut physiology with remarkable clarity and impact. Over many years, I have benefitted enormously from listening to world-class speakers on a wide range of topics. Equally important was the apprenticeship of presenting Original Communications. Initially always as oral presentations, OCs were, and remain, a great way for early career researchers to showcase their research. My first OC was at a meeting in the University of Reading. I was very nervous and so I had practiced carefully what I was going to say. To my dismay, the presenter immediately preceding me, Dr Roy Smith (Chairman of the Editorial Board of the British Journal of Nutrition, 1982 – 1988) spoke about a similar topic and had similar opening remarks. I did not have the wit to make a joke about it and, somehow, stumbled through my repetitive opening.

In time, I took on responsibilities within the Society. This started in 1983 as a member of the BJN Editorial Board (under Roy Smith's leadership) and then, from 1988 – 1990 as Editor of the Proceedings of The Nutrition Society. These were formative experiences that exposed me to the full gamut of nutrition research and taught me not only how to evaluate such studies but also how to communicate research findings. It also embedded me in a community of researchers and helped me to develop networks in the UK and globally. I looked forward to Nutrition Society meetings, big and small, as a time to meet up with, and to make new, friends and colleagues.

This role also provided a wonderful opportunity to work with Dr Elsie Widdowson through co-editing a book of articles to celebrate The Nutrition Society's Golden Jubilee (Widdowson & Mathers, 1992). Although she had retired formally twenty years previously, she was still working hard and she set a blistering pace in reviewing the chapters. Indeed, despite being more than 40 years her junior, I had to be at my best to keep up with her. Near the end of our editing work, Elsie invited me to visit her at her home in Barrington in Cambridgeshire where we worked through some of the remaining manuscripts.

Then it was time for lunch – a simple but delicious meal including apples from her orchard. This seemed entirely fitting given that Dr Widdowson's PhD in chemistry from Imperial College London was based on the analysis of the carbohydrates in apples.

In 1993, I was elected as Honorary Secretary of The Nutrition Society and I served in that role under two Presidents. This was the beginning of a period of change for the Society – Professor John Webster (President until 1995) and then Professor Mike Gibney. My perception is that John represented stability and continuity whereas Mike was keen to shake things up. Through Mike, I had an introduction to the politics of nutrition research nationally and internationally and to the deal-making that is essential for institutions such as the Federation of European Nutrition Societies (FENS) and the International Union of Nutrition Sciences (IUNS). This was also excellent training when I represented the Society on the Royal Society's Scientific Unions Committee and on the IUNS 21<sup>st</sup> Century Committee.

Sometime in early 2000, Professor Christine Williams (President of The Nutrition Society, 1998 – 2001) took me aside at a Society meeting and asked me if I would be interested in being the next President of the Society. I was taken aback. I did not know that that was how such things were done and I had not been expecting the question! In due course (summer 2001) I was elected as the 21<sup>st</sup> President of the Society – one of the proudest moments of my life. This was the beginning of the genomic era and of the subsequent revolution in biological research. I felt that the Society needed to embrace new ways of doing science and so a theme of my presidency was encouraging the Society to look outwards and to connect with cognate areas of science within the remit of other disciplines. That trend towards greater connectivity and more inter-disciplinary working to address big societal issues has continued. In the teeth of the perfect storm of a global climate emergency (exacerbated by food-related issues) and a global epidemic of obesity, the centrality of nutrition, and the opportunities for nutrition researchers, has never been greater.

In 2019, I took on a new role for the Society as Editor-in-Chief (EiC) of the *British Journal of Nutrition*. It is a great privilege to have the opportunity to lead our flagship journal and to follow in the footsteps of such a distinguished cohort of EiCs. Next year (2022), we will celebrate the BJN's 75th Anniversary. During the year, we will reflect on some of the outstanding nutritional science that has been published in the BJN and we will continue to contribute to addressing global issues of nutrition and health.





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## Professor Ann Prentice

OBE, PhD, FMedSci, FafN, FSB

### 2004-2007

My earliest memory of The Nutrition Society was in 1985 when I attended the 13<sup>th</sup> International Congress of Nutrition in Brighton. The Nutrition Society hosted this congress on behalf of the International Union of Nutrition Sciences. It was attended by over 2000 participants from 92 countries. I had recently returned to my post-doctoral studies after having spent five years researching in The Gambia, and it was inspiring to hear and meet so many enthusiastic nutritional scientists from all over the world.



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I became more closely involved with the development of the Society when there was a move to set up topic networks to cater for the ever-widening number of specialist interests within the membership. At the first meetings I attended in the 1980's, many of the original communications were about studies of animal nutrition and husbandry or on human clinical nutrition. However, within a few years, the burgeoning ability to apply objective measures and biomarkers to cellular and metabolic research meant a much greater emphasis on research into human nutrition and health at different ages and in different populations. I helped to establish the Reproduction and Health Group, a network of members with a special interest in the nutrition of pregnant and lactating women and their offspring. This enabled us to input into the programming of symposia and to run dedicated oral and poster sessions at meetings in our area of interest. This was a formative experience for me, giving me greater insights into the running of the Society and providing new opportunities to make professional friendships and collaborations.

In 2003 I was selected as President-Elect and served as President from 2004-7. During this time I attended a number of Society committees and contributed to an external task force on the professionalisation of nutrition. This was a time of change for the Society because of the recent introduction of new charity laws. Together with the other Honorary Officers, we forged the Society's first Strategic Plan, and had many discussions on how best to separate the charitable and professional functions of the Society which ultimately led to the creation of the Association for Nutrition. I remember this period as one of high-intensity pressure coupled with close comradeship with all involved from the Society, without whom I would not have been able to achieve anything worthwhile during my Presidency. The guiding light behind these changes, and the person who was instrumental in keeping me sane during this period, was the late Fred Wentworth-Bowyer, the Executive Secretary of the Society from 2005-14, of whom I have very fond memories.

Of the many Society meetings I have attended, one that stands out in my memory is the summer meeting in Cambridge in 1987. This coincided with the Diamond

Jubilee of the MRC Dunn Nutrition Unit where I was working. The meeting was held at Robinson College, the sun shone throughout, and many of the luminaries of nutrition science past and present were able to attend and pass on their wisdom to those of us starting our careers. The meeting was a huge success and the Society dinner at St John's College was a triumph, going on long into the warm summer evening.

Many of my memories of The Nutrition Society revolve around informal meetings with members to catch up with their research, to mull over scientific puzzles and to support and help each other through difficult periods. This was never more important than the time in the late 1990's when the MRC decided to move the Dunn Nutrition Unit away from population nutrition research to mitochondrial biology with the appointment of a new director. The furore and concern that this caused within the nutrition community ultimately led the MRC to create a new centre in Cambridge, MRC Human Nutrition Research (HNR), which I directed for the next 20 years. I shall be forever grateful for the personal support and friendship given by members of the Society to me and all the others who were affected at the Dunn, and for their high-level lobbying that led to the formation of HNR.

Most enjoyable of all were the social events at Society meetings which gave time to get to know members and relax in their company. Each meeting laid on social events with their own distinctive flavour, from pub quizzes to caelidhs, from formal dinners in grand banqueting halls to buffet meals in interesting places. The Summer Meetings often coincided with major sporting events such as football cup finals and the Wimbledon tennis tournament, and somehow many of us would find ways to be at the social event and still watch the sport, even in the days before mobile phones. And there were other particularly memorable occasions – torrential downpours in Leeds, a lightning storm over the UEA campus in Norwich, an early morning fire alarm at our hall of residence in Glasgow caused by exuberant steam in the small shower rooms that led to us gathering outside and admiring each other's nightclothes! All very happy memories. Since the start of the coronavirus pandemic in 2020, of course, such social gatherings have been impossible. During this challenging time, the Society has been highly successful in bringing up-to-date scientific programmes into our homes through video conferencing. However, its essential networking function through imaginative social events and dinners has necessarily, but regrettably, been curtailed. We are all looking forward to their resumption as soon as the pandemic has eased.

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As these recollections reveal, the Society has been a central part of my professional life from my first venture into nutrition science. I had the pleasure of recounting some of my research experiences when I was selected for the Society's inaugural Widdowson Award in 2020. For the Award lecture and subsequent paper in the Proceedings<sup>(1)</sup> I took as my topic "*Hard Facts and Misfits*" in honour of the inspiring advice I had been given by Dr Elsie Widdowson early in my career. This was "*If your results don't make physiological sense, think and think again! You may have made a mistake (in which case own up to it) or you may have made a discovery. Above all, treasure your exceptions. You will learn more from them than all the rest of your data*"<sup>(2)</sup>. As many

of my students and post-doctoral scientists over the years will confirm, this is a piece of advice I repeat very frequently! Dr Widdowson helped to fund some of my initial research into nutrition and bone health and she later consented to give her name to the new building purposely built for HNR in Cambridge, The Elsie Widdowson Laboratory, which we moved into in 2000/1.

I have been very fortunate to have worked with many wonderful people and in many places around the world, far too many to detail here. Top of the list are all those members of my research groups in Cambridge and The Gambia, and our collaborators, without whom none of my research would have been possible. But there is a special place in my heart for the people of Keneba, The Gambia, who, many years ago, welcomed me and other members of Dr Whitehead's team into their village and who have participated in our studies for many decades. They have contributed more to our understanding of global nutrition and health than they will ever fully realise. Key to this success has been my close friend and colleague, Dr Landing Jarjou, who has led my Gambian research group for many years and been a pivotal link with the people of Keneba.

Keneba is a resource-poor, predominantly farming community in the West Kiang region, that had previously hosted research on the demographics of malaria since the early 1950's<sup>(3)</sup> When we first started our nutritional studies in The Gambia in the 1970's, the sub-Saharan drought was at its worst and food was in very short supply. An attempted coup to oust the country's president added to the problems. The generosity and spirit of the villagers through the years, and particularly during those difficult days, has been especially inspirational. At a personal level too, they have befriended and supported me throughout, and the villagers cherish

my two daughters as their own. My daughters were born during the time I was living in the village, and the ladies of Keneba gently taught me all I know about demand breast-feeding! I am deeply grateful and appreciative of them all.

It was while I was living in Keneba that I started my research into the composition of breast-milk. My undergraduate and PhD degrees were in chemistry, and I was not convinced that the assays available at that time, developed as they were for cow's milk, were valid for breast-milk. This was a concern for other researchers around the world and became a major focus for members of the newly-established International Society for Research into Human Milk and Lactation (ISRHML). This ultimately resulted in the collaborative production of a comprehensive treatise on the composition of milk, which remains essential reading for those in lactation research to this day<sup>(4)</sup>.

In the same way as The Nutrition Society, ISRHML has played a central role in my career. The biennial meetings, rotating around different continents, have been especially rewarding scientifically and have led to many enduring friendships. The ISRHML aims to promote breast-feeding through scientific evidence and, because of my associations with the Society, I was privileged to be invited to join a Working Group that held a seminal meeting at the Vatican in 1995. This was the symposium "Breastfeeding: Science and Society" co-sponsored by the Pontifical Academy of Sciences and The Royal Society of London. This was held to present the scientific evidence on the advantages of breast-feeding, and it culminated in an audience with, and encouragements from, His Holiness Pope John Paul II<sup>(5)</sup>.

The importance of generating robust evidence to inform nutrition policy has been a fundamental driver of my research and led to my long-standing involvements with the National Diet and Nutrition Survey and the UK Scientific Advisory Committee on Nutrition. The results of my studies have often been at odds with the general consensus, especially those relating to calcium and vitamin D requirements, as I described in the Widdowson Award lecture mentioned earlier<sup>(1)</sup>. The ability to synthesise scientific evidence on nutrition has been enhanced in recent years by the development of techniques for statistical modelling, systematic reviews and meta-analysis. However, it remains the case that a thorough understanding of the methodologies used in the studies is essential for a proper reading of the data. In my experience, this is particularly true of nutritional biomarkers because their interpretation depends heavily on sample collection, analytical processes and the environmental and physiological conditions at the time the samples were obtained. This is also the case for intermediate health markers, such as bone mineral density measured by dual energy X-ray absorptiometry which, without careful adjustments, can give rise to erroneous conclusions in population studies<sup>(6)</sup>.

These are just a few of my recollections from the past 40+ years in nutrition research and I hope there will be many more to come. Much has changed



over that time. At the beginning of my career, calculators were rudimentary, there were no personal computers, no internet, no mobile phones. Data were collected, collated and analysed on paper. Papers, theses, letters and memos were typewritten, diagrams prepared with tracing paper and letraset, presentations by photography to create transparencies for projection. I remember my astonishment when I received my first fax message transmitted from a colleague in Australia, complete with a drawing of a tree! When I was stationed in Keneba, the fastest line of communication with the UK was the weekly session with Dr Whitehead via amateur radio, which required me becoming a licensed amateur radio ham. Over the years, computing power has increased dramatically, larger and larger studies have become possible, and sophisticated laboratory, physiological and statistical techniques have been developed to tackle ever more complex questions. For many years, older papers generated before the digital age, with their more limited size and methodology, became forgotten or disregarded, despite the fundamental insights many of them contained. Fortunately, this trend is now being reversed and many of the older bibliographies are being digitised, archived and made available via the internet.

Some things, however, have not changed and are as important to nutrition scientists today as they were when I started. The kindness and generosity of colleagues, the curiosity to ask questions and make new discoveries, the desire to improve the health of people round the world through evidence-based solutions, the importance of collaboration, networking and learned societies. My adventures in nutrition research to date have gone in a flash and there is much more to do and to look forward to. I hope that the current generation of early- and mid-stage investigators derive as much enjoyment from their research as I do, and that they have long and fulfilling careers in nutrition science.

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## Professor Ian A. Macdonald

PhD, FIBiol, FAFN, FIUNS, FTPS

### 2007-2010

I have been a member of The Nutrition Society since I was a PhD student with Mike Stock in the early/mid 1970's. During my early years as a member of the Society there was another Ian Macdonald (Professor at Guy's Hospital Medical School) who was President of the Society from 1980 to 1983. The similarity in names led to a number of amusing situations where invitations to attend meetings/give lectures were sent to the wrong person.



I have been a member of The Nutrition Society since I was a PhD student with Mike Stock in the early/mid 1970's. During my early years as a member of the Society there was another Ian Macdonald (Professor at Guy's Hospital Medical School) who was President of the Society from 1980 to 1983. The similarity in names led to a number of amusing situations where invitations to attend meetings/give lectures were sent to the wrong person. One of the most amusing was when I was invited to give a talk at the Golden Jubilee meeting of the Society, on the basis that I was a past President. At that stage, in the early 1990's, I had not been President and so had to diplomatically ensure that the invite went to the right person. Interestingly the Programme for the meeting continued to have IA Macdonald as the speaker (ie me) rather than I Macdonald.

My first recollection of a Nutrition Society Scientific meeting was in 1976 at Llandaff College in Cardiff. I gave an oral presentation of a study undertaken by Nancy Rothwell (now Dame Nancy) when she was a final year undergraduate BSc student at Queen Elizabeth College and I was a 3rd year PhD student who supervised her project alongside Mike Stock. This of course preceded the days of Powerpoint presentations, the 35mm slides took about a week to be made by the Audiovisual Department, and the Seminar room which hosted the meeting was fairly basic and did not even have a pointer to help show what was on the slides. Fortunately these were the days of printed Programmes and Abstract books so I rolled the Programme into a cylinder and then elongated it to make a pointer. Once I had given the talk the home made pointer was borrowed by the subsequent speakers!

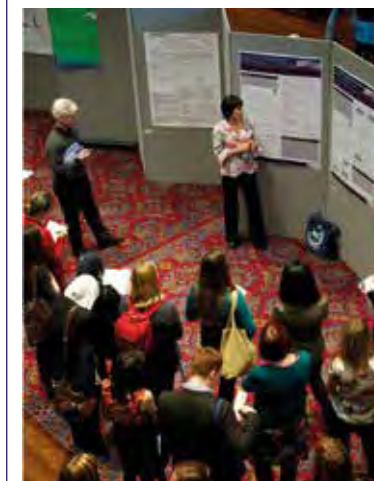
The Nutrition Society has evolved substantially in the subsequent 45 years and now plays a major role in supporting Nutrition Societies around the world. It is very satisfying to see that The Nutrition Society Office is so well regarded by our colleagues in other countries that it provides administrative support for both the IUNS and FENS, as well as providing outstanding support to the Society in the UK and Republic of Ireland (ie the British Isles).

My recollections of The Nutrition Society are extensive, and some of the older ones have probably either become embellished over time or even completely rewritten (at least in my memory). I was fortunate in spending approximately 10 years on Council before I was elected to be President so I had a good idea of what I was getting into. My time on Council and then as President was challenging but also very stimulating, with the development of the Register of Nutritionists, initially administered by the Society but eventually transferred to the newly formed Association for

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Nutrition, the financial crisis of 2008 and subsequent purchase of the adjacent property to the one already owned in Hammersmith, which benefited from very low bank interest rates. Having extensive discussions with a solicitor acting for the Society when a Registered Nutritionist was threatening to sue the Society and me after disciplinary action was taken, was not something I had expected. I was very confident that both the Society and I had acted appropriately and thankfully this was endorsed by the legal advisors and nothing came of it.

My final thoughts are about The Nutrition Society's Scientific meetings (and accompanying social events) and its future developments. The size and quality of the Society's meetings has developed enormously since that day in 1976 when Nancy Rothwell and I drove to Cardiff to present her project data. The pre-Covid Society meeting jointly with FENS in Dublin in 2019 was excellent and showed the clear International standing of The Nutrition Society. This quality has been building over the previous 30 years since the development of the



Professor Ian Macdonald chairs a poster session



Summer Meetings and reduction in the number of smaller meetings throughout the year. One major feature which has been kept and even expanded is the encouragement of the Research students by having focused meetings which they organise and chair, and Postgraduate symposia at the Summer meeting. This has made a major contribution to the development and success of Nutritional Science in the British Isles and will hopefully continue in the future.

One of the enduring characteristics of The Nutrition Society meetings and the membership of the Society is their friendliness and collegiality. One drawback of this collegiality was the enthusiastic social events, especially the ceilidhs at the Irish meetings, which sometimes had a detrimental effect on the meeting the following morning. I hope The Nutrition Society continues to successfully combine high quality science, friendliness and support for all nutrition scientists both in the British Isles and around the world.



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## Professor Sean Strain

OBE, MRIA, BSc, BAgr, PhD

### 2010-2013

My first job, after completing my PhD at Queen's University Belfast, was as a lecturer at Newcastle College of Advanced Education, New South Wales in Australia. During my three years and more (1977-1980) in Australia, I joined The Nutrition Society of Australia (NSA) and attended and presented at their early meetings.



Attendance at the Society meetings in the 1980s was vitally important for me as I tried to develop a research base and establish networks with others in the nutrition field in the UK and on the Island of Ireland.

my wife Brenda and our baby, Daire, travelled with me and I wasn't in a position to attend the conference dinner. The next day a senior member of the Society approached me to ask why I had not attended the conference dinner arguing that it was one of the most important occasions for networking at any scientific meeting. My Aussie experience made me acutely aware of the importance of the social programme, and especially the conference dinner, at any scientific meeting and I always made sure during my career that there were ample funds available for research students and early career researchers to attend such events. Given my membership of that Society in its formative years, I was delighted to be invited back as a key-note speaker at their 25th Annual Scientific meeting in Canberra in 2001. This close interaction with the NSA led me to try to foster closer links with other nutrition societies when I became President of The Nutrition Society many years later.

I became a member of The Nutrition Society in 1981 after my return to Northern Ireland. Attendance at The Nutrition Society meetings in the 1980s was vitally important for me as I tried to develop a research base and establish networks with others in the nutrition field in the UK and on the Island of Ireland. My time in Australia was very enjoyable socially but I had a large teaching load and undertook little research. I did, however, successfully transition from animal nutrition, which was the basis of my PhD, to human nutrition and continued in that vein of interest during my employment at the Ulster Polytechnic, Jordanstown (just north of Belfast).

The year, 1984, was a momentous one as the Polytechnic merged with the New University of Ulster to form the University of Ulster and I found myself in a university environment with one paper to my name and only one previous small research grant which I had obtained during my time in Australia (coincidentally, around this time the College at which I worked in Australia amalgamated with Newcastle University across the creek). I consider myself to be an accidental research academic as I would have had little chance nowadays of being appointed to a university at 34 years of age with such a poor research record. Anyway, I had to fast-track my research profile and the merger facilitated that end. I met Gerry

My first job, after completing my PhD at Queen's University Belfast, was as a lecturer at Newcastle College of Advanced Education, New South Wales in Australia. During my three years and more (1977-1980) in Australia, I joined The Nutrition Society of Australia (NSA) and attended and presented at their early meetings. At one of the NSA meetings in the late 1970s,

McKenna who was soon to be promoted to a Chair in Biomedical Sciences and later Pro-Vice-Chancellor, Research, and eventually Vice-Chancellor. Gerry had a very strong interest in horse-racing, which matched my own passion, and he also had the vision to promote nutrition with a new undergraduate course. Together we wrote and managed to get validated, against both internal and external opposition, new BSc degrees in Human Nutrition and in Dietetics. We were able to visit those institutions in GB with similar degrees and my networking through The Nutrition Society was crucial in attaining those goals. There is little doubt that Ulster would not have achieved excellence in nutrition research confirmed by successive research assessment exercises nor a critical mass of nutrition researchers without having these degrees in place. The first intakes were in 1986 and one of our students of that year became a valued colleague, namely Alison Gallagher, who also gave much of her time in later years to The Nutrition Society as Honorary Programmes Officer. I was fortunate to be in the right place at the right time to build significant research capabilities at the University and to surround myself with such excellent colleagues. I was one of two nutritionists (the other was Barbara Livingstone who was in a different Faculty) at Ulster at that time and nutrition at Ulster was eventually rationalised to one campus (Coleraine) in 1989.

I also managed to get my first PhD students at the time of the merger and supervising research students is critical for an early career researcher, especially for one late into the race. My first two research students were Dr Sean Lynch and Dr Davy Carville, both of whom subsequently got post-docs in the USA. Sean is still there working at Midwestern University but Davy tragically died in an accident. Another of my early PhD students was Dr Goudarz Mazdai from Iran and with whom I have kept in close contact throughout his career. Goudarz later studied medicine and was one of the top oncologists in Tehran before moving back to Northern Ireland to work in the Western Trust at the local Altnagelvin Hospital. I remember all three attending and presenting at Nutrition Society meetings with all of us on edge with questions followed by the open discussion by all present on whether their abstract was publishable in the *Proceedings of The Nutrition Society* (PNS). This format no longer exists for current Nutrition Society meetings and perhaps this is no bad thing, given the mental stress that it imposed on both student and supervisor.



Northern Ireland Diet and Health Study Team and Advisory Board, Giant's Causeway, Co. Antrim, 1984

L to R: Kate Thompson, Sean Strain, Marion Wright, Denis Burkitt, Derek Miller, Gerry McKenna, Margo Barker, Oliver White, Alison Black, Arthur Williamson

Even though I was in awe of other presenters and those with enough confidence to ask questions and indicate amendments to abstracts, many of the senior Nutrition Society members at that time were very supportive. The late Derek Miller, was an important early mentor and a member of the Advisory Board for the Northern Ireland Diet and Health Study. Dr Denis Burkitt and another Nutrition Society member, Dr Alison Black, were also members of the Advisory Board for this large grant and Margo Barker, now a Professor at Sheffield Hallam University and who continues to be an active member of the Society, was employed as a post-doctoral fellow. I also met a young John Mathers, who was originally from Northern Ireland, at these Nutrition Society meetings in the 1980s and Professor Mathers became President some years later.

The 1980s was an exciting time for the development of nutrition on the Island of Ireland. An important date was 11th June 1986 when Gerry McKenna and I met with Mike Gibney who had recently returned to Ireland from Southampton to take up a post at Trinity College Dublin. This meeting led to a number of fruitful collaborations and it was obvious that there was now a critical mass of those interested in nutrition on the Island of Ireland. Dr Fred Andrews of Trinity College Dublin organised a successful Nutrition Society meeting in Dublin in July 1988. Mike Gibney took advantage of our critical mass and our ability to organise successful meetings by managing to get The Nutrition Society to agree to an Irish Section and we had our first scientific meeting at University College Cork in September 1989. Mike was the first Chair of the newly formed Section, with Fred as our first Secretary and with me as the first Treasurer. I found that the experience with the Irish Section was very helpful, especially when I undertook subsequently two terms as Honorary Treasurer of the Society. I followed in Mike's footsteps as Chair of the Irish Section as did Albert Flynn, from University College Cork who took up the Chair of the Section after me and after his three-year term as Secretary. Other universities, colleges and health professionals on the Island of Ireland with interests in nutrition supported the initiative and the Irish Section has organised some excellent meetings over the years.

Working on the Irish Section committee was also an advantageous experience for the career development of my colleagues at Ulster. Professor Mary Ward is a past Chair of the Section. As we had the complications of two currencies, a

The possession of a cost centre within the Society allowed us to undertake a number of Irish Section initiatives and one of these was the establishment of a post-graduate research meeting, organised and run by the students.

succession of Treasurers from Ulster looked after the sterling account. Professor Barbara Livingstone took over as treasurer from me and was followed by Professor Julie Wallace, who sadly died at a young age. Julie's legacy is the annual Julie Wallace Award which the Irish Section presents for recognition of scientific excellence by early career researchers (a colleague, Dr Kirsty Pourshahidi, was the first recipient). Professor Alison Gallagher was also Treasurer of the Irish Section before terms as Honorary Programmes Officer for The Nutrition Society and she is now Editor-in-Chief of the PNS. Alison was succeeded by Dr Pamela McGee and the current Treasurer of the Irish Section, Dr Mary McCann. The possession of a cost centre within the Society allowed us to undertake a number of Irish Section initiatives and one of these was the establishment of a post-graduate research meeting, organised and run by the students. This very successful initiative was largely self-funded by grants sought by the students and has run annually ever since the early 1990s. It is gratifying that this idea was also taken up centrally by The Nutrition Society a decade or two later.

I was responsible for organising the first Irish Section meeting at Coleraine in 1991. This meeting was successful scientifically and I even found time to enjoy the social programme as well but it was an important meeting for other reasons. One was the formation of the Irish Universities Nutrition Alliance (IUNA) to formalise the partnership among those Universities with nutrition research and degrees at that time. This initiative was led by Professor Gerry McKenna and involved the setting up of a memorandum of understanding signed by representatives from University of Ulster, Trinity College Dublin and University College Cork. It was a cross-border, North-South initiative, which predated the Good Friday agreement, and it is still in place. The IUNA never obtained formal funding and we did not always take minutes of meetings, many of which were held in hostels. This alliance, however, was central in obtaining several large EU-funded grants. University College Dublin became a signatory when Professor Gibney moved his team there from Trinity College Dublin some years later. Professor Flynn now flies the flag for IUNA (IUNA.net) with rolling dietary surveys in Ireland and the first such survey also included Northern Ireland. One important outcome of IUNA and the establishment of the Irish Section was that the three of us (Flynn, Gibney and Strain) have remained life-long friends.



"The three amigos" at Joint Irish Nutrigenomics Organisation (JINGO) Symposium, Dublin, 2013

L to R Albert Flynn, Mike Gibney, Sean Strain

That first Nutrition Society meeting at Coleraine attracted a number of Irish science luminaries, including Professor Pat Morrissey from University College Cork and Professor John Scott from Trinity College Dublin. Professor Scott was obviously impressed with our potential and advised a recent PhD graduate of his that the University of Ulster would be a good place to continue her research career. Helene McNulty, who also attended the meeting, was that graduate and we subsequently managed to attract Helene, who had just started out on an alternative industry-based career at Kellogg's (Manchester), to the post of lecturer in human nutrition and dietetics at Coleraine. Thereafter, Professor McNulty built up a large Folate and B vitamin research group at Ulster and she took over as Director of the Northern Ireland Centre for Diet & Health (NICHE, more details later) on my retirement in 2016. John remained an important mentor of, not only Helene, but for many of us at NICHE over many years until his untimely death in 2012. The high standing and recognition of nutrition science in Ireland is reflected in that John (1984), Helene (2008) and I (2002) were elected as Members of the country's senior academic body, The Royal Irish Academy (MRIA).

Networking at Nutrition Society meetings was instrumental in attracting Professor David Thurnham and his team to Ulster in 1992 on the back of a Howard Foundation Scholarship. We also managed to appoint Professor Ian Rowland at the University as Director of NICHE, a research centre we had established through EU Structural funds in 1996 and it is now known as the Nutrition Innovation Centre for Food & Health with the same acronym.

The experience gained with the Irish Section was useful when I was local organiser for The Nutrition Society Summer meeting at Coleraine in 1996. Most events, both science and social, went smoothly except for a missing speaker, buses not turning up at the right place on the campus to take delegates to the

conference dinner and the final bus not turning up to take delegates back after the post-dinner entertainment. Fortunately, the hotel minibus helped out with multiple shuttles and everyone eventually got back to the campus safely. Unbeknownst to me, there was an employee dispute at the local Ulsterbus station and there was a work-to-rule in place. In any event, it was mostly an enjoyable experience and I even found time to attend some of the



Sean Strain with Fred Wentworth-Bowyer

science in between trouble-shooting.

I devoted much time to the affairs of the Society and in turn the Society played an important role in establishing my research portfolio and furthering my career prospects in those early years. I was obviously delighted and deeply honoured when, years later, Professor Ian MacDonald contacted me to inform me that I had been nominated as the next (24th) President of the Society. I

accepted immediately but not without apprehension. As President-elect, I was able to ease into the position by attending meetings of the Officers and Council and I got to know the workings of the Society again and the importance of the office staff and the Chief Executive, the late Fred Wentworth-Bowyer, in the smooth running of the Society. Presidents and Honorary Officers come and go but the implementation of decisions taken and the assurance of continuity require a diligent executive. Even so, there can be occasional glitches as we discovered when we investigated why we were not getting any International Union of Nutrition Societies (IUNS) correspondence. We discovered that a past Executive member had not bothered to amend the point of contact on leaving the Society. The links with IUNS were re-established and the Society now plays an active and important role in IUNS and also in the Federation of European Nutrition Societies (FENS). I relied greatly on Fred during my time as President and together with the serving Officers, I think we progressed the Society.

I took over from Ian at the 2010 meeting at Heriot-Watt University, Edinburgh and a number of my colleagues made the journey over to mark the occasion. Some of our initial work was consolidating and extending the initiatives of my predecessor. I inherited an excellent bunch of Officers, whom I knew well. The out-going Honorary Treasurer, Professor Harry McArdle, was a close collaborator and friend when I worked on trace elements and it was great forming a working relationship with him again. Harry agreed to remain on the Board without portfolio and took over as Honorary Secretary from Professor Carolyn Summerbell during my tenure. It was also very rewarding to renew close working relationships with another long-standing friend, Professor Chris Seal, who was Honorary Scientific Development Officer at that time. Chris had served multiple terms as an Honorary Officer (and still does) and knew much about the workings of the Society. The in-coming Honorary Treasurer was Dr Kate Younger, whom I knew very well from the Irish Section. I also greatly appreciated the help provided by Professor



Nutrition Society Summer meeting 2010 at Heriot-Watt University, Edinburgh (photograph taken by Barbara Livingstone)

L to R: Ann Prentice, Mary Ward, Mike Gibney, Sean Strain, Chris Seal



Brian Ratcliffe, Honorary External Relations Officer, Dr David Bender, Honorary Publications Officer and Dr Beckie Lang, Honorary Training and Education Officer during my time as President. Others, who were elected during my tenure and were also hard-working team members, were: Professor Andrew Salter (Honorary Scientific Officer), Dr Dean Sewell (Honorary External Relations Officer)

and Sarah Stanner and Sue Bird (both taking up the Public Engagement portfolio at different times). In recognition of the importance I placed on international links and extending the influence of The Nutrition Society world-wide, Dr Paul Amuna was elected to a new post of Honorary External Affairs Officer.

I had inherited from Ian a process for the formal separation of the Association for Nutrition (AfN). The AfN eventually became a financially and structurally independent organisation and my sincere thanks to Professor Alan Jackson for facilitating the process and for establishing alternative funding arrangements for AfN. Other Governance issues included the 1st Annual Charity meeting (supplanting the AGM) at the 2012 Summer meeting. Electronic voting came of

**I was very pleased to be able to present, on behalf of the Society, a Gold Medal at the Anniversary dinner in London in December to each of our living past-Presidents.**



Inspection of Gold Medal by Jo and Mike Gibney; looking on is Nino Binns (centre) at 70th Anniversary dinner

age at this time and we established a lecture in memory of Professor John Waterlow, a new journal, the Journal of Nutritional Sciences, and the Public Health Nutrition medal.

One of the first initiatives during my tenure was collaboration with the American Society of Nutrition (ASN) to run a joint meeting at University College Cork. This meeting was highly successful and was a forerunner of other collaborative ventures with ASN including the e-learning hub. I had attended ASN conferences in the past and had met many of the leading lights through the late Dr Vernon Young of Massachusetts Institute of Technology. Vernon undertook a short sabbatical at Ulster and was an important mentor and friend. The links with nutritionists in the USA were also helpful from the perspective of my close collaboration with University of Rochester, New York, through



Presentations of Gold Medal at the 70th Anniversary dinner, 2011

multiple large National Institutes of Health grants (covering the period between 2002 to present) to study the risks and benefits of maternal fish consumption using mother-child cohorts in the Seychelles.

I was especially interested in establishing formal links with other nutrition learned societies and we ran a joint meeting at Lille, France with The French Society of Nutrition and Belgian Nutrition Society in May 2013.

I was invited to give a lecture by The Nutrition Society of Taiwan, the Korean Nutrition Society and the Chinese Nutrition Society on different trips and formal links were established with these and with a number of other national societies of nutrition including the NSA of which I had a particular interest extending back to my early career. I was very well received by all and made me appreciate the esteem with which The Nutrition Society is held in world-wide nutrition and scientific circles. Likewise, when I was a member and vice-chair of the European Food Safety Authority (EFSA) Panel on Dietetic Products, Nutrition and Allergies (NDA) and the inaugural Chair of its Working Group on Claims, I was heartened by the respect that other European members of EFSA had for the activities and publications of The Nutrition Society. I was also President of the European Nutrition Leadership Platform (ENLP) at that time and made attempts to facilitate meetings/events at our Summer conference. The ENLP supports courses which have run for 27 years in Luxembourg, has a membership of over 1,000 in the network, and was founded by Professor Jo Hautvast, who is an Honorary Fellow of The Nutrition Society and a valued mentor of mine in the past. I have always been a European at heart and I look aghast at current political developments in GB as science and research should have no borders in Europe or elsewhere.



Sean and Brenda Strain at 70th Anniversary dinner, 2011

Then again I might just have been attending Nutrition Society conferences for all these years just for the craic; we used to joke in the Irish Section that we set the social programme first and arranged the science around it.

The highlight of my tenure as President was the 70th Anniversary Celebrations. The celebrations were spread over 2011 with events at the Summer meeting in Reading and at the Winter meeting in London. I was very pleased to be able to present, on behalf of the Society, a Gold Medal at the Anniversary dinner in London in December to each of our living past-Presidents: Mike Gibney, Ian MacDonald, John Mathers, Anne Prentice, John Webster, Roger Whitehead and Christine Williams. It was also a very pleasant task to present Mrs. Liz Costin with a Gold Medal for long and valued service to the Society. Presidents of other national societies of nutrition with which we had formal links were also invited and a number attended this event.

Dr Margaret Ashwell, the editor of this book asked me to expand on: “my fondest memory of a Nutrition Society event”. I have attended many memorable conferences, including those of the Irish and Scottish Sections and of course the four Summer meetings (Edinburgh, Reading, Belfast and Newcastle) when I was President have a special place in my memory. Other meetings of note include the first IUNS meeting I attended. This meeting was held in Brighton and hosted by The Nutrition Society at great expense. The meeting was very enjoyable and I have attended all IUNS conferences since. The following three, after Brighton, in chronological order in Seoul (made new Nutrition Society friends and met up with old), Adelaide (first trip back to Australia since my Newcastle days) and Montreal (for all sorts of reasons including initial meeting with Vernon Young) were also most enjoyable and memorable. I think that the first of the Summer meetings organised in 1989 at Oxford Polytechnic by Professor Jeya Henry, now in Singapore, might be the most memorable of The Nutrition Society meetings. It was a difficult choice to make even amongst the Summer meetings as I’ve attended all such meetings since that date up until last summer. Perhaps my choice was influenced by the fact that everything at that time was still relatively new to me and that included champagne receptions.

The Plenary Symposium was “Diet and Cancer” with Sir Richard Doll as the keynote speaker and the Colloquium was on transgenics and biotechnology, “A brave new world or much ado about nothing”. Each of the Specialist Groups at that time organised a symposium and most held their business meeting and AGM at the symposium. There were five symposia in total organised by the Clinical Metabolism and Nutritional Support Group, Energy and Protein Metabolism Group, Micronutrient Group, Nutrition and Health Group and Reproduction and Growth Group. The conference banquet was a black tie affair and it took place after a champagne reception at Keble College. The banquet address was given by Mr. David Mellor, Minister for Health, albeit after a short delay and a frantic search to uncover his written speech, which had gone missing at the top table. One of those at the top table had actually been sitting on it! Post-dinner entertainment in those days was usually not provided and once the nearest nightclub had been located, but before further networking could begin, the men

had to remove their black tie in case of confusion with the quite large gentlemen who were controlling entry and exit.

Conferences in the age of the pandemic are quite different from those days and I suspect that the convenience of attending lectures on-line from home or office will dictate some sort of hybrid format for future Nutrition Society conferences. There is something missing, however, as I never get very enthused with the on-line format; it is not the quality of the lectures as some have been very good. Perhaps, there are too many distractions when attending on-line or the effort to attend in person in the lecture theatre makes one appreciate the lecture and accompanying questions much more. Then again I might just have been attending Nutrition Society conferences for all these years just for the craic; we used to joke in the Irish Section that we set the social programme first and arranged the science around it.

To end, I'd like to go back to a comment I made in the first paragraph of the importance of the social programme, and especially the conference dinner, in facilitating networking as it would be a major loss for research students and early career researchers if they could no longer attend such events. Networking at Society events was hugely important for my own career and I look forward to continuing to do so as an Honorary Fellow of the Society and in my current position as Emeritus Professor of Human Nutrition at Ulster University.



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## Professor Catherine Geissler

BDS MS PhD RNutr

2013-2016

The field of nutrition provides an enormous variety of opportunities from genetics, through clinical studies, epidemiology, nutrition interventions, to government and international policies. There has been a great variety in my trajectory so keeping the overview relatively short is difficult. As Mark Twain said “If I had more time, I would have written a shorter letter”.





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## Edinburgh

I was born and brought up in Edinburgh. Both of my parents were artists: my father was a watercolourist although he made his living teaching art in a teachers training college, Moray House in Edinburgh. My mother became a renowned glass engraver, having returned to the Edinburgh College of Art to collect ration cards just after the WW2 and was persuaded to try engraving, now that she had more time, with my brothers and myself now at school. Later they advised my brothers and me not to take up art for a living and we all went for science. I decided to become a dental surgeon as a careers lecturer had focused on oral pathology and the detection of disease which I found interesting and it seemed to combine science with artistic or technical aspects. I soon realised it was not the right occupation for me and I almost changed to medicine but was dissuaded for various reasons including an opinion that as a woman it would be easier to get a part time job when I had a family. I did finish the course which I enjoyed, and graduated with a BDS, Bachelor of Dental Surgery.

## Paris

I then escaped from various constraints to Paris for a year, having applied for and been granted a scholarship from the French Government to work in a hospital in Paris conducting a study on oral lichen planus and cancer. There I lived in the Maison Franco-Britannique and met fascinating people from all over the world which expanded my horizons and desire to see more of the world. A book I read in Paris was ‘The Geography of Hunger’ by Josue de Castro, a Brazilian physician, expert on nutrition, geographer, and activist against world hunger. He received the International Peace Prize in 1954 and became chairman of FAO. The book turned out to be influential in my subsequent life. I returned to Scotland to keep my mother company as my father had died while I was in France, my brothers had gone to National Service or university so she was suddenly alone. I practiced dentistry for a year, which convinced me I wanted another way of life.

## Berkeley

I then joined friends to travel to Berkeley, California. At that time, in the late 1960s, it was easy to get a permanent visa, and almost immediately on arrival I found a part time job teaching dental radiography in San Francisco City College. It was a time of great social ferment, peaking in 1968, including black power, flower power, and anti-Vietnam war demonstrations. It was through my involvement in some of

these activities that I met Doris Calloway and Sheldon Margen, both Professors in the Nutrition Department at the University of California, Berkeley, who were both social activists. They told me about a research grant available in the Nutrition Department on the availability of fluoride in fish protein concentrate, to determine whether the level of fluoride could be detrimental to teeth and bones. I applied and was awarded the grant.

The current belief was that protein deficiency was a major worldwide nutrition problem. The idea had originated in a description of kwashiorkor in Ghana by Cicely Williams, a doctor in the Colonial Medical Service in the Gold Coast, now Ghana, in 1933, in which she said it may be due to protein deficiency. The idea was taken up by the post war UN agencies including FAO where Brock and Autret published ‘Kwashiorkor in Africa’ and estimated it to be ‘the most serious and widespread nutritional disorder known to medical and nutritional science’.

Protein requirements were calculated for world needs and a World Protein Gap was declared. In 1955 the UN Protein Advisory Group (PAG) to WHO/FAO/UNICEF/WFP had been established and widespread efforts were made to close the gap with the development of high protein cereals, myco-proteins, leaf proteins, and fish protein concentrate. The latter was considered to be a good quality protein, inexpensive and with good storage, but its contraindications were a high fluoride content of 60-300 ppm from bones & scales, leading to fears of toxicity with tooth mottling in children and excess bone deposition. The US Department of Agriculture (USDA) reserved endorsement of its production and use, hence the proposed research project.

The Fish Protein Concentrate research was carried out on rats and indicated that the absorption of fluoride was considerably less than from the same amount as NaF and therefore the impact on mottling and bone deposition was reduced. This was reassuring, but developments in the field later showed that the research was irrelevant. The World Protein Gap was later declared a myth. Several researchers examined the relationship between energy and protein metabolism and this culminated in 1974 McLaren’s article in the Lancet entitled the ‘Great Protein Fiasco’, in which he postulated the problem was lack of food, not specifically protein. He noted that the Protein Gap belief had resulted in much wasted effort over 30 years. However over the same period I completed a Masters degree in Nutrition at Berkeley.

## Iran

In 1970 I went to Iran with my first husband, a fellow Berkeley nutrition student and agricultural economist, who was French. He was assigned there for his French national service in an agreement between the French and Iranian governments following discussions between Professor Tremolieres in Paris and Dr Hedayat, Director of the Nutrition Institute in Teheran. We both worked there

for 2 years where I was involved in several areas of research including energy expenditure and lactation and community nutrition consultancy. Dr Hedayat was interested in collecting information about the nutrition situation and energy requirements of the population. He instituted Nutrition surveys in several parts of the country and wanted to compare energy intakes with requirements of various population groups. We carried out the measurement of energy expenditure of agricultural workers and also female carpet weavers and villagers. Dr Hedayat had noted that one of the problems in Iran was lactation failure and so this was chosen with Doris Calloway as the topic of research for my PhD. It was carried out in two socioeconomic groups: low and middle class women in Teheran, and resulted in 3 publications: on the social and economic aspects; diet and nutritional status, and hormonal factors associated with lactation failure.

The consultancies were in Baloutchistan, an area divided between Iran and Pakistan. It was the poorest part of Iran in the arid south east. There was extensive migration of workers from Baloutchistan to the Gulf states, and political unrest. We undertook several consultancies with Parsconsult, an Iranian company investigating water supplies in the arid area and the impact on the population, largely nomadic, for the Iranian Ministry of Planning. This involved several periods in different areas of Baloutchistan. These were carried out initially while based at the Nutrition Institute, but also after return to France in 1972 and to the US in 1974.

We also spent fascinating time camping with the Qashqai nomadic tribe around Shiraz, introduced by a colleague at the Nutrition Institute, a Khan in enforced exile from his tribal lands as the tribe was historically opposed to the national



Camping with the Qashqai nomadic tribe

regime. This provided an insider view of the way of life of these nomads and carpet weavers.

After 2 years in Iran, and several months in Paris writing my thesis I returned to Berkeley to complete my PhD, complete a divorce, and then looked for a job. Doris Calloway gave me introductions to several research centres in the UK and I learned about a lectureship on Nutrition planning about to be advertised in Queen Elizabeth College (QEC), University of London. I applied and was interviewed by the Head of Department, Professor Arnold Bender, and the Principal of the College, as I passed through London on my way to a consultancy in Baloutchistan. Urgent messages at that time were sent by telegram and the telegram address of QEC was Queen Beth. A telegram arrived in the middle of the desert offering me the job from Queen Deth. Was this a bad omen? In any case I accepted the offer.

## London

The context of intersectoral National Nutrition Planning started in the 1970s. In national development up to the 1960s it had been assumed that as countries developed economically improvements in health and nutrition would trickle down to the under privileged. This was not always the case. In the early 1970s Alan Berg of Johns Hopkins and later the World Bank wrote 'The Nutrition Factor: its role in national development' in which he reversed this assumption and proposed that with specific interventions to improve nutrition and hence manpower, the improved human resource would lead to economic development. In 1973-4 there was a World Food crisis with famine in several parts of the world and in 1974 an FAO World Food Conference was called, attended not only by agricultural and nutrition specialists but also by politicians. Before and after the conference there was a plethora of publications on food, nutrition, and national development. The outcomes of these deliberations included encouragement of countries to develop integrated national food and nutrition plans. Technical support was provided by FAO and the United States Agency for International Development (USAID). In 1975 Leonard Joy of the Institute of Development Studies in Brighton and Philip Payne of the London School of Tropical Medicine (Joy and Payne) prepared for FAO a guide to National Nutrition Planning. This intersectoral approach was promoted for a few years but was thwarted by several problems including lack of evidence about which interventions work, the question of where nutrition should sit in ministries, and the reluctance of ministries to collaborate.

## Energy research

Following energy work in Iran my first area of research in Queen Elizabeth College was in collaboration with a senior colleague, Derek Miller, who had done extensive work with others on energy and protein metabolism, including overfeeding experiments. They found great variation in individual weight gain

under the same excessive energy intake and activity levels, providing evidence of energy dissipation, thermogenesis. In the 1970s obesity was not considered a major problem and there was little research funding available. Now it is a vast enterprise, but not yet resolved.

The QEC research group including several PhD students conducted a series of studies, starting with the construction of a low budget room respirometer that was shown to be very accurate to enable measurement of energy expenditure over 24 hours or longer. We used this to validate field techniques for measuring energy expenditure ie short term measurements of individual activities linked to longer term activity diaries – the factorial method. As examples of our studies, we compared obese & lean subjects and the effects of thermogenic substances on energy expenditure. Most of this work was in fact published after Derek's untimely death at the age of 61 in 1986.

A current controversy was whether obesity was due to gluttony and sloth or defective thermogenesis. Was there evidence of defective thermogenesis in obese? Resolution of this question was hampered by most studies comparing metabolic rates of the lean with the obese. Expression of these results is misleading as obese of same height as lean have more metabolic tissue and dividing by body weight assumes all tissues to be equally active, while dividing by lean body mass assumes obesity tissue is inactive. To explain differences in obesity it is not valid to compare obese and lean subjects because of differences in body composition, weight, food intake, and activity. We therefore compared: women who had been obese, now slimmed (post-obese PO) and subjects who had never been obese (lean L), matched for height, weight, age, BMI, body fat and



Thailand

lean body mass. This was conducted at various activity levels: sedentary; mild exercise; and aerobic exercise.

We found that the metabolic rate (MR) of PO was 15% lower than L at any level of activity and BMR was 10% lower; thermogenesis was 50% lower, partly due to lower food intake but also reduced thermogenic response. There were differences in family history of obesity: 88% of PO had a family history, compared to 38% of L. Those with a family history had lower MR, indicating an influence on energy expenditure over and above personal history

If a factor in susceptibility to obesity is reduced thermogenesis what effect have thermogenic substances on daily energy expenditure? For example, we investigated caffeine. A single dose of 100 mg caffeine was provided over 24 hours in room respirometer. The metabolic rate (MR) was measured in PO & L after 100 mg caffeine with or without a 300 kcal meal. The metabolic response to the meal was only half in PO compared to L. This defective diet induced thermogenesis (DIT) in PO was improved by caffeine while in L there was only a small additional stimulation. In further experiments on caffeine in a room respirometer, 100mg caffeine was consumed every 2 hrs during the day. This increased EE of both PO & L by 8-11% during the day, with no residual effect at night. There was therefore a 5% increase in daily EE ( $p < 0.02$ ) at normally consumed doses, a significant thermogenic response.

### Public health nutrition

In the 1970s little was known about the effectiveness of nutrition interventions and lack of evidence of effective interventions was one of factors thwarting intersectoral national nutrition planning. Since then there has been accumulating evidence of effective nutrition interventions mainly in developing countries. For example: 1980 Gwatkin, Wilcox, Wray. Can health and nutrition interventions make a difference? 1982 Burgess Evaluation of Nutrition Interventions; 1987 Berg. Malnutrition – What can be done? Lessons from World Bank Experience; 1991 Gillespie & Mason. Nutrition-relevant actions – some experiences from the 80s and Lessons for the 90s; 2001 Allen & Gillespie. What works? A review of the efficacy and effectiveness of nutrition interventions. And many more resources have been developed to monitor effective interventions including: the Cochrane Collaboration since 2004 providing systematic reviews of health interventions; WHO eLENA, the e-Library of Evidence for Nutrition Actions, from 2009; WHO GINA, a global database on the Implementation of Nutrition Action to show which interventions are being carried out, from 2012; and the WCRF NOURISHING policy framework, a database of food policy actions that have been implemented with robust design and potential for impact.

Some of the international nutrition studies in which I have been involved, in many cases along with PhD students include in: Iran (food rationing after Iran-



Iraq war, Islamic revolution 1979); Yemen (rural migration, agriculture decline, imports, food aid); Kenya (Maasai diet and lipid levels); Indonesia (interventions on female factory workers); Argentina (dieting, anorexia, hypercholesterolemia); Thailand/Philippines (comparative nutrition in comparable economies); California (nutrition of farm workers); China (The China Study – nutritional epidemiology data analysis). A couple of examples follow.

In 1990 Indonesia was rapidly industrialising, with a growing female workforce. The research project, fronted by a PhD student, Gill Mackilligin, was to investigate interventions at the place of work to improve nutrition, health & productivity. 5 Jakarta factories were selected: textiles, plastics, printed goods, pharmaceuticals, and 252 subjects. Pre-intervention it was found that 47% had anaemia; 94% intestinal parasites, and poor health. Work conditions were very difficult: heat, noise, poor sanitation, and few accessible food sources. Sanitation was improved for all the factories and the factory based interventions were: with or without medical treatment (anthelmintics and daily iron and vitamins; and either nutrition education or other education. The most effective intervention was medical treatment plus nutrition education, in increasing energy intake, general health, productivity, nutritional knowledge, and decreasing absenteeism. In a subsequent follow up the International Labour Organisation (ILO) commissioned manuals and audiovisual materials on: Hygiene and Sanitation in Factories



Department of Nutrition & Dietetics, Kings College, London at Kensington site before moving to Waterloo in 1999

L-R Judd, Geissler, Emery, Wiseman, Leeds, Sanders, Nelson, Thomas

and similar establishments; Canteens and eating places in Factories and similar establishments; Running a clinic in Factories and similar establishments. The studies also led to an ILO pilot project on improvement of welfare facilities and services for women factory workers in 14 Jakarta factories in 1988 and an ILO project in enterprises in 3 provinces – Java, Sumatra, Sulawesi – funded by Dutch government, from 1989.

In the early 1980s China was emerging from the cultural revolution and moving from state farms and communes to family responsibility system. I participated in a European funded study from 1985 on adaptation to low energy intakes in Hainan. The site was chosen by our Chinese colleagues, but it turned out the energy intakes were not low. However, the collaborative study provided a potentially useful training opportunity in energy research for young Chinese scientists.

This experience was followed by work on a China Study that had been organised from Beijing, Oxford and Cornell (Chen Junshi, Li Junshi, Richard Peto, Colin Campbell) in the late 1980s. The context was that China was a rich source of epidemiological data on health and nutrition over a long period, being a huge country, with a wide ecological range, a then stable population with little migration. The study was carried out in 65 counties, with 367 variables including mortality rates, blood & urine indicators, food constituents, food and nutrient intakes, and lifestyle and geographic factors. The data was published in a 900 page monograph, available for extensive data analysis. I spent a sabbatical year in Cornell between 1989-90 on data analysis and the preparation of publications. These included a range of topics such as: cirrhosis of the liver and mouldy bread; plasma cotinine, smoking and lung cancer in China; China: from diseases of poverty to diseases of affluence-policy implications of the epidemiological transition; antioxidant status and cancer mortality in China; impact of large-dose vitamin A supplementation on childhood diarrhoea, respiratory disease and growth; vitamin A and carotenoid status in rural china; and China: the soyabean-pork dilemma.

Through this work I was privileged to meet influential Chinese scientists including Chen Jun Shi who was instrumental in designing and organising the China study, and Chen Chunming. She was the founding President of the Chinese Academy of Preventive Medicine, now called the Chinese Center for Disease Control and Prevention to which she became Senior Adviser. Her research and advocacy on nutrition and public health revolutionized preventative healthcare in China. She designed the National Nutrition and Food Surveillance System and conducted 8 rounds of surveillance (1990-2010). She died in 2018 aged 93.

### Queen Elizabeth College/King's College

It was around this time in the mid 1980s that Queen Elizabeth College, a small college, merged with King's along with other mergers. On my return from Cornell



in 1990 I was appointed head of the Department of Nutrition and Dietetics, taking over from Professor Donald Naismith and became involved in negotiating the move from leafy Kensington to the Franklin Wilkins Building across Waterloo Bridge from the main King's site on the Strand. As head of department there were additional administrative duties as well as teaching and research supervision. The department was part of the Division of Health Sciences which included physiotherapy, gerontology, and pharmacy. In 1994 I was promoted to Head of the Division and Professor of Human Nutrition.

## Iron research

Another area of research moved to iron. It started in an unconventional way. I was visiting a friend and was surprised to see that she put orange juice on her cornflakes instead of the usual milk. Small student research projects were needed for final year nutrition students. I attended a Pharmacy Department seminar on measuring Fe absorption by the O'Neill Cutting 1984 method using serum Fe curves in Fe deficit subjects. I decided to use the method to measure the difference of absorption between the orange juice and milk cornflakes for a student project. The results demonstrated, as expected, that Fe absorption was considerably greater with orange juice.

This led to collaboration with the Health Sciences iron group. Some of group were working on haemochromatosis which has a high (10%) incidence in Celtic, English, and Scandinavian populations, with 1% being physically affected. It is caused by a mutation of the HFE gene that can lead to increased absorption of iron, resulting in iron overload and non-transferrin bound iron (NTBI) that causes tissue damage, especially in the liver and heart. It is often undiagnosed until the damage occurs. Some of the studies included: Fe availability from foods using serum Fe curves and the development of a food group algorithm. In relation to haemochromatosis we studied: the effect of proton pump inhibitors in reducing iron absorption and so the need for phlebotomy; the effect of Milk thistle, silybin, as an iron chelator; differences in post-prandial Fe absorption according to HFE phenotype; and the relationship between iron supplementation and the production of NTBI.

The standard method for measuring Fe bioavailability is by quantifying the incorporation of radioactive isotopes  $^{55}\text{Fe}$  or  $^{59}\text{Fe}$  or the stable isotope  $^{58}\text{Fe}$  into haemoglobin, 2 weeks after consumption of a test meal. This is technically demanding, and requires expensive equipment and expertise. In contrast the serum Fe curve method, based on the O'Neill Cutting publication on testing for Fe deficiency by measuring serum iron curves following a small dose of iron. The method is simple, inexpensive, and uses iron deficient subjects. We decided to test this method to measure the availability of iron from foods. With iron deficient subjects the serum iron curves over 4 hours clearly distinguished between meals of high and low availability and correlated well with relative absorption calculated by the standard labelled iron method.

In view of the well-known oxidative effects of some iron supplements and the detrimental effects of NTBI we tested the absorption of Fe from a standard dose of Fe So4 (200mg FeSO4 with and without food) and found increasing levels of serum NTBI over 4 hours after the dose. This was corroborated by Schumann K et al. in 2012 in relation to FeSo4 but not to Fe polymaltose or NaFe EDTA, indicating that methods of supplementation other than FeSO4 are likely to be better tolerated.

## Consultancies

I have been involved in several consultancies for example for the World Bank, FAO, WHO, UNICEF, Parsconsult, British Council, ILCA, Pakistan Open University, and IFPRI. The topics were varied, including integrating nutrition in development programmes, in Benin, Ghana, Haiti, Iran, Mauritius, Niger, and Senegal, in which I was the nutrition member of a team, along with other specialists in eg social science, agriculture, finance, etc; some capacity building & course reviews, in Ethiopia, Iran, Pakistan, Sierra Leone, Syria, and Yemen; as well as a programme and management review of IFPRI programmes, in Malawi and Mozambique. These consultancies were very interesting and mostly satisfying in providing an opportunity to participate in improvements in health and nutrition, but others are distressing when political turmoil subsequently destroys the country, as has occurred in Syria and Yemen. For example the Syria consultancy was with a British Council/World Bank team to develop a nutrition and health curriculum for a community development course in Agricultural Institutes in Damascus, Aleppo and Latakia. This is a distressing example of how advances in welfare can be brought to nought by political unrest.

## Administration

Academic life involves much administration and many committees including government and university: at National Level I was a member for many years of the UK Food Advisory Committee, the role of which subsequently became incorporated into the UK Food Standards Agency (FSA), and the World Cancer Research Fund Grant Review Panel. In Kings College London I was on King's College Council; Academic Board; Academic Staff Committee; Appeals Committee; etc. When the UK government became concerned that the University emphasis on research and research assessment, was reducing the focus on teaching, it established the Higher Education Academy and universities were invited to apply to host various subject centres. In King's there was a strong representation of Health Sciences and as Head of the Division of Health Sciences I submitted the bid for King's College London to host the Health Sciences Subject Centre. We won the bid and I subsequently became the Subject Centre Director from 2000-2010. This involved the recruitment of a team and the organisation of conferences and newsletters on

aspects of teaching and learning. The national system was later changed from subject centres based in different universities to a central organisation named Advance HE.

Several of these committees were particularly interesting, for example in dealing with promotions it was fascinating to find out about the interesting work and talents of colleagues in many subjects. Some produced surprises, as did Kings College Council. In 1990 I was appointed to Council as a non-professorial representative, and during proceedings my neighbour told me he was a judge and travelled a lot on circuit. 10 years later I was appointed as a professorial representative, and the judge, now in the Court of Appeal, was also on the Council again. We both remembered our conversations from a decade before, and many more years later we were married – he likes to reserve his judgements.

## Teaching

Teaching has involved lecturing and supervising student projects including undergraduates, Masters, PhD, Intercalated, Medics, and Dentists. Teaching topics were mainly global nutrition and policy, and energy metabolism and obesity. I have calculated there must have been about 9000 students in total. It also involved information dissemination through publications, and nutrition societies, both The Nutrition Society and the American Society for Nutrition (ASN).

Apart from research publications there have been several books. The New Oxford Book of Food Plants, Vaughan and Geissler, with botanical and nutritional information and beautiful illustrations, was published by OUP in 1997. The 2nd edition was published in 2009, unfortunately after death of John Vaughan, the botanist. To complete the edition, I contacted botanists at Kew who pointed



IUNS Council, 2016

out the need to revise the plant nomenclature as it is now based on genetic information. I was fortunate in finding an expert on this at the botanic gardens in Oxford to make the corrections.

Textbooks have included several editions of Human Nutrition. The series started in 1950s as Davidson & Passmore's Human Nutrition and Dietetics. Reginald Passmore was a reader in physiology at Edinburgh University along with Sir Stanley Davidson, Professor of Medicine. Passmore was elected an Honorary Fellow (or Member) of The Nutrition Society in 1983. He produced 8 editions of the textbook, mainly with Davidson but latterly with Professor Stewart Truswell and Martin Eastwood. Hilary Powers from Sheffield University and I agreed to edit the 11th edition but, as there already existed good text on Dietetics, we decided to limit the content to nutrition. This was published by Elsevier in 2005, and the 12th edition in 2010. The 13th edition should have been published in 2015 but was delayed. Elsevier had asked us to prepare that edition, we recruited all authors, and signed our editor contracts, but the contracts for the authors did not appear. The company had decided to review their portfolio and emailed us that they would not continue with the 13th edition. Having made all the preparations we were not best pleased but fortunately managed to keep on board most of authors for a year while we found a new publisher, Oxford University Press (OUP), for the 13th edition in 2017. We are currently preparing the 14th edition due to be published by OUP in 2022.

## Nutrition Societies

Throughout all these activities the associated Nutrition Societies formed a congenial core for a sense of belonging, exchange of information and connection with colleagues and friends. As a member of the American Society for Nutrition since a student in Berkeley I later became a member of the Executive Committee of the Society for International Nutrition Research (SINR) from 1990-96. From the time I came to London in 1976 I was a member of The Nutrition Society of UK & Ireland, later a member of Council from 1987 to 1990 and 1993 to 1996, then Honorary Secretary from 2005 to 2008, and eventually President from 2013-2016. I was honoured to be elected an Honorary Fellow of The Nutrition Society in December 2016 and an Honorary Fellow of the American Society of Nutrition in 2020.

Around the same time as being President of The Nutrition Society I was elected Secretary General of the International Union of Nutritional Sciences (IUNS) at the International Congress in Granada for the term 2013-17. I transferred the Secretariat of IUNS from a commercial company in the Netherlands to be hosted by The Nutrition Society, its original home. At the ICN in Buenos Aires I was re-elected for the term 2017-2021 which has been extended for a year as the International Congress set for September 2021 had to be postponed to December 2022 because of Covid 19.

IUNS started in London in 1946 at a meeting convened by the British Nutrition Society. It was attended by 22 research workers from 13 countries. Dr Leslie Harris who was a Director of the Dunn Nutrition Laboratory in Cambridge, the first Secretary and later President of The Nutrition Society from 1953-1956 was also the first Secretary General of IUNS which he described as threatening 'to become pretty well a full time occupation' but 'a particularly happy feature of this post was the close contact it gave me with eminent nutritionists in different countries'. I concur with both of these remarks. IUNS now it has 82 member countries and 18 affiliated organisations. There are 4-yearly IUNS-ICN congresses, attended by around 4000 participants, the most recent, the 21<sup>st</sup> ICN was in Buenos Aires in 2017, and the 22<sup>nd</sup> will be in Tokyo in 2022, postponed from 2021. IUNS also works through Task Forces on important issues. These are currently: Capacity building; Risk benefit of iron supplementation; Multidimensional indicators of child growth & development; Dietary fat quality; International malnutrition; Sustainable diets; Nutrition & Cancer; Precision nutrition; and Traditional and indigenous food systems and nutrition. These are led by a chairperson, have international membership including young scientists and each is linked to a member of IUNS Council.

## Conclusion

In conclusion, nutrition continues to provide a varied focus. Collaboration with colleagues and students is a delight. There have clearly been great advances in the science and application of nutrition since I started in the 1970s : in genetics and technology and in public health concepts of problems, causes, and solutions such as Scaling up Nutrition (SUN), the FAO/WHO ICN2 in 2014, the UN Decade of Nutrition 2016, 2015 Sustainable Development Goals Agenda for 2030, in the prevalence of undernutrition (but the numbers still too high) and the global increase in obesity; and growing evidence of effective interventions. But there is still much to be done in public health nutrition: to meet global nutrition targets; obesity and associated pathologies are still a problem; global warming and climate change is a growing concern; the recent impact of Covid 19 is still to be fully assessed and addressed; and there is little progress in resolution of conflicts that cause so many nutritional problems. Any success I have had in nutrition is due largely to excellent collaborating colleagues and students, many of whom appear in publications as co-authors, numbering over 200. I thank them for their stimulating teamwork.

We are asked to cite a book or paper that inspired us and a few to pass on to others. There are so many but I shall choose the one that inspired me initially and one that is my current work. These are: *The Geography of Hunger* by Josue de Castro (1946 in Brazil) 1952 Boston, Brown & Co and *Human Nutrition* eds Geissler & Powers Elsevier 11e 2005, 12e 2011, OUP 13e 2017, 14e 2022



With Chen Chun Ming, founding President of Chinese Academy of Preventive Medicine, China

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## Professor Philip Calder

BSc(Hons), PhD, DPhil, RNutr, FSB, FAFN, FHEA

### 2016-2019

I am a New Zealander and have lived in the UK since May 1987. I hold a Personal Chair in Nutritional Immunology at the University of Southampton, where I head a research group, supervise graduate students and teach undergraduates. I am currently Head of the School of Human Development and Health in the Faculty of Medicine. I was President of The Nutrition Society from 2016 to 2019.





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### Early encounters with The Nutrition Society

My academic path has been linked strongly with The Nutrition Society. I joined the Society in August 1989 and have been a member since then. The oldest record I have of active participation as a presenter was at the meeting of the Society's "Clinical Metabolism and Nutritional Support Group" held at the University of Manchester in November 1990, although it seems likely that I had attended Society conferences in the year or so before that. Reading the abstracts published from the Manchester meeting demonstrates the real strength of British research in clinical nutrition and metabolism at the time. By 1990, this strength had led to the formation of an interest group in the Society and to stand-alone meetings hosted by that group; these meetings would lead to a strong and vibrant entity within the Society and eventually to the launch in 1992 of the British Association for Parenteral and Enteral Nutrition (BAPEN), with The Nutrition Society as one of its founders. The meetings of the clinical nutrition and metabolism group, and later of BAPEN, were a highlight of the year for me. These meetings were held in late November/early December often in Harrogate, but also sometimes in locations like Eastbourne and Bournemouth – it was always bitterly cold and there was serious snowfall in Eastbourne at the time of the meeting of December 1995. But the science, the atmosphere and the exchanges at those meetings were remarkable, and somewhat unique, and there were characters aplenty ... Those early meetings, along with other Society meetings which I attended regularly at the time, created long-lasting friendships – Bob Grimble, who became a colleague, mentor and friend when I moved to Southampton in 1995, and the late Ken Fearon, a surgeon with a strong interest in nutrition who I much admired and developed a close friendship with, were both at the meeting in Manchester in November 1990 – and were highly influential on the path and trajectory of my career.

My academic path has been linked strongly with The Nutrition Society. I joined the Society in August 1989 and have been a member since then.

### The early Oxford years

At the time of the meeting in Manchester in November 1990, I was a post-doctoral researcher in Eric Newsholme's laboratory in the Department of Biochemistry at the University of Oxford. I had completed a PhD in biochemistry at the University of Auckland in my native New Zealand in early 1987. The topic of my PhD was the structure and metabolism of glycogen; I had focussed on skeletal muscle glycogen and made discoveries about its structure. At the time, Newsholme was an international leader in the study of metabolism and his lab was producing excellent papers on muscle glycogen metabolism in the context of different physiological, hormonal and pharmacological exposures. Newsholme's pedigree in metabolic biochemistry was second-to-none: he had completed a PhD in Cambridge under the supervision of Philip (later Sir Philip) Randle and had performed key experiments leading to the discovery of the so-called glucose-fatty acid cycle (sometimes called the Randle Cycle), and then later spent some years in Oxford in the laboratory of Nobel Prize winner Sir Hans Krebs. I was fortunate enough to secure the one Nuffield Medical Fellowship allocated annually to New Zealand to enable what was intended to be a two year move to Newsholme's lab to further my studies of skeletal muscle glycogen. I arrived in the UK in late May 1987 and on meeting Newsholme found that he had developed an interest in the metabolism of cells of the immune system. In the early 1980s it was generally believed that immune cells derived all of their energy from glucose metabolism, but two of Newsholme's PhD students had shown that this was not the case and that immune cells could generate significant amounts of energy from the oxidation of amino acids and fatty acids. Newsholme suggested I follow the latter thread and "find out more about fatty acids and immune cells". Having travelled from the other side of the world to work on muscle glycogen with a global leader in that field, Newsholme's suggestion was somewhat of a shock and I must confess I struggled for some time to get my research going. This struggle was compounded by the fact that Newsholme's lab had no facilities for culturing immune cells or for studying their function! Eventually, I was to make links with two research groups in the Sir William Dunn School of Pathology in Oxford, one led by Siamon Gordon, an internationally recognised expert in macrophage biology, and Simon Hunt, a lymphocyte biologist. The generosity of these two Si(a)mons was instrumental to me being able to follow Newsholme's deeply insightful suggestion. I was able to culture macrophages from mice and lymphocytes from rats (and later from humans) and to study their functions. At that time interest in cell membrane structure, in polyunsaturated fatty acids as precursors to bioactive lipid mediators, and in the properties of omega-3 fatty acids was growing. I was in the fortunate position of being able to blend studies of fatty acid metabolism in immune cells with studies of how fatty acids modulated immune cell function and, eventually, some of the relevant mechanisms. Two additional local collaborations were important here. Firstly, somehow I found out that David Harvey in the Department of Pharmacology had a gas chromatograph and a protocol for measuring fatty acids; for the next years Harvey gave me unlimited access to the instrument enabling me to assess the influence of

fatty acid exposures on the fatty acid composition of immune cells, which very few people were doing at the time, and to make studies of fatty acid utilisation by these cells beyond oxidation for energy. Secondly using the state-of-the-art electron spin resonance spectroscopy facility in Tony Watts' lab in the Department of Biochemistry, I was able to make measurements of membrane order in immune cells with altered fatty acid composition. This local network of collaborations enabled me to conduct a programme of highly novel research. I discovered that fatty acids modulate the adhesive interactions of macrophages, which is important in their infiltration into sites of immune and inflammatory activity, including the blood vessel wall, and contributed to new understandings around fatty acids and macrophage phagocytosis. Using a new bioassay for the cytokine interleukin-2 (IL-2) and a very early flow cytometer I was able to show that omega-3 fatty acids affect IL-2 production and activation marker expression by stimulated T lymphocytes. It was the effects of fatty acids on IL-2 production that were the topic of my presentation to the Society in Manchester in November 1990. This research drew me towards nutrition, because the applications of my findings were in nutritional modulation of immunity and inflammation and the subsequent diverse impacts on public health and on patient treatment. This clear link to nutrition was obvious to both Newsholme and myself and by 1989 Newsholme had given over his lab to studying metabolism of immune cells and nutrients and metabolites of relevance to immunity. He renamed the group the "cellular nutrition research group", an affiliation first used on a 1990 paper I published in the *Biochemical Journal* reporting the effects of fatty acids on macrophage functions. In this regard, Newsholme could be viewed as the founder of "immunometabolism", a term not widely used for another twenty years.

### Closer ties with The Nutrition Society

Following on from Manchester in November 1990, I became a regular presenter (both posters and oral communications) at the Society's meetings. The meeting experience was a bit different then: posters were usually rudimentary in construction, talks were given using 35 mm black and white slides via projectors, lecture theatres had hard uncomfortable wooden seats and years of undergraduate graffiti etched into the benches, and conference dinners were rather plain fare served in dimly-lit rooms in town halls. But these meetings were exciting – the science was fun, other delegates were great company, and the characters were entertaining. I was always struck by the dedication of a core of Society members to ensuring the meeting was a scientific and social success; this collegiality has always been a strong attraction of the Society for me. The one really daunting prospect for a presenter at the meetings of that time was the requirement that, after a poster or oral communication and the no-holds-barred questioning, those Society members present would vote by a show of hands on whether the abstract could be accepted for publication in the *Proceedings* or not ... and sometimes it was not. However, my work was well received at Society meetings and I think its novelty was well recognised: very few others were working on nutritional modulation of immunity

and inflammation either in the UK or elsewhere. My first invited lecture at a Society meeting was the joint meeting with the French Society held in Paris in July 1994 ("The Lavoisier Symposium"): this meeting had an extremely well structured programme dealing with metabolism in different cell types and tissues and in different conditions. I was extremely proud of being invited to speak on "Fuel utilization by cells of the immune system"; thinking back, it is incredible to realise that the immune system was included alongside the more traditional metabolic organs like the liver, skeletal muscle, heart, brain and adipose tissue and I remain grateful to the organisers of that meeting for helping to put the immune system on the metabolic map. Subsequently, I have given a number of invited lectures at the Society's meetings and I have always considered it an honour and a privilege to share my research interests with delegates. The year after the Paris meeting, I was fortunate enough to receive the Society's Sir David Cuthbertson Medal, giving my Medal Lecture at the snowbound Eastbourne meeting of December that year. I don't remember much about my lecture, but what I do remember very clearly is that two well-dressed ladies joined the small gala dinner and that it was not until part way through the main course that they, and everyone else, realised they had come to the wrong event! Over the years, the nature of the Society's meetings has changed: poster presentation has been revolutionised, talks are given using sophisticated software and design, lecture theatre seats are more comfortable, conference dinners have improved, and the much-feared voting on acceptance of abstracts was eventually abolished. However, the important things at the core of the meetings remain unchanged: the science is strong, the discussion is robust, the atmosphere is convivial, and there are always characters. These are the things I love about The Nutrition Society. It focuses on science; it provides unparalleled opportunities for young researchers; it brings together the disparate arms of the discipline treating everything from molecular nutrition to nutritional epidemiology with equal respect; it creates a fellowship amongst individuals who may not always agree on the details but who do agree on the fundamental importance of nutrition to human and animal health and well-being; it is a "family".

### A step-change in my research

My research on fatty acids and immunity over the period from 1987 to 1990 was based on cell culture experiments and, as explained, drew on the generously offered capabilities of others which enabled significant progress to be made. In the period of 1990 to 1993 a series of events allowed a step-change in my research. Firstly,

The important things at the core of the meetings remain unchanged: the science is strong, the discussion is robust, the atmosphere is convivial, and there are always characters. These are the things I love about The Nutrition Society.

in 1990 Newsholme allocated a PhD student, Parveen Yaqoob, to work with me on fatty acids and immune cells. Parveen's motivation, dedication and gentle but determined personality were instrumental to the research successes that followed over the next years. Secondly, in 1991 my Fellowship, which I had managed to extend for four years, came to an end and I was appointed to a Lectureship in Biochemistry and given my own lab! Thirdly, in 1992 I was awarded my first grant. This was from the Nuffield Foundation and was valued at £49,500; this enabled me to employ a research technician (Emma Sherrington) for two years and to cover some laboratory consumables costs. Fourthly, in 1993 I wrote to the CEO of Scotia Pharmaceuticals explaining my research and asking whether his company might fund animal-based research in this field. By return post, he sent a cheque for £30,000 with a hand-written note wishing me good luck with the research – things worked differently back then! Fifthly, in 1993 the Department of Biochemistry allocated me one of their quota MRC PhD Studentships and I took on Peter Sanderson. Finally, also in 1993, Unilever awarded me funds to support a PhD student (Nicola Jeffery) and her research costs. Before the funding from the Nuffield Foundation and Scotia Pharmaceuticals, Parveen Yaqoob and I continued to carry out in vitro research, but with the significant funding and technical help that came in 1992 we were able to start feeding studies in rats and mice with different dietary lipids; this work was helped when I set up my own cell culture facility. These feeding studies focussed on omega-3 fatty acids from fish oil, but also included studies of olive oil and evening primrose oil. The animal feeding studies were continued by Sanderson and Jeffery. This period coincided with the availability of a wider range of antibodies to characterise rodent immune cells and cell surface proteins by flow cytometry and the commercial availability of enzyme-linked immunoassay kits for rodent cytokines. All of this meant that we were able to carry out research on dietary lipids (especially omega-3 fatty acids) and aspects of macrophage, dendritic cell and T lymphocyte function, including activation responses and cytokine production, that was highly novel. These were exciting times in the lab. Sanderson carried out unique research on the effects of dietary lipids on adhesion molecule expression and on immune cell-endothelial cell binding, on antigen presentation by dendritic cells, and on very early signalling events in activated T cells, making several novel discoveries that were quite some way ahead of their time. Jeffery carried out unique studies examining the impact on lymphocytes of highly controlled discrete substitutions of one fatty acid for another in the diet of rats. In 1994 Newsholme and I were awarded a large three-year grant from the Ministry of Agriculture Fisheries and Food (MAFF) who wanted us to translate our research to humans. Parveen Yaqoob, who had just finished her PhD, was appointed as a post-doc on the grant and she was able to carry out our first human trial; this was a fully fledged randomised controlled trial in 48 healthy participants who supplemented their diet with oil capsules daily for 12 weeks. Conducting this study was greatly aided by the Department of Biochemistry who set up a clinical room just for us! We found only modest effects of the oils used (fish oil, evening primrose oil, olive oil) on blood immune cell function but we were able to describe for the first time the time course of the change in the fatty

acid composition of immune cells in response to the oils we used and also the loss of those fatty acids during a wash-out phase. In 1995, whilst that research was ongoing, Newsholme and I were awarded a second large grant from MAFF, this one under the Agri-Food LINK Scheme and involving Unilever. We appointed Frank Thies as post-doc and were able to set up an in-house fatty acid analytical facility. This grant was to support research in humans, pigs and rats. Thies conducted highly novel research in older people with near pure fatty acids of interest (alpha-linolenic acid, gamma-linolenic acid, arachidonic acid, docosahexaenoic acid) as well as with fish oil.

## The move to Southampton

Even though things were going well in Oxford, my future there was uncertain, and Newsholme planned to retire in 1996. An opportunity arose for me to take a post as Lecturer in Human Nutrition in Southampton and I moved south in October 1995. Because of the two MAFF grants, the two post-docs (Yaqoob and Thies) and the two PhD students (Sanderson and Jeffery) I was able to retain my lab in Oxford right up to 1998, an act of extreme generosity by my former employer. In Southampton, nutrition was well established and well recognised for its excellence. The relatively small academic staff of Alan Jackson, Bob Grimble, Steve Wootton, Barrie Margetts and Simon Langley-Evans were all respected and they successfully linked experimental, public health and clinical nutrition. Southampton ran the first accredited undergraduate course in nutritional science and in the years soon after my arrival Margetts started the first master's course in public health nutrition. Grimble was a wonderful colleague and mentor and great fun to be with, especially away from home at a conference! He too had been working on dietary fats and inflammation, mainly in animal models, so we were able to easily form a close working relationship which was always enjoyable. Grimble was somewhat of a free-thinker and was always coming up with new research ideas – these were sometimes ahead of the field and I gained much from my close working relationship with him. I was fortunate to be awarded a BBSRC grant soon after my arrival in Southampton; this was to continue my research on dietary lipids and immunity in both animal models and another human trial, with some focus on gene expression. Liz Miles came to my lab in mid-1996 to work on this grant as a post-doc and Fiona Wallace joined as a PhD student. In 1997, Grimble and I teamed up with a vascular surgeon and a pathologist from Southampton General Hospital (Cliff Shearman and Patrick Gallagher) to conduct a trial funded by MAFF to see if omega-3 fatty acids could stabilise advanced atherosclerotic plaques; we did this by studying carotid plaques removed at surgery from patients who were enrolled in a randomised controlled trial for a period prior to surgery. No-one had done a “nutrition” trial like that before – Parveen Yaqoob came to Southampton to work on the trial for a year before her very successful move to the University of Reading and then Frank Thies came from Oxford to join us, along with PhD student Jennifer Garry. We showed that omega-3s do stabilise plaques, a finding of real clinical significance, that we argued explained the mortality advantage of these fatty acids.

We patented our discovery of plaque stabilisation by omega-3 fatty acids; the patent was granted and then licensed which was quite exciting. Grimble had another remarkable idea around this time: he wondered whether an individual's genotype, let's say of a gene encoding a cytokine, could influence how omega-3 fatty acids influenced production of that cytokine. We got our first grant to investigate this from the BBSRC in 1998 and the research showed that Grimble's hunch was right: polymorphisms in the tumour necrosis factor (TNF) gene affected the ability of omega-3s to reduce TNF production in response to an inflammatory stimulus. Two other BBSRC grants followed from this, one involving a collaboration with University of Birmingham and the other involving industry, and again we were able to patent and license some of our discoveries. Gillian O'Reilly, Jackie Madden, Anna England and Jo Slater-Jefferies worked as post-docs on these grants. In the meantime, I was awarded two grants from the BBSRC, one to compare the effects of plant- and fish-derived omega-3 fatty acids in humans and the other to conduct novel human research comparing the effects of two forms of conjugated linoleic acid (CLA). Both of these grants involved highly successful collaborations with the University of Reading and with industry. Samantha Kew worked as a PhD student on the omega-3 grant and then she and Graham Burdge worked as post-docs on the CLA grant. The omega-3 grant showed that alpha-linolenic acid cannot substitute for EPA and DHA in terms of physiological effects, while the CLA grant showed that 9,11-CLA and 10,12-CLA have different, and sometimes opposing, effects. One of the highlights of that work was modifying the diets of dairy cows to produce milk enriched in 9,11-CLA and then to use that milk to produce dairy products (UHT milk, butter and cheese) which were used in a human dietary intervention in comparison with standard dairy products. Around this time (2000), I was awarded my first grant as part of an EU-consortium; the consortium investigated effects of omega-3 fatty acids and folate on human health across the life course from pregnancy to older age. Liz Miles worked on my part of the project which involved conducting a dose-response study with omega-3 fatty acids in middle aged and older males looking at cardiovascular risk factors, immune function and inflammation. Liz Miles subsequently worked on a large collaborative study funded by the Foods Standards Agency (FSA) that also involved the Universities of Reading, Glasgow and Newcastle and investigated the impact of genotype, age and sex on responsiveness to omega-3 fatty acids. This study was quite an undertaking since it involved prospective apoE genotyping, rare in nutrition studies, with the aim of randomising the same number of individuals with each possible genotype, so requiring the screening of over 800 individuals to obtain the requisite sample size of 364. This was followed by another FSA grant, held collaboratively with University of Cambridge, that involved a 12 month dose-response intervention with omega-3 fatty acids defining the time- and dose-dependence of incorporation of EPA and DHA into 9 body pools in 210 healthy participants; again this was quite an undertaking with over 17,000 samples analysed by gas chromatography. Jackie Madden and Annette West worked on that trial. I was also involved in two more EU-funded consortia. The first of these enabled me to conduct the first, and still the only, randomised, controlled intervention study with salmon in pregnant women;

50 women continued with their habitual diet low in oily fish while 50 women consumed farmed salmon twice a week from week 20 of pregnancy until giving birth. We conducted detailed investigation of nutrient status and immune markers in maternal and umbilical cord blood and followed up the infants at ages 6 months and 2.5 years for allergic outcomes. As such, this was a very labour intensive study: Liz Miles and Paul Noakes worked as post-docs, Maria Vlachava and Stella Kremmyda as PhD students, and Norma Diaper as research nurse. We showed that salmon increased EPA, DHA, vitamin D and selenium in maternal and fetal blood and DHA in breast milk; altered some cord blood immune parameters; and had clinical benefit at age 2.5 years. The other EU consortium was about biomarkers and I was responsible for a rather complex acute and then chronic randomised controlled trial of omega-3 fatty acids and post-prandial inflammation in normal weight individuals and individuals with obesity. Again, this was a labour intensive study: Paul Noakes, Liz Miles and Caroline Childs all worked as post-docs and Annette West and Carolina Paras-Chavez as PhD students. We found large, and in several cases novel, effects of obesity on post-prandial metabolic and inflammatory responses and on adipose tissue biology, but only modest effects of omega-3 fatty acids. More recently I was a partner in an NIHR grant under the Efficacy and Mechanism Evaluation scheme that was led by Cardiff University and University of Oxford and involved a randomised controlled trial of a probiotic in older people in care homes. I was responsible for conducting assessments of markers of immunity and inflammation, work done by PhD student Vivian Castro Herrera.

### **The importance of funding, collaboration and talented people**

I was very fortunate over the period from 1994 to 2019 to hold, or be heavily involved in, the series of substantial MAFF, FSA, BBSRC, EU and NIHR grants outlined above. These enabled highly novel research, mainly in humans, to be conducted, and frequently involved invaluable collaborations with other institutions in the UK (the University of Reading has been a particularly valued collaborator) and in Continental Europe and with industry. It is these collaborations and the efforts of talented researchers that really make the research what it is; the funding is just the enabler. I have already mentioned the talented postdocs and PhD students who contributed to the success of those research projects. Over the period since 1997 I also held a number of sizeable grants from industry, mainly for work on omega-3 fatty acids, but also on prebiotics. These grants also enabled novel human research to be carried out, for example on unusual fatty acids like stearidonic acid and on different chemical and physical formulations of omega-3 fatty acids investigating strategies to enhance bioavailability. Liz Miles, Abbie Cawood, Ren Ding, Graham Burdge, Paul Noakes and Alex Nunes Costa all worked as post-docs on these industry-funded projects while Amy Lomax, Annette West and Helena Fisk were PhD students. I should also mention PhD students not directly linked to external grants: Chris Donnellan did early work on fatty acids and peroxisome proliferator activated receptors in the context of obesity and insulin resistance; Caroline Childs carried out rat studies investigating the effects of sex, pregnancy



and diet on immune function; Hayati Yusef studied fatty acids and inflammation using different models; Alison Fear studied fatty acids and immune programming; Albandri Alshathry studied fatty acids and synbiotics in patients with non-alcoholic fatty liver disease; Janna Collier studied nutrition and wound healing; Ella Baker conducted novel in vitro comparisons of plant- and fish-derived omega-3 fatty acids and the unusual pinolenic acid in cultured endothelial cells; and Carina Valenzuela compared effects of 18-carbon cis and trans fatty acids in cultured endothelial cells. One of the things I learned in Eric Newsholme's lab was the positive impact of having a group of diverse individuals sharing a common purpose and a common working space. Hence, I have always hosted visitors in my own lab and over the years there have been many from Brazil, Spain, the Netherlands and a number of other countries. Each of the postdocs, PhD students and visiting researchers has made important and unique contributions to my research programme contributing to its success; they also created and maintained a convivial atmosphere and many long-lasting friendships were made. I have mentioned the importance of collaboration and the benefits I gained from working with Newsholme, Grimble and others. In the last 10 years I have been fortunate to establish a strong collaboration with my colleague Christopher Byrne and together we have conducted two high quality randomised controlled trials in patients with non-alcoholic fatty liver disease with the support of the NIHR Southampton Biomedical Research Centre. The first trial used omega-3 fatty acids and the second, a combination of a prebiotic and a probiotic. These trials link the gut-adipose-liver axis and metabolism and inflammation and have enabled us to perform novel research in this very common clinical condition. Currently (June 2021), I have research funding from the EU, the MRC and industry and my colleague Graham Burdge has kindly involved me in his highly novel BBSRC-funded research on oil from transgenic *Camelina sativa* which has an EPA and DHA content similar to that of standard fish oil. Work carried out by Annette West has established that this oil and fish oil have very similar effects in healthy humans indicating that the camelina oil offers a sustainable and clean source of bioactive omega-3 fatty acids to support human health and well-being.

### Deeper involvement in The Nutrition Society

Over the years since I joined the Society, I have moved from being an early career researcher presenting my recent findings to playing a number of leadership roles. Because of its importance to me, to my research, to the research of others, and to nutrition education, I realised early on that I wanted to give back to the Society. I served on Council from 1998 to 2001. I was Secretary of the “Clinical Nutrition

and Metabolism Group” from 2000 to 2003 and, in that capacity, I represented the Society on both the Programmes Committee and the Council of BAPEN. I served on the Society's Publications Committee from 2001 to 2013, being an Associate Editor of the British Journal of Nutrition (2001 to December 2005) and then one of the longest serving Editors-in-Chief of that journal from December 2005 until January 2013. I built on the changes introduced by my predecessors, Keith Frayn and Paul Trayhurn, enhancing the journal for the benefit of authors, readers and the Society. In 2012, I became founding Editor-in-Chief of the Society's new fully open access journal, Journal of Nutritional Science, thereby bringing the Society's publications fully into the 21st century. While I was Associate Editor of the British Journal of Nutrition, the Society decided to publish a book series and I was appointed Editor-in-Chief of the Frontiers in Nutritional Science series: eventually four books were published before the project was replaced with the Society's textbook series. In 2016, I was truly honoured and somewhat surprised to be asked to become President of the Society, being installed at the Summer Meeting in Dublin in July of that year. I think that during my Presidency the Society blossomed, with enhanced transparency, an engaged membership, enhanced networking opportunities and a series of truly excellent conferences and social activities. My Presidency coincided with the refinement of successful Society activities such as its Honorary Fellowships and the International Student Competition; the evolution of the Student Section and its annual conference; and the further refinement of the Training Academy and the Society archiving project, both of which I strongly supported. I really enjoyed my interactions with the Society's dedicated staff, CEO Mark Hollingsworth, and my fellow Council members and Trustees, who all acted to make my role as President seem easy. I was honoured to represent the Society at events in the UK and abroad and to be President for the Society's 75th Anniversary. During my Presidency the important Academy of Nutrition Sciences became a reality. One highlight of this period was leading the Society's successful bid to host the 2019 FENS Congress; the bid was made during the Berlin Congress of 2015 and the memory of the selection process will remain with me forever. It was a true honour to oversee the Society's preparation to host the 2019 FENS Congress and I am enormously grateful to those who put in extreme effort to make that Congress the success it was; in my view, the 2019 FENS Congress set a new benchmark for scientific quality and vibrancy in nutrition congresses and the success of that Congress made a massive



Professor Philip Calder closing the 2019 FENS conference as FENS President

Enjoy your work and the interactions it brings. Join a friendly, nurturing but scientifically robust organisation to help you find your way – in this regard you can do no better than The Nutrition Society.

contribution to the reputation of The Nutrition Society within the European and wider international community. By the time of the 2019 FENS Congress, my period as President of The Nutrition Society had (only just) finished, but at that Congress I became President of FENS, a new adventure for me!

### Final words

What are lessons that can be taken from my path as I have mapped it out? Master your field of scholarship and work hard are obvious ones, but there is much more to it than these. Have a vision and stay focussed on this. But be adaptable, embrace new technologies, take opportunities that arise and form meaningful collaborations and networks. Enjoy your work and the interactions it brings. Join a friendly, nurturing but scientifically robust organisation to help you find your way – in this regard you can do no better than The Nutrition Society.

It is evident that The Nutrition Society is very important to me, that I have benefitted much from involvement with the Society, and that the Society has shaped my career. The Nutrition Society plays a vital role in bringing those interested in different aspects of nutrition together in a way that they can share their common interest and language, so fostering a collegiate environment enabling the discipline to flourish. Through its meetings and its publications, the Society provides the discipline, well beyond its membership, with high quality information contributing to understandings of, and advances in, public, patient and animal health and well-being. It nurtures early career researchers and offers significant opportunities for personal and career development and enhancement. But the influence of The Nutrition Society goes well beyond the discipline and well beyond the UK and Ireland. I have seen that The Nutrition Society is highly regarded by other learned societies in the UK, including the Royal Society for Biology, and by nutrition societies in other countries. Through its journals and textbooks, the Society has global reach. It has a reputation for excellence, stability and good governance. This reputation has been earned over the last 80 years and has been shaped by the selfless efforts of countless individuals to whom we, in 2021, owe a great debt. For me, it is a huge honour for the University of Southampton to host the Society's Summer Conference in 2021, the year of the Society's 80th Anniversary. This makes me very proud as both an employee of the University of Southampton and as a former President of The Nutrition Society. Long may The Nutrition Society flourish.



Professor Philip Calder hands over the Presidency to Professor Julie Lovegrove, 2019



For me, it was a huge honour for the University of Southampton to host the Society's Summer Conference in 2021, the year of the Society's 80th Anniversary. This makes me very proud as both an employee of the University of Southampton and as a former President of The Nutrition Society. Long may The Nutrition Society flourish.





## Professor Julie Lovegrove

BSc, Diet (Dip), PhD, RNutr, FAFN

2019 to date

I joined The Nutrition Society as a student member while studying for my PhD at the University of Surrey and have been a member for over 30 years. The Society has been a welcome presence throughout my career as a source of scientific meetings, social events, collaborations and life-long friendships.





I joined The Nutrition Society as a student member while studying for my PhD at the University of Surrey and have been a member for over 30 years. The Society has been a welcome presence throughout my career as a source of scientific meetings, social events, collaborations and life-long friendships. My first conference presentation on my PhD research was at The Nutrition Society Summer Conference in 1990. I've never forgotten how nervous I was, the exact questions I was asked, and my relief to see the familiar face of my PhD supervisor, Dr Sheila Hampton, in the audience. For this reason, I make every effort to be present at my research team's presentations, which gives me great pleasure and pride, but can be a physical challenge running from one lecture theatre to the next.

There have been so many fond memories over the years, including heated scientific debates on emotive topics, and Summer Conference gala dinners at venues of outstanding historical interest, often equipped with large TV screens for 'unmissable' European and World Cup football matches.

Wherever the occasion, and final score, once tables and screens were cleared, the evening invariably ended with dancing and friendly banter. Even after such fun-filled social events, you could guarantee a full attendance at lectures the next day, at least by the afternoon.



Summer meeting Coleraine 1996



Summer Conference, Belfast 2011



Summer Conference, Glasgow 2014



Winter Conference, RSM 2018

To place these recollections of the Society in context of my own career. After my PhD and a Post-Doctoral Research Fellowship at the University of Surrey, I became a founding member of the Hugh Sinclair Unit of Human Nutrition with Professor Christine Williams, at the University of Reading.

The Unit was established in 1995 with funds from the estate and legacy of the late Professor Hugh Macdonald Sinclair (1910-1990). Sinclair was a pioneer and passionate advocate of nutrition, famously leading the Government-commissioned Oxford Nutrition Surveys (ONS) during World War II and one of the first to recognise the importance of long chain n-3 polyunsaturated fatty acids to human health<sup>(1)</sup>. Recently, I was fascinated to discover in a copy of the first *Proceedings of The Nutrition Society* Journal, that Sinclair was a member of the first committee, tasked with establishing The Nutrition Society in 1941<sup>(2)</sup>.

Throughout my career I have been fortunate to be engaged in a broad range of research and teaching in nutrition-related topics, with particular interests in diet, cardiometabolic risk, nutrient-gene interactions, public health and personalised nutrition. The importance of nutrition to health and disease prevention is irrefutable, though frustratingly often misreported, with the social media and 'false news' generating confusion and mistrust amongst the general public. The Nutrition Society initiated a Voluntary Register of Nutritionists and for this purpose developed criteria for degree programme accreditation that ensured graduates had the necessary competencies in evidenced-based nutrition and its practical application. The role of nutrition professionalism was then passed to the newly founded Association for Nutrition (AfN) in 2010. I was keen to be involved with this important initiative and became Chair of the Accreditation Committee, and latterly Deputy Chair of AfN. Currently an application for the protected title of Chartered Nutritionist is with the Privy Council, and we are hopeful that this will be granted in due course.

The importance of evidence-based dietary guidance has been a key driver throughout my career, and continues the legacy of Dr Hugh Sinclair. I have had the good fortune to contribute to dietary policy through my involvement with the Scientific Advisory Committee on Nutrition (SACN) as a committee member and latterly as Deputy Chair<sup>(3)</sup> and Chair of the Subgroup on SACN's Framework and Methods for the Evaluation of Evidence that Relates Food and Nutrients to Health. The work of SACN on risk assessment has been extremely rewarding. It has been a privilege to have some of my research teams work used within the evidence-base and a pleasure to work with numerous nutrition experts, most of whom were also Nutrition Society members.

My first official duty as President was to open FENS, the largest European Nutrition conference, which in 2019 was hosted by The Nutrition Society in Dublin, with over 1700 delegates.



Over my 30-year engagement with the Society, I have been involved with many different aspects of the Society's work, including presentations and organising conferences. I served on the Editorial Board of the *British Journal of Nutrition*, was an editor of one of the textbooks entitled '*Nutrition Research Methodologies*', and have published my research in The Nutrition Society journals. I was elected to Council of the Society in 2004, serving under Professor Ann Prentice, and elected as President in 2019, a role in which I feel privileged to follow in the footsteps of so many eminent and inspiring nutritionists.

My first official duty as President was to open FENS, the largest European Nutrition conference, which in 2019 was hosted by The Nutrition Society in Dublin, with over 1700 delegates. The conference was a great success due to the hard work of the organising committees in the preceding four years. We enjoyed excellent science and exceptional Irish hospitality. I was then invited to Pakistan, by the Pakistan Nutrition and Dietetic Society, to give an address to the President and to open their first conference on Nutrition and Non-Communicable Diseases. It was a privilege to represent the Society and I was struck by the high esteem with which the Society was held by our international colleagues.

In March 2020, COVID-19 reached pandemic proportions, and the UK underwent its first 'lockdown', restricting face-to-face meetings and international flights. As a result of the Government's imposed restrictions, our planned conferences could not be held face-to-face. This was a major disappointment, but the Society responded immediately by reverting to a virtual online format for the delivery of all events and meetings. This had some unexpected benefits by enabling greater engagement of our international colleagues and a higher number of attendees than before. While we have learnt new ways to



A few of us having a scientific meeting in the pub at FENS 2019!!

L-R Professor Bruce Griffin, Penny Hunking, me, Professor Jayne Woodside, Professor Bernard Corfe



With Professor Christine Williams OBE (past president 1998-2001) and Professor Ian Rowland at FENS 2019

It is an exciting time for the Society, and I feel honoured to be able to serve as President for an additional year, an exception that was granted after a Special Resolution was agreed to enable stability in leadership over the uncertain times of COVID-19. I am looking forward to working with the exceptional team.

communicate and how to adapt during lockdown, it has also made us acutely aware of how much we need social contact and miss interacting with each other on a daily basis. I owe sincere thanks to Mark Hollingworth, our CEO, my fellow Trustees, Council members and all Society staff for their immense efforts, innovative ideas and meticulous planning that has ensured the delivery of successful virtual conferences during these unprecedented times.

My own virtual experiences haven't been without mishap. I've delivered presentations, opened and closed international conferences, chaired meetings and awarded prizes from the confines of my kitchen, with Harry our cat, sitting on my lap. The phrase "you're on mute" has become more commonly heard around the world, than "hello", or so it seems. On one occasion during a Society conference, I managed to introduce a speaker on mute, and then after unmuting myself



Professor Julie Lovegrove cuts the cake at the opening of Boyd Orr House

accidentally, broadcasted our plumber saying we had a leak in the shower. Not my finest hour!

Despite the pandemic we have continued to progress the Society's business, which has been facilitated by monthly Trustee meetings. Significant progress has been made with the development of the Society's new 5-year strategic plan, including continued commitment to leadership in equality, diversity and inclusivity (EDI), and 'flipping' of our Public Health Nutrition journal to Gold Open access in response to 'Plan S', an initiative that calls for all research to be freely available and published open access. It is an exciting time for the Society, and I feel honoured to be able to serve as President for an additional year, an exception that was granted after a Special Resolution was agreed to enable stability in leadership over the uncertain times of COVID-19. I am looking forward to working with the exceptional team, which includes my fellow Trustees, Council members, CEO and Nutrition Society staff to promote the Society's mission to advance scientific study of nutrition and its application to the maintenance of human and animal health. The Nutrition Society has been invaluable in the development of my career, in the building of lifelong friendships and providing so much enjoyment. I owe huge thanks to so many friends, family and colleagues throughout my career, many of whom I continue to see at The Nutrition Society events. Finally, I wish the Society continued success and prosperity, and the very best for the next 80 years.

### Books I have used throughout my career

*McCance and Widdowson's The Composition of Foods*. Editions 4 (1985) – Edition 7 (2014) and *Human Metabolism: A regulatory perspective*. Evans R and Frayn KN. Edition 2 (2003) – Edition 4 (2019).

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<sup>2</sup> Foundation of The Nutrition Society. *Proceedings of The Nutrition Society*. 1944;1;1-2.

<sup>3</sup> The Scientific Advisory Committee on Nutrition (SACN) Report on Saturated Fats and Health, 2019.

<https://www.gov.uk/government/publications/saturated-fats-and-health-sacn-report>.



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# Honorary Fellows receiving their certificates





## Honorary Fellow **Professor Alan A. Jackson**

CBE, DSc, MA, MD, FRCP, FRCPCH, FRCPath, RNutr

My first major introduction to The Nutrition Society was in 1985 through the International Congress of Nutrition (ICN), hosted by the Society on behalf of the International Union of Nutritional Sciences <sup>(1)</sup>. At the time I was Director of the Tropical Metabolism Research Unit in the University of the West Indies in Jamaica and Professor John Waterlow, President of the Society, had encouraged our participation.





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## Early Days

As a number of our staff were making important contributions to international nutrition science, we were eager to become involved in what was considered to be an influential, landmark event. Our research agenda embraced the interactions of protein and energy metabolism and had played directly into the ongoing expert consultation on energy and protein requirements of the WHO/FAO/UNU <sup>(2)</sup>. Our approach to the care of severely malnourished children was exemplary and had directly informed the global WHO guidelines on how to manage the condition <sup>(3)</sup>. We had established a trace element laboratory enabling Michael Golden to use the meeting to enunciate the “free radical” theory of kwashiorkor <sup>(1,4,5,6)</sup>. Sally Grantham McGregor and her team had early evidence of the importance of stunting in childhood as an associate of poor neurocognitive development and constrained lifetime achievement <sup>(1,7)</sup>. Our applied nutritionists had contributed directly to the Regional Food and Nutrition plan towards enabling food security across the Caribbean. We had much that we were proud of and about which we wished to inform the world. By the time of the ICN, I had accepted the newly established Chair in Human Nutrition at the University of Southampton. So for our group as a whole it was a joyous occasion and to an extent, a farewell celebration.

## Nutrition in the UK

The post in Southampton was the first chair in Human Nutrition in an undergraduate medical school. It carried a specific remit to promote and develop clinical nutrition care and nutrition related activities within public health, with a clear mandate to better enable the health professions to contribute to improved nutritional health for the nation. At the same time The Rank Prize Funds were in the process of awarding endowments to establish Chairs in clinical nutrition, which were subsequently filled in Glasgow University and St Bartholomew’s Hospital in London University. The medical school in Southampton was relatively new, having been opened in 1972, based upon a strong, established base in preclinical sciences: physiology, neurophysiology and biochemistry. A foundation chair in nutrition had been added to this with the appointment of Professor Geoffrey Taylor. Support for the Chair had been enabled through the personal generosity of Lord Rank and subsequently supported directly by the University. There had always been a strong relationship between the Department and The Nutrition Society as for many years Geoffrey Taylor had

been Editor of the *British Journal of Nutrition*. At the time of my arrival Bob Grimble was Honorary Meetings Secretary of the Society. David York and Steve Wootton completed the staff as Michael Gibney had recently moved to Dublin. From this base there was a secure scientific research agenda, undergraduate and graduate training but only modest links with clinical practice itself.

Many of the foundation professors in the clinical school were strongly supportive of nutrition, most notably Sir George Alberti in Chemical Pathology. This commitment to nutrition in Southampton was evident and encouraged by the Foundation Dean and subsequently the Chief Medical Officer, Sir Donald Acheson. The desire to ensure that the links to health care should be stronger was reinforced when Dame Barbara Clayton, having come to Southampton to succeed Sir George Alberti, was appointed Dean of the Faculty of Medicine. She already had an enviable reputation for her work with children, developing dietary care for those with inborn errors of metabolism. I was fortunate to have the help of the Wessex Medical Trust with the encouragement and support of Lord Congleton, a staunch supporter of medical education, the NHS, nutrition and clinical academic research <sup>(8)</sup>. Despite the constraints faced by all Universities at the time, he had enabled financial support making it possible to resuscitate a University Chair in Southampton with a clinical face. Into this climate of expectation I took up my responsibilities, but in my youthful naivety, with little real sense of the challenges ahead. I had significant experience but in a very different context that was far removed from the challenges in the UK. Nevertheless, in many senses, the fundamental principles that encapsulated the need to profess and prosecute nutrition in relation of human health and wellbeing helped to define a way forward. At the time The Nutrition Society itself was going through a period of significant change, but provided a supporting framework and helped to define the character of the challenges ahead, creating a favourable climate within which I could play my role.

In society at large, health related pressures and tensions were increasing, and inevitably these were reflected in the expectations for nutrition and the microcosm of The Nutrition Society itself. In 1979, John Rivers had, in his own words, made caustic comment about the tension between science and service within The Nutrition Society which had been set up as a learned body and how nutritionists and the Society might consider engaging constructively with wider society <sup>(9)</sup>. In his Boyd Orr Lecture to the Society in 1980, Waterlow <sup>(10)</sup> had called for a deliberate move towards professionalisation of nutrition, together with clearer identity of its public responsibilities and the service it should render to society at large. The broader move towards greater emphasis on public health and the identification of the role nutrition should play in this was reflective of the increasing awareness of the role that diet and nutrition played in the aetiology and hence prevention of common chronic diseases. To better understand and characterise the nutritional health of the country, during 1986/7 government carried out the first National Diet and Nutrition Survey: a notable major

collaboration between the Ministry of Agriculture Fisheries and Food (MAFF) and the Department of Health (DH)<sup>(11)</sup>. Progressively, as general awareness of the importance of nutrition grew and its relevance to the everyday experience of ordinary people became more evident, once again the tensions emerged around the character of the discipline and its preferred direction of travel. In advance of the ICN, Waterlow had revisited these concerns in his Presidential address to the Society asking three questions<sup>(12)</sup>. Firstly, should the Society regard itself as a purely scientific Society or should it take account of practical problems arising in the outside world? Secondly, how should the Society relate to its overseas contacts? In planning the programme for the 1985 ICN, Waterlow shared the viewpoint that contacts with the rest of the world were less strong than they should be. Thirdly, drawing on comments in his Boyd Orr lecture, the importance of considering nutrition as a profession and the related concerns about the need for defined careers in nutrition. He noted that despite competent people being trained to a good standard, there were no jobs in nutrition and no career structure. In response to his call for a review of the perspectives of members of the Society, Ashwell & Cole sought views through a survey of the membership<sup>(13)</sup>.

### Responsibilities in The Nutrition Society

It was at this stage that I joined the Council of The Nutrition Society: at the time when the Society was going through a serious period of self-reflection about its structure, function and purpose. David Armstrong was President, and it seemed that much of his time was given to acting as an emollient for the real stresses expressed by different viewpoints. Personally, I was challenged to understand the basis for the seeming distance between the business of the Society and what might be considered to be the pressing issues related to food and nutrition that beset wider society<sup>(13)</sup>. The public appeared to have a dim view of nutritionists, expressed as “the experts cannot agree amongst themselves”, making it difficult to give consistent advice, which in consequence was very difficult for the public to follow. It was clear that there were very clever people with great knowledge across enormous swathes of science, but with seemingly limited contributions to public benefit and hence modest impact on the health of society in comparison to the potential resource. I had been impressed by the great impact that flowed internationally from the success of the ICN, but alarmed that the follow-up discussions within The Nutrition Society appeared full of recriminations: not primarily around national and global nutrition problems, but that the ICN meeting had over-run its budget and placed the Society in a financially embarrassing position. Had we, the delegates from overseas, contributed to this state of angst? Certainly it was an important but not insoluble problem.

### The Way Forward

The review of members’ opinions had helped to define the territory<sup>(13)</sup>. The wide variability and contradictory viewpoints expressed in the responses made

it clear that a primary challenge was how best to organise the business of the Society in a way that enabled members to find and add value. How best to bring different but complementary capabilities together across the enormously wide range of science and human experience? For me the problem was encapsulated one late November afternoon when I was Chair of the last session for the day, at one of the many small meetings of the Society where members had the opportunity to present abstracts. The session was the last before the Autumn fog descended to envelope any homeward journey. At the mid-session tea break it was clear that my only audience was likely to be the presenters themselves with no other person to ask questions or invite a discussion of any kind. Apart from myself the only other “non-presenting” person there was John Waterlow, who had been Chair of the earlier session. I prevailed upon him to stay, in fairness to the presenters’ hard efforts.

**For me, the combination of a single large meeting each year, and the development of special interest groups helped to recognise, organise and encourage the wide range of interests within the Society.**

From this experience I was convinced that many short meetings of this kind did not work in the best interests of the members: few heard of others’ work; there was little cross-fertilisation; and there was frustration for those who put great effort into their presentation to have to present to an empty auditorium. This seemed symptomatic and indicative that without a ready means of sharing experience the Society could not operate to common purpose. From that point onwards I canvassed with vigour for fewer larger meetings, in my preference one large meeting a year. In many senses this was for me reminiscent of the benefits of the ICN, reflected at national level. A corollary of this would be that here was an opportunity to bring those with common areas of interest together, settle differences and offer clearer, more carefully considered guidance to others. Importantly for me there was a body of clinicians with an interest in different aspects of clinical care who were trying to come together, but without the benefit of the sort of strong scientific basis that could be provided by The Nutrition Society. As one of very few clinicians on Council, my second major advocacy was to press for and support an invitation for this group to join the Society. This worked out well and in 1987-88 led to the Clinical Metabolism and Nutrition Support Group (CNMSG) becoming a cognate grouping within the Society. Their joining represented the establishment of the first of a number of special interest groups and gave encouragement for a wider move towards a formal group structure within the Society. For me, the combination of a single large meeting each year, and the development of special interest groups helped to recognise, organise and encourage the wide range of interests within the Society. This was achieved without setting priority for any one group in particular. It served to

emphasise the special characteristic of nutrition as an integrative science. Further, the exchange and understanding fostered within and between groups not only reduced tensions between different interests, but equipped the Society with access to organised advice through which it could directly influence national policy. The public face would make clear that “experts agree” where policy options were concerned. The private face was where legitimate scientific differences could be expressed and resolved as a defined responsibility of the Society, enabling nuanced interpretation for difficult issues of importance. In my judgement this was of enormous benefit to the Society as a whole, and especially helpful for the development of nutrition in clinical practice

Thus, it was possible for the different perspectives to work together for the common good and increasingly could be seen to be advantageous for the Society as a whole. As a member of Council, I served under three successive Presidents: David Armstrong, Roger Whitehead and John Webster. Each had their own priorities, but each was massively supportive of the proposal to deal with the challenges in a structured way. At this time, the Nutrition Group of the Department of Health (DH), led by Martin Wiseman, came to one major conclusion and in addition undertook two major activities. The conclusion reached jointly with MAFF, deriving from the success of the National Diet and Nutrition survey of adults<sup>(11)</sup>, was that the survey was of sufficient importance that it should be extended to other age groups within the population. The survey(s) fulfilled a critical need, making it possible to characterise the nutritional state of the population as the secure basis for rational policy and public health action. Further, in order to interpret the data collected securely would require a clear understanding of the food and nutrient requirements of the population and major sub-groups. A review committee was set up with Roger Whitehead as Chair which developed “Dietary Reference Values” for the population: a completely novel concept which became a landmark for international health<sup>(14)</sup>. In the clear expectation that data of quality would be available, there was in place the opportunity for it to be used as the basis for a strategic plan within which the ambition to secure food availability and to improve the nutritional wellbeing of the population could be identified as a meaningful ambition. Inevitably government called upon nutritionists and The Nutrition Society to support these efforts. Nutritionists had to be organised and competent to take on this major charge.

### **Nutrition within a Strategy for Health**

In 1992 the government launched its strategy, the “Health of the Nation”<sup>(15)</sup>. This was the first time the government had developed an explicit strategy to improve the health of the population with nutrition being integral and based on accepted international norms. There had been wide consultation and discussion of the green paper, leading to the adoption of the white paper which commanded a high degree of support<sup>(15)</sup>. The strategy identified key areas and main objectives

for: coronary heart disease and stroke; cancer; mental illness; HIV and sexually transmitted diseases; accidents. It was acknowledged that food, diet, nutrition and physical exercise were critical underlying considerations across all areas. The Health Education Authority in their response to the green paper had offered specific advice on how to ensure that the health workforce were secure in the expectations that were to be placed upon them. The training of a workforce with these capabilities would require that nutritionists were appropriately accredited for their competence, not least so that dietitians and nutritionists were able to provide the necessary guidance and support for the wider health workforce<sup>(16,17)</sup>.

To deliver the nutrition specific components of the strategy a Nutrition Task Force was set up with Dame Barbara Clayton as Chair, and charged with developing planned activities in a short period through a series of working groups, “Eat Well I”<sup>(16)</sup>, and reporting on progress, “Eat Well II”<sup>(17)</sup>. The Nutrition Society through its membership gave major support to all these activities, especially the group to address nutrition education, on which I was invited to serve. There was broad agreement for the aspirational idea of the need for all health professionals to be educated formally about the principles of nutrition. For the first time nutritionists and dietitians had committed themselves to working with universities and colleges to ensure that all courses in nutrition and in dietetics should equip graduates as a resource for the education of other health professionals, thus emphasising the responsibility they had for their own professional practice, but also for the professional practice of those other professions that were regulated by statute, eg medicine, nursing, dentistry, pharmacy. Inevitably, therefore, there was the explicit need to identify and to protect professional standards in nutrition. For The Nutrition Society it was clear that it had to be able to prosecute two separate but related agendas: the scientific basis of nutrition of relevance to all; service delivery mode with evident application to clinical care together with public health and policy formulation. For me formal professionalisation in some form or another sat at the heart of the solution: in the same way that a PhD marks competency in research and application of the scientific method there needed to be an equivalent which marked capability and competence in delivering “nutritional care” in its widest sense. At the time I was advisor for nutrition to the Chief Medical Officer and I sought his help, advice and support for the professionalisation of nutrition. He was very supportive in principle but made clear that any cognate group with aspirations to becoming a defined profession had to take responsibility themselves. However much they wanted the development to take place, government would be supportive but could not be directly involved. If nutrition were to do it properly, come together and command respect, government would be very willing to listen to their advice. Government had no direct role in the formulation or characterisation of any professional body, an important lesson for the next decades.

Within this rapidly emerging backdrop, for me there were three separate but related areas of activity for which The Nutrition Society needed to take

the lead, and where I had specific responsibilities. Each dimension could be seen as addressing important considerations that had come through the analysis of Ashwell and Cole<sup>(13)</sup>, but also matched my personal interests and experiences: the professionalisation of nutrition itself of relevance to public health; the development of nutrition within clinical practice and with health care professionals; the international nutrition agenda.

## Doctors and health professionals

The advice of doctors and other health professional command high regard from the public. They make life and death decisions about the care of individual patients and it is important that they possess the basic understanding that ensures that nutritionally they are reliable and safe in this practice. I had trained as a paediatrician at UCH and as a newly qualified houseman one of my responsibilities had been the intravenous nutrition, especially for vulnerable, small preterm infants. Jonathon Shaw had perfected the skill for passing a silastic catheter through the long saphenous vein at the ankle to the right side of the heart through which nutrition could be delivered. This was one skills we had to learn. What was given through the catheter was not always as clear, but this together with the experience of dietary and nutritional care for children with inborn errors of metabolism formed the backdrop of understanding. Indeed, I was in the first class to take Membership of the Royal College of Physicians with a special interest in child health and at least 50% of the questions related to nutritional support. I required little persuasion of the importance and power of effective nutritional support. This respect was reinforced by my time at TMRU, with responsibility for caring for severely malnourished children in a life-threatening state. We had established experimental diets which made clear the great power of trace elements when used judiciously, and the complexity of nutrient-nutrient interactions<sup>(1,3,6)</sup>. We had to think for ourselves as our practical experience of success did not always fit with prevailing wisdom.

The most widely recognised difference was the serious controversies captured as the “great protein fiasco” – protein requirements are relatively modest and too much protein can be toxic in its own right<sup>(18,19)</sup>. This error of understanding is having something of a resurgence with proponents of high protein diets seemingly ignorant of the relevant high quality science that has been prosecuted globally for children’s health. We offered formal training for nutritionists to go into government service, through an MSc which drew on the same experience in practice but in terms of preventive care. In 1981, we were asked to advise on the care of the first patient in Jamaica who had contracted HIV overseas and had progressed to acquired immunodeficiency syndrome. We were very familiar with acquired immunodeficiency, but inevitably as a consequence of poor nutritional state. This person’s symptomatic presentation was very similar to any malnourished child with acquired immunodeficiency, with severe diarrhoea and wasting, no appetite and evident sickness. There were no specific therapies

available for HIV at the time and supportive care was all that was available. We provided the same treatment we would have for any malnourished child, as enunciated in WHO guidelines<sup>(3)</sup>. After 2 weeks there was complete resolution of all symptoms and improvement was confirmed with gain in weight and a good appetite, so that the patient literally “took up their bed and walked”, back to the USA. These experiences could not fail to convince of the enormous power of nutrition when scientific understanding was applied appropriately in context to defined clinical problems. Their value for public health in anticipating and ameliorating the development of ill-health was equally evident. However, most doctors did not receive training that enabled them to appreciate the enormous potential for benefit that lay within their gift. This needed addressing.

When I arrived in the UK, it was clear that nutritional support and parenteral nutrition in particular was an increasingly attractive approach to care. I asked where I could go to learn the accepted way to deliver this modality of care. There were clinical academic groups that shared experience but no opportunities for formal training. It was considered within the professional competence of any doctor, usually a surgeon, to be able to place a catheter in right side of heart and pour in potentially toxic compounds known as nutrients. Little had changed in the delivery of this practice over nearly 20 years. There was an undoubted need for formal training, the definition of standards and identification of competencies. At the same time there would have been benefit from interaction with and support from people who had a deeper understanding of nutrition, most notably within animal nutrition and related basic sciences. This had been a major driver and justification for celebrating the inclusion of the CMNSG as a group within The Nutrition Society. In Southampton a well-regarded nutrition support capability had been set up under Steve Karran. His young surgeons in training carried the major responsibility for delivering nutrition support. With Graham Sutton, Brendan Moran and the specialist nurse, Mary Taylor, we established the first formal short course on nutritional support of the seriously ill. The senior members of the CMNSG were invited to deliver the course and contribute to reflection on its success. In time this experience had a direct influence on the need for a more formal structure within which professional standards could be established and patient needs protected. Subsequently the CMNSG was instrumental in the creation of the British Association of Parenteral and Enteral Nutrition (BAPEN). This in turn enabled the influential report from the King’s Fund in 1992 on “A Positive Approach to Nutrition as Treatment”<sup>(20)</sup>. For patients in hospital this played an important role in raising awareness and emphasising the nutritional care for patients amongst doctors and administrators within the NHS. Publication by BAPEN of authoritative documents on the professional standards needed for nutritional support set the standards expected for the nutritional understanding of doctors in the future<sup>(21)</sup>. The course itself continues to run and clinicians in Southampton have continued to support BAPEN with Marinos Elia, Mike Stroud and Trevor Smith serving as Presidents, but many others providing support.



The experience with BAPEN, reinforced the awareness that during the training of doctors and all health professionals there needed to be defined expectations in the undergraduate curriculum, with the primary objective of ensuring that all doctors are safe in relation to diet and nutrition. This was achieved as a defined outcome for the Nutrition Task Force within the “Health of the Nation”. The action plan published in 1994 contained as a specific proposal, the need to create a core curriculum in nutrition for health professionals. I represented The Nutrition Society on the Task Force for this specific remit. To ensure that the statements of intent were translated into practice the Society, with BAPEN formed an ad hoc group to carry the agenda forwards: the Stratford Executive Group, with Martin Wiseman and Alan Shenkin playing lead roles<sup>(21)</sup>. The curriculum for undergraduate health professionals had been developed with the full support of the British Dietetic Association and The Nutrition Society, adopted by the Chief Medical Officers and their counterparts in nursing, dentistry and pharmacy<sup>(22)</sup>. Subsequently the support of medical Royal Colleges provided a very persuasive argument to the importance that practitioners should be adequately trained. Oversight was provided through the Intercollegiate Course on Nutrition of the Royal Colleges. This was originally managed through the Royal College of Pathology, with responsibility subsequently being handed to the Academy of Medical Royal Colleges, and most recently to the Association for Nutrition. From early in the journey, the support and encouragement of the General Medical Council ensured that the activity was fit-for-purpose and met realistic expectations in making doctors safe to practice.

### Nutritionists as health professionals

Nutrition Society had been actively exploring aspects of training and education in nutrition since the 1980s. This comprised two arms, one for nutritionists and one for the wider health professions. The Institute of Biology had commissioned a report on the training of nutritionists<sup>(23)</sup>. As the Government developed its strategy for health with the evident need for a strong nutrition-related voice in public health The Nutrition Society started to explore committing its full support in principle and where possible in practice. The Society had been actively engaged in discussions about the training requirements for nutritionists and the potential for the development of Public Health Nutrition as a cognate discipline in its own right as recorded by Landman and colleagues<sup>(23,24,25,26)</sup>. If nutritionists were to be a resource for training other health professionals it was imperative to have clarity about their own professional capabilities, standards and scope of practice to be able to accept responsibility for advice and the objective adducing of evidence.

The debate around whether or not nutrition is a cognate discipline, and hence whether or not it could see itself as a professional activity had been well rehearsed. There was an imperative in this direction with the shift in emphasis in public health from a primary concern with infectious diseases to attention to

chronic diseases and hence an increasing emphasis being placed on prevention. For myself I saw the role of a nutritionist as being as complex as that of medical doctors in that it embraced a wide base both in basis science and social sciences. However, for the Nutritionist the emphasis was on staying well, ensuring that the healthy remain healthy. This contrasted with the primary focus for most clinicians who were concerned with diagnosing aspects of ill-health and acquiring skills for healing the sick. For this reason, I have identified nutrition as being the pursuit for Doctors of Health<sup>(27)</sup>. The necessary skills and capabilities were substantially beyond those possessed by most dietitians and therefore justified a new professional grouping. I had represented The Nutrition Society in the discussions around the development of a register of nutritionists with the Institute of Biology. However, this activity had a main focus on the science background of its membership and did not offer any clear career opportunities for those promoting human health and wellbeing. The first large meeting of The Nutrition Society had been held in Oxford in 1989. A later meeting hosted in Southampton had major participation of the Public Health Group with many members from overseas and those working in policy as well as public health. This provided the impetus for Barrie Margetts and Judy Buttriss to move forwards an initiative towards the formation of a Formal Voluntary Register of Public Health Nutritionists within The Nutrition Society<sup>(23)</sup>. This experience matured over the years and increasingly came to play a defined role in the national health agenda reflecting the importance of formalising its character, thereby achieving formal recognition within the framework of government<sup>(24,25,26)</sup>. This in turn led to the formation of the Association for Nutrition (AfN) with the direct responsibility for holding the Voluntary Register of Nutritionists. As responsibility for the Register was passed from The Nutrition Society to AfN this marked the coming of age of the professionalisation for nutrition<sup>(26)</sup>. As the separate responsibilities of The Nutrition Society and AfN were more clearly demarcated, I became personally involved once again as President of the AfN. Becoming financially and administratively independent represented major challenges for AfN in the early years. From these hard lessons it required three to four years before AfN was able to launch itself as a voluntary regulator: a fully independent body with the primary purpose of protecting the public interest through establishing and upholding standards of professional practice<sup>(27,28)</sup>. Again, at critical time-points when the endeavour appeared most vulnerable, we had been able to call on and receive critical support from government<sup>(29)</sup>.

There are professional groups who need to access nutrition, but for whom nutrition is not their primary focus of responsibility. These groups fall into three broad categories: those in health, those in food production and those in education. By contrast there are those groups for whom food, diet and nutrition represent their primary interest. These carry responsibility for “owning” the discipline and they have to be secure both in professing its underlying science, and its practice in context. Today, access on a regular basis to an adequate diet that is balanced and wholesome is acknowledged as a fundamental human right. It is important that

those who commit to holding these important considerations on behalf of society and provide advice in the formulation of relevant policy are adequately equipped to live up to the expectations of society, and the responsibilities that they carry on behalf of society. How this might be best organized and managed represents one of the most significant achievements for The Nutrition Society over the last four decades. The structured sharing of experience, reflection on best practice, mutual support and agreed evidence-informed advice for the population and to policy makers capture the essence of best professional practice<sup>(27)</sup>.

### Nutrition in the international context

As had been raised by Waterlow<sup>(12)</sup>, and explored by Ashwell & Cole<sup>(13)</sup>, there had always been considerable international engagement by individual members of The Nutrition Society, but these were unstructured. Whether there was any need for a common approach to addressing international activities met with a mixed response. Many, like me, who had engaged with the Society from afar, had been excited and stimulated by the rich offerings from the ICN, but saddened by what appeared to be poorly considered within the analysis by Ashwell and Cole<sup>(13)</sup>. Indeed for some, the basis of the Society's financial problems emanated from the overgenerous support for participation of scientists from low and middle income countries. Roger Whitehead asked me to Chair a Task Force on Overseas Members<sup>(30)</sup> to review the situation and prepared a report which was well received by Council, leading to the formation of International Collaboration of The Nutrition Society (ICONS). This fed directly into the emergent group structure with a major emphasis on public health, thereby having impact for UK nutritionists in government(s) and UN agencies and with considerable knock-on benefits for global nutrition and health. The felt need from overseas members was satisfied supporting NGOs and UN Agencies. This group benefitted directly



from a single major meeting each year, bringing together basic science, practice in public health and policy formulation. There was undoubtedly benefit from the two-way flow, especially in the building of international capability and capacity in nutrition through shared interest and experiences. More recently this has seen considerable benefit in strengthening nutrition in Africa where the Society has worked directly with different groups (Africa Nutritional Epidemiology Conference, Federation of African Nutrition Societies and Africa Nutrition Society) with a move to a single shared annual meeting<sup>(31)</sup>, with each group supporting the others. Strictly local organization of the most recent meetings have been highly successful with upwards of 700 to 800 participants. By being able to address the major problems experienced by countries at different levels of development within a cooperative framework has earned nutrition much associated respect. By representing the nutrition interests in Africa, and defining the explicit challenges that need to be addressed has enabled constructive interaction with the policies of the Africa Union. The catalytic support provided by The Nutrition Society has facilitated rapid progress and optimism for the next period.

### Lessons learnt from the experiences

Nutrition is an integrative science that by its nature draws on a wide range of experience at all levels of organization across molecular biology, cell biology, physiology and metabolism, structure and function, growth and development, lifestyles and behaviours, social and economic considerations, human rights, planning and policy, international relations. Each has its own perspective, but all are interconnected. It is the language of nutrition that enables translation from one experience to another, bringing all into a whole that is substantially greater than any of its parts. Inevitably this carries with it the challenge of drawing together disparate perspectives and the inevitable tensions associated with different viewpoints. These tensions are dynamic and the source of considerable strength when they can be managed for constructive purposes. However, there is always a threat from the high passions that can be excited and are expressed from one context to another. The learning experience is that given an appropriate common ambition and framework within which to operate, all of this can be managed for the greater purpose.

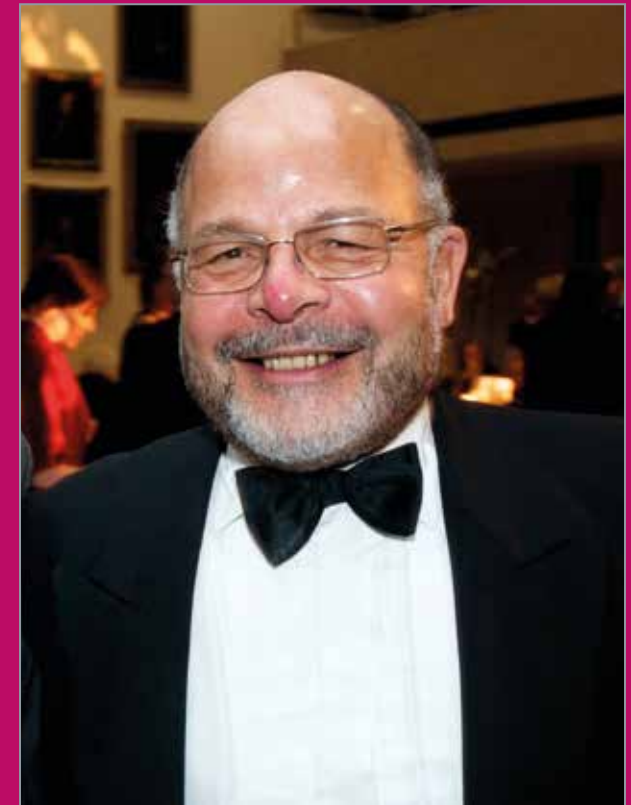
Discovery thrives on the uncertainties generated by different perspectives, one of the bases of successful science. But there is also the need for a public face which, while acknowledging the uncertainties, gives clear guidance where the evidence is strong. Where the evidence is less sure, the identification and articulation of where and how that uncertainty exists (the basis for differences of opinion and viewpoint) is the basis for further research. Research by its very nature seeks to explore uncertainty and hence carries an important measure of risk, with no certainties about the preferred or best direction. There is learning to be had from success, but even greater opportunities for learning from constructive reflection

on failures. Managing this learning appropriately provides a mechanism for support, and the basis through which an acceptable measure of risk can be accepted towards building a different future. This should draw on past experience but be better fit for purpose based upon the outcome of the research.

The chance to grow organically, learning from cumulative experience, makes it possible to build stronger progressively, extending capability with flexibility within defined boundaries. The most important safeguard to public health and public wellbeing is the organization provided by a professional approach which defines standards and sets expectations of governance and conduct: the agreed basis for terms of engagement.

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## Honorary Fellow **Professor W. Philip T. James**

CBE FRSE FMedSci

My ignorance of the British nutritional scene was profound when I turned up at the London School of Hygiene & Tropical Medicine (LSHTM) in 1970 to discover I was meant to reorganise and teach their nutrition course to a range of doctors, health professionals and other scientists from all corners of the world. To say this was disconcerting is an understatement!



My ignorance of the British nutritional scene was profound when I turned up at the London School of Hygiene & Tropical Medicine (LSHTM) in 1970 to discover I was meant to reorganise and teach their nutrition course to a range of doctors, health professionals and other scientists from all corners of the world. To say this was disconcerting is an understatement! Until then my only knowledge of nutrition came from my time at the Tropical Metabolism Research Unit (TMRU) in Jamaica which had equipped me with very little general nutritional understanding except for that gained from analyses of the pathophysiology and treatment of malnourished children. I learned about the importance of breast feeding from Derrick Jelliffe who had just established the Caribbean Food & Nutrition Institute after working in Uganda. Prior to that the only nutrition I had gleaned during my medical training was in 1958 when my future boss, Lord Max Rosenheim, told me that I should not concern myself with folic acid or vitamin B12 deficiencies as these relatively newly discovered vitamins only presented a serious public health problem in India! My entry into the field of clinical nutrition<sup>(1)</sup>, my IUNS-recognised work for the developing world<sup>(2)</sup> and a more personal autobiography are set out elsewhere<sup>(3)</sup>; this brief account relates to the world of Nutrition Societies.

## Nutrition beginnings

While I was in Jamaica, John Waterlow was invited to become the Deputy Director of the new MRC Clinical Research Centre at Northwick Park Hospital in North London. He asked me to join him to run the metabolic facilities spread over several floors of this new 11 storey MRC centre, having been impressed that I had, in effect, turned the TMRU ward into an intensive metabolic facility. However this plan was scuppered when the founding Director of the new Centre, Professor John Squire, tragically died and John Waterlow discovered that no contract had been signed so our potential posts no longer existed. However, I was fortunate to gain considerable experience of gastroenterological research in both the Massachusetts General Hospital in Boston and the MRC Gastroenterology Unit at the Central Middlesex Hospital in London. At that stage the nutritional aspects of gut function were largely unknown when a new colleague, John Cummings, arrived and embarked on a study of 'dietary fibre'.

John Waterlow then asked me to join him at the LSHTM. It was an intimidating environment, with a plethora of world famous people; the Nutrition Department seemed to be dominated by Philip Payne who was clearly apprehensive about his new boss, John Waterlow, and definitely suspicious of this young physician with such limited nutritional experience. I soon became aware of the extraordinary talent in the School and its pioneers such as Jerry Morris in community and social health, and Geoffrey Rose in epidemiology. Yet in no time I found myself chairing the Admissions Board for aspiring students wishing to undertake the Diploma in Tropical Medicine & Hygiene course.

I found myself teaching a whole variety of subjects to a class of about 25, scrabbling to mug up on each topic 48 hours before giving a lecture! However I soon grew more confident as I recognised I was giving them a pithy summary of the latest evidence in the style which I had learned in the hot house of savage medical rounds at University College Hospital. After a few weeks, confident that the students were benefitting from this approach, I set them a test on my lectures only to discover to my horror that the majority of the students had not understood a thing! Gradually it dawned on me that many were having to translate the words I used into their native language. Clearly I was going too fast, using unusual English words with subjunctive clauses, logical inferences and occasional amusing allusions – leaving them floundering! Gradually I learned to lecture in a completely different way, checking their comprehension as I went and slowly learning to tailor my teaching to their abilities. Often they would ask me questions which I could not answer until I had done some more background reading myself: this tactic of us all learning together proved to be a recipe for an enthusiastic class.

The Nutrition Society at that stage seemed to me to be dominated by research in animal nutrition. There were agriculture institutes galore dealing with animal husbandry in Britain as well as University agricultural departments, e.g. in Newcastle and Nottingham. So The Nutrition Society seemed to be dominated by animal nutritionists. There was a Food Research Institute in Norwich but this seemed geared to issues relating mainly to the food industry

There seemed to be few centres for human nutrition research in the UK. There was Queen's College in Notting Hill, London where John Yudkin was setting out his controversial views on sugar, and Derek Miller and Mike Stock assessed energy flexibility in young people and helped Arnold Bender run the distinctive course for nutritionists and dietitians. The MRC Dunn Unit in Cambridge was already renowned for its vitamin D research and more recently Elsie Widdowson had transferred there in her pre-retirement years. David Southgate and Alison Paul were also maintaining the database on food composition for the National Food Survey. John Garrow, back from running the TMRU in Jamaica during John Waterlow's sabbatical, switched from studying placental function to starting his obesity research at the new MRC Clinical Research Centre at Northwick Park Hospital. Dietitians were also being trained by John Dickerson in Guildford and there were other courses in Leeds, Edinburgh and Aberdeen. Nevertheless human nutrition research seemed to be limited when I attended The Nutrition Society meetings in the early 1970s.

The UK nutrition research emphasis began to change soon after my arrival at the School when the MRC decided to shift the Dunn's focus after Egon Kodicek's retirement. John Waterlow, with other key figures, was trying to determine what the MRC should now do. I had already submitted a research grant to the Department of Health (DoH) to study a strange new phenomenon of obesity

which seemed to be a problem mainly in middle-aged women. This application led to John Waterlow being asked by the DoH and the MRC to chair a national group, including John Garrow, John Durnin and Dorothy Hollingsworth, with myself as Scientific Secretary, to assess the state of obesity research. The MRC's Henry Bunje – who had interviewed me at Lord Rosenheim's request before my Jamaican appointment – was also there. Meanwhile we were developing John Waterlow's interest in amino acid and protein turnover studies in the newly opened Wellcome Trust building built for John Waterlow behind the Hospital for Tropical Diseases in the grounds of St Pancras Hospital. Jo Millward and Peter Garlick led the nutritional biochemistry team and Andrew Tomkins helped me study the role of folic acid in restoring intestinal function in tropical sprue before going on to distinguish himself as the Professor of International Child Health at the Institute of Child Health.

In 1972 I learned that Hamish Munro, the brilliant Glaswegian scholar of nutrition and protein metabolism, was due to take over from Kodicek at the Dunn and John Waterlow told me I was designated as Hamish's deputy prior to taking over as Director when Hamish retired in about six years' time. Then, on the plane to the IUNS conference in Mexico City, I found Henry Bunje from the MRC sitting a few rows behind me and, on landing, he asked me to look out for Roger Whitehead as he was very anxious to talk to him urgently. I had met Roger in Jamaica when he visited with Robert McCance before Roger took over from McCance who was temporarily acting as Director of the MRC Kampala Unit. Then, on the bus from the airport, I found myself behind two Americans who were discussing the astonishing news that Hamish Munro had withdrawn from his new post at the Dunn on the grounds that the MRC had refused a move to a Hospital site for undertaking clinical nutrition research. So, clearly, my prospective job had disappeared! It then became clear that President Idi Amin was expelling all "foreigners" from Uganda, including Roger's MRC Unit. It therefore came as no surprise to hear that the Kampala Unit was moving partly to the Dunn, with the community research being transferred to The Gambia to one of the sites of the renowned MRC unit for malaria research where I had originally been offered a job by the MRC before opting for Jamaica.

### **Establishing obesity research in the UK**

So, with my stay in London assured, I started an obesity clinic at University College hospital – the first in a UK teaching hospital – and slowly realised I knew nothing about obesity apart from what I was learning as the Scientific Secretary of the DoH and MRC working party. I did, however, also become involved with issues relating to the nutritional support of traumatised patients and Professor Exton Smith in St Pancras taught us elements of his extraordinary caring and scientifically-based management of the elderly. I also slowly realised that there was a nutritional basis for a whole range of diseases in affluent societies as I read about Ancel Keys' studies on cholesterol metabolism, heart disease and the inter-

individual responsiveness of circulating cholesterol levels to specific saturated fatty acid intakes, as well as a host of animal experiments on the processes of atherosclerosis and thrombosis. There was also discussion about sodium's role in determining societal increases in blood pressure and a recognition that cancer prevalence varied markedly across the world with migrant studies showing the changing rates of cancer incidence. However, at that stage, the nutritional world seemed exclusively concerned with nutritional deficiencies.

Then, out of the blue, the MRC suggested that I consider developing a group to undertake research on obesity at the Dunn. I would not be offered clinical facilities, but an honorary clinical contract was engineered – with difficulty – so that I could see patients "somewhere". I was assured by senior Staff from MRC HQ that they were pressing Addenbrooke's Hospital to give me space, but at that stage I realised that the "Medical School" had just four students who seemed to attend in their own time. There was little evident organisation before John Butterfield was appointed as Regius Professor in 1976 and established a proper Medical School. Soon after I arrived in late 1974, I was conducting outpatients' clinics in a colonoscopy instrument cleaning room in New Addenbrooke's Hospital! Nevertheless, I soon had a waiting list 18 months long with patients coming from as far afield as Northern Scotland. A junior consultant then kindly offered me in-patient facilities for one or two patients at a time in Old Addenbrooke's Hospital. We promptly took over, probably illegally, an abandoned upper ward and my newly appointed bioengineer Peter Murgatroyd, rewired the place thereby allowing us to create offices, food production facilities, a clinical intensive study room with calorimeters and a urine and faeces processing room so we could conduct total metabolic studies. I benefited from obtaining help from some pre-existing staff e.g. Joy Dauncey and David Southgate who had worked with Elsie Widdowson. I was also able to appoint some new staff including Paul Trayhurn who had previously done research on vision, Margaret Ashwell who had worked with John Garrow and the now renowned psychologist, Barbara Sahakian. Roland Jung (who later became the Chief Scientist for the Health Department of Scotland) and the late Prakash Shetty, from Bangalore, India proved to be a formidable duo who conducted intensive clinical studies with speed and flair.

With Roger Whitehead now in charge of the Dunn and engaged in a welter of community research in The Gambia, the MRC wanted to emphasise that it was supporting human nutrition research and dealing with practical issues of public health importance. Within six months of starting work, I was precipitously called upon to produce a detailed account of all my obesity research in Cambridge! I had no clinical facilities or space at that stage but fortunately I had been able to purchase a simple calorimeter which I was allowed to put in the Thoracic Clinic's testing room. I also discovered a relatively underused human whole body counter for potassium  $K^{40}$  assessments and, with a bit of persuasion, we used  $K^{42}$  injections to assess the self absorption of  $K^{40}$  in my obese patients. So with some quick

calculations, the day before the media visit, I was able to discuss the seemingly anomalous findings of high basal metabolic rates in the obese as the press toured the new Dunn's research programme. Given the favourable and intense publicity, the Dunn then seemed to be on the MRC's preferred list of Units to be visited whenever they wanted a publicity fillip – which seemed to be a yearly requirement! This publicity worried me because respectable Cambridge scientists did not talk about their work until it had been peer-reviewed and even then one avoided the press if at all possible. Only pseudo scientists sought media attention!

At that stage human nutrition seemed geared simply to relatively general measures of food intake with some national studies assessing anaemia. We, however, started from the assumption that dietary surveys were hopelessly unreliable so we did not believe anything unless backed by other validating measures. John Cummings had just arrived from London and we appointed Sheila Bingham, soon to become renowned for her epidemiological research. We seemed to spend our lives doing weighed intakes on ourselves including 24-hour urine-collections, even during conferences and dinner parties as we began developing biological markers of intake to validate our dietary data. Hans Englyst was recruited and promptly began the new analysis of dietary carbohydrates and helped change our understanding of starches and non-starch polysaccharides.

With so much publicity attaching to our human studies the MRC rapidly organised formally for me to become a Consultant to Unilever in Colworth House, Bedfordshire as part of the MRC response to political demands for MRC/industrial interactions. I was frankly horrified because I had the impression that the only human nutrition research then being undertaken was on issues favouring particular food industry products. However, my interactions with Tony James, a senior manager, meant that we rapidly had Unilever offering to snap-freeze tons of carrots, cabbage and apples in the field. In addition, they then shut a huge perfume distillery for about 3 months so that we could obtain fibre fractions, as specified by David Southgate, distilled from the frozen fruits and vegetables as well as from bran and guar gum. The cost then was well over a million pounds which would never normally have been possible on an MRC budget. Our metabolic balance data then allowed us to transform our understanding of dietary carbohydrates, their digestibility, the concept of a colonic microflora with fatty acid absorption and faecal bulking. This also permitted us to come up with the goal of 400 grams of fruit and vegetables per day as a nutrient goal for WHO, or 5 portions/day for the USA.

### **A new world of science communication, media and nutrition messaging**

In the middle of this research frenzy, I was suddenly asked by Jerry Morris – renowned for his research on bus drivers and conductors and the role of exercise in preventing heart disease – to take part in a BBC series with TV personality Roy Castle, aimed at educating the general public. I immediately refused, concerned

for my reputation as a serious, non-publicity seeking scientist. Jerry then asked me whether I had taken the Hippocratic oath, indicating it was my moral responsibility to take part. So, reluctantly, I agreed and soon realised not only how little I knew about the appropriate recommendations, but also discovered the scarcity of collated evidence or policies relating to obesity, diabetes, heart disease, high blood pressure or cancers; indeed, there were no formal nutritional recommendations for any major dietary issues. This seemed to accord with our increasing awareness that human nutrition analyses related mostly to vitamin deficiencies. It soon emerged that policymaking often involved senior physicians with little knowledge of nutrition but trained, like me, in savage analyses of double-blind trials as the only criterion for allowing drugs (and now nutrients) to be used therapeutically. So, I used classic analyses by Keys, Hegsted and Ahrens on the dietary control of circulating lipids in relation to heart disease and the early studies on salt inducing higher blood pressures. Higher fat and sugar intakes we considered as increasing the risk of obesity; sugar we knew induced dental caries. However, our own studies of the universally appalling weekly diet of 50 consecutive households in a housing estate in Linton near Cambridge allowed us to generate six programmes lasting 9 minutes 50 seconds each on prime-time Sunday evening TV. I well remember Peter Riding the producer stopping me as I struggled to set out the evidence that whole grain bread might affect zinc absorption. He just said: “look at the camera and in 12 seconds tell your mother whether she should worry about zinc when eating wholemeal bread!” We filmed a typical family in their kitchen before and after a week's dietary change only to be criticised by nutrition establishment figures for such crude presentations – but they never specified what we should have said! We then discovered the supermarkets and millers were dismayed because we had not forewarned them as they immediately ran out of various items for several days when, for a few seconds, viewers saw a scan of Sheila Bingham's food diaries showing our recommended foods. We were even more astonished when the BBC received an avalanche of post: the greatest response to a programme since the Second World War! Not so surprising, however, when we learned our nutrition messages were indeed the first for the general public for 30 years.

This success led to Jerry Morris press-ganging me onto the Health Education Authority's committee to set out clear nutritional messages. However, I was informed by the Medical officer dealing with nutrition in the Department of Health that all I needed to consider was how to present evidence in a suitable form and language to persuade Asian and African immigrant communities to take extra Vitamin D as there were marked deficiencies even in their young children and adolescents. The only other national nutritional priority at that stage was determining the appropriate composition of breast milk substitutes. Yet I knew – from personal clinical experience – that cardiovascular disease was the biggest killer, affecting even early middle-aged men as well as postmenopausal women. This suggested to me that human nutrition research and its practical implications for policymaking had been woefully neglected for years.



So, I proposed that we should add a range of chronic adult conditions to our portfolio. This resulted in Jerry Morris asking me to form a group to present a report on the general approach to nutrition education for the UK in the modern age. This, in turn, led to the Nutrition Advisory Committee on Nutrition Education (NACNE) Report, produced with the help of Derek Miller of Queen's College, Jim Mann, then of Oxford but now Prof of Human nutrition in Dunedin, New Zealand, and from our group Caroline Walker, Rhys Williams and Graham Neale. Caroline became a prominent health campaigner before her untimely death, Rhys subsequently became the first Dean of Swansea Medical School and now leads the international Diabetes Federation's analyses of global diabetes prevalence. Graham Neale who had formerly been Dean of Medicine in Dublin with responsibility for nutrition in Ireland – also contributed with others. The Report included the prevention of adult chronic diseases and caused consternation as we seemed to be usurping the role of the Department of Health's Committee on Medical Aspects of Foods (COMA). Nevertheless, we persisted with help from Ian Munro, Editor of the Lancet. Later Geoffrey Cannon's exposé on the front page of the Sunday Times's led Margaret Thatcher to sanction our report at Prime Minister's Question Time in the House of Commons.

Meanwhile Paul Trayhurn and Margaret Ashwell were producing a plethora of ground-breaking research on brown adipose tissue and obesity; further publicity came from a BBC Horizon programme *"Fat in the fire"*. In this I recounted our and others' animal research on brown adipose tissue and our clinical studies on brown fat which our next recruit, Michael Lean – of current diabetes treatment fame – was to analyse immunologically. By that time we had an established metabolic facility with whole body calorimeter analyses with a stream of publications showing the remarkable consistency of metabolic rates, but with cyclical patterns during the menstrual cycle. Data on the effects of smoking, coffee-drinking and the differential effects of selective nutrient overfeeding or semi-starvation on metabolism rapidly emerged. New analyses of dietary salt sources by lithium tracer tracking also bore fruit. Publications on fibre, its fermentation in the colon, the concept of a colonic microbiome and the colonic absorption of short chain fatty acids were also hitting the press. So, with Roger Whitehead's group's analyses of seasonal variation in mothers' and children's nutritional state, human nutrition research was now augmenting the excellent animal research and being presented at Nutrition Society meetings.

During this time, I was invited by Professor Geoffrey Rose and then Lord Swan, Chair of the London School of Hygiene and Tropical Medicine's Council, to become the School's Dean. I thought myself too young for such a big job and anyway we were having an exciting time in Cambridge. Having also refused the offer of a Professorship at the School when John Waterlow was due to retire, I was bemused when – at a 1981 Christmas party for myself and other Council members with senior staff of the Institute of Physiology in Babraham – I was asked by various colleagues about my planned take over of the Rowett Research

Institute on Sir Kenneth Blaxter's retirement! This was baffling as I had only briefly been there once when The Nutrition Society had met in Aberdeen and knew nothing of Sir Kenneth's impending retirement. I rapidly discovered that John Gibson of the Scottish Office in conjunction with the Chief Scientist of the Ministry of Agriculture and the Head of the UK Animal Research Council had indeed decided to target me to take over the Rowett. This coincided with intense political shenanigans in the MRC, dealt with elsewhere<sup>(3)</sup> and, nine months later, I was appointed Director of the Rowett. The appointment came with a demand that I expand the research of the Institute to include human nutrition but, in the event, it was not until the day of my resignation, 17 years later, that this area was formally included in the Rowett's remit! The Scottish office's immediate offer of funding and transfer costs for all 30 of my staff from Cambridge was then sabotaged by a reversal of MRC policy and an offer of greater funding if my colleagues stayed in Cambridge! This was the first time since the Second World War that backing human nutrition research became a competitive issue for national funders!

### The increase of human nutrition research in the UK

I have described briefly elsewhere my time at the Rowett where it became clear that the animal research was often superb but practical and/or strategic animal nutritional studies were also being conducted at 13 other major UK institutes. Human nutrition, however, was by then beginning to blossom in the UK. This is illustrated by my wife Jean's records of all guests dining at the Director's House, Wardenhill. Her list of the members of the Association of Professors of Human Nutrition attending a Nutrition Society meeting in July 1995 reveals a marvellous array of talent by then: Peter Aggett, John Cummings, Anne De Looy, Catherine Geissler, Tim Gill and his wife Gillian (now in Sydney, Australia), Alan Jackson, Joe Millward, Christine Northrop, Jeremy Powell-Tuck, David Thurnham, Michelle Torraladona (née Murphy – now in Reus, Catalonia, Spain), Prakash Shetty, Roger Whitehead and Martin Wiseman. The menu was not very traditional Aberdonian fare: melon and smoked salmon; stuffed quail wrapped in bacon with black cherries, green beans, boiled potatoes and decorated with strips of roast pepper and cherry tomatoes; strawberries with cream or Greek yoghurt followed, then an assortment of cheeses, grapes and coffee to counter the effect of large quantities of Rioja Reserva, Frontonnis red and Jacob's Creek white wines, and finally Pineau. I see the cost per head for the food was then only £8.50 per head!

The blossoming of nutrition was by then long overdue and meant that many of us were in demand for seemingly endless government committees. This related to the realisation that human nutritional research involved a good understanding of whole body physiology in health and disease and lead to my serving on the Food Advisory Committee for MAFF and the committees dealing with toxicology, novel and irradiated foods and COMA for up to 25 years. I remember having to insist on resigning after 8-15 years from several of these committees but there

were all sorts of ad hoc meetings, especially relating to secret MAFF meetings on bovine spongiform encephalopathy a decade before its emergence as the human novel Creutzfeldt-Jakob disease. Then there were other meetings, e.g. for Prime Ministers Thatcher then Major, where 14 of us were required to transform the industrial base of Britain by science- industrial interactions. I was responsible for the whole food chain while somebody whom I thought was a student attendee, turned out to be a mathematician leading the revolution in computing for the financial sector of the City. Others dealt with energy, computer technology, cars etc. where we all went through iterative Delphi exercises with industrialists and set out financial priorities for industrial development – or, in my case, what proved to be a relatively unsuccessful nutritional transformation of the food chain.

### International engagements

I served on the Council of The Nutrition Society and remember being unpopular when, in response to initial widespread criticism of all the poorly attended, far flung meetings of modest quality, I suggested a drastic change with a single major meeting annually to include careful selection of first class speakers and a selection of potential abstracts. Perhaps this was why I was soon representing the Society on the European Association of Nutritionists and then on the International Union of Nutritional Sciences (IUNS) Council? The IUNS required a good deal of travelling and clearly suffers from poor funding despite the overwhelming global need. This need I understood after a decade as the official nutrition advisor to the UN Food and Agriculture Organisation (FAO) and then when heavily involved with WHO. So I ended up challenging all 53 European Ministers of Health in the WHO region, as well as their Agricultural counterparts, with an opening presentation to their conjoint conference in the Budapest Opera House in 1986; then, again, in 2013 with updated WHO proposals to all European Health Ministerial teams in Vienna. Earlier I helped Madam Chen Chun Ming in Beijing develop a Chinese childhood obesity taskforce which then evolved into a group for national strategic thinking. Perhaps this explained my being asked to personally debate for three hours the need for food chain improvements to prevent non-communicable diseases with all 30 of the main Ministers of Health of China, Japan, Malaysia, Indonesia, Australasia and the other Western Pacific Health Ministers in Osaka Japan in 2002? This proved much easier than my attempts with Dr Alwan, Regional Director of the WHO Eastern Mediterranean Region to repeatedly persuade 22 Ministers of Health in meetings from 2012 to 2017 to generate better public health strategies based on nutritional change to lower the catastrophic levels of diabetes, obesity and cardiovascular disease in the Middle East. Perhaps the best outcome came from the Caribbean Prime Ministers in a special 2007 CARICOM meeting in Trinidad: this was organised by Sir George Alleyne, then head of Pan American Health organisation, with whom I had worked 40 years earlier in the TMRU, Jamaica. This meeting started the main drive for the UN Assembly's initiatives on the global control of noncommunicable diseases starting in 2011.

The IUNS meetings themselves varied in their demands – from helping Emorn Wasantwisut with her interactions with the Princess Sirindhorn of Thailand, given the Princess's interest in the Nutrition institute in Mahidol University in Bangkok, and her nurturing of the IUNS meeting there in 2009. Earlier, however, at the 2005 IUNS Durban meeting not only did I have to prepare the opening speech for the congress in case the alcoholic Minister of Health was unfit to speak at the opening ceremony, but also suddenly had to chair the IUNS Council meeting after first declaring, as Senior Vice President, that I would not be standing at any time for the Presidency. The Council meeting of all delegates was in turmoil as the incoming and outgoing Presidents disputed an attempt to appoint an African as President Elect but where his own African Nutrition Society quietly told me that they did not favour his nomination. This was despite his being backed by a welter of new African Societies whose \$100 dues had miraculously been paid that day to try – contrary to the rules – to qualify to vote!

These IUNS challenges were minor compared with being unexpectedly asked by Tony Blair in 1997 to prepare a strategic plan for a UK Food Standards Agency (FSA) in six weeks. I proposed a radical reorganisation of the Scientific Committees of the Ministries of Health and Agriculture. Subsequently, Members of the House of Lords forewarned me that representatives of the food industry were lobbying intensively against me and my proposals. However, it was not until 13 years later, as I was booked for a strategy session for the Labour party in the preliminaries to the 2010 election, that my team met David Cameron who told us that he was planning to follow the recommendations of the Food and Drink Federation by transferring the nutritional element from the FSA back to the Ministry of Health's political control. This limited the independent nutritional policymaking and reduced the FSA's international reputation. Nevertheless, my proposal for a European Food Safety Authority as one of the "Three Wise Men" on the top Scientific Steering Committee for Europe means that independent nutritional thinking can still prevail, albeit not in the UK following Brexit.

Achieving good nutrition and sustainable development in a climatically unstable world remains a huge challenge as we had to emphasise when I chaired the Millennium analysis for the UN's Scientific Committee for Nutrition. My hope is that countering persisting childhood malnutrition will continue to be a focus for the global Nutrition Community but we still need rigorous science as well as unusual skills if we are to succeed in establishing public health nutrition as a global priority.



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## Honorary Fellow **Professor Leif M. Hambræus**

MD, PhD

I was born in June 1936 and brought up in Stockholm, Sweden as the fourth, and by far the youngest child, in a family where both parents were MD. I went to school in the central part of Stockholm, left secondary high school in 1955 and started my medical studies at Karolinska Institute in Stockholm the same year.





I was born in June 1936 and brought up in Stockholm, Sweden as the fourth, and by far the youngest child, in a family where both parents were MD. I went to school in the central part of Stockholm, left secondary high school in 1955 and started my medical studies at Karolinska Institute in Stockholm the same year. At 23 years of age I married Anna, my life partner. We met during the first years in our medical training. A “student marriage” was not very common in those days, and we tried to balance our medical studies and research activities within our limited resources. I continued my medical studies while I started my graduate studies for a PhD thesis, which however delayed my final MD legitimation. Anna went straight on to get her MD, specialised in clinical microbiology, and presented her PhD thesis on hospital infection control some years later. Together we brought up a family with 4 children. Today we have 12 grandchildren and so far, 2 great grandchildren. It has always been our goal that both of us should continue our work as MD and scientists, and especially that Anna should not give up her career, as my mother unfortunately did, for family reasons.

From the beginning of my own medical studies I was especially interested in biochemistry and physiology and the relation between metabolic turnover and health. I began to work as graduate student at the Department of Metabolic Research at the Wenner-Gren Institute, which was affiliated to Stockholm University. The concept of this institute was interdisciplinary research between zoology and metabolic research in humans.

My first supervisor, Professor Harry Boström, MD, asked me to participate in a study on an inherited kidney stone disease, cystinuria. It was aimed to be a follow up of studies initiated in 1920's by Professor Mörner, who was professor in medical chemistry at Uppsala University. He had deposited his notes in the library to be available for future research. This made it possible to perform unique long-term prospective studies on this inherited metabolic disease.

Thanks to the development of chromatographic and electrophoretic methods to identify and analyse intermediate metabolites, the interest for inherited metabolic diseases had increased immensely after the 2nd World War. Sweden was a “heaven” for genetic studies due to fact that it had a well-established registration of its population through the State Church parish registers.

My PhD thesis was presented in 1964 and titled “Cystinuria in Sweden. Biochemical, Clinical, Medico-social and Therapeutic aspects of the disease.”

From the beginning of my own medical studies I was especially interested in biochemistry and physiology and the relation between metabolic turnover and health.

During these studies I had my first contact with scientists within the UK, as I visited Professor Harry Harris at King's College, University of London, for helpful discussions and constructive criticism about my data on the genetic characteristics of cystinuria. However, my studies on cystinuria did not raise any specific nutritional questions, as dietary treatment was not a solution to treat the patients. The disease could later be treated using more sophisticated chemical components to create more soluble mixed disulfides than cystine.

After my dissertation I was “head-hunted” by Professor Bo Vahlqvist, Head of the Department of Pediatrics at the Medical Faculty of the Uppsala University. He offered me a postdoctoral fellowship at his clinic with the task to establish a metabolic ward for diagnosis and treatment of inborn errors of metabolism during infancy and childhood. Already during my graduate studies my interest for metabolic diseases had led me to start metabolic screening programmes for diagnosis of inborn errors of metabolism in pediatric clinics. Consequently this offer was accepted with enthusiasm and I moved to Uppsala with my family and got a formal assistant professorship status in medical biochemistry at the Medical faculty at the Uppsala University.

In a small country in the northern part of Europe, it is most essential for teachers and scientists to communicate with well-established universities in and outside Europe. Uppsala University was founded already in 1477, and it has always been, and still is, of significant importance that its students and teachers have close contact with scientists in other European countries. In the beginning we made contacts in England, France and Germany. After the 2nd World War, our contacts were more focused on collaboration with universities in UK and US.

I was consequently sent out by Professor Vahlqvist to visit clinics in the UK and US to learn from their experience gained in metabolic wards in pediatric clinics. This was the first time I met members of The Nutrition Society in the UK and scientists within the US, especially in Boston and New York. When I later became interested in global nutrition problems, I also had the opportunity to visit several nutrition activities in Africa, India, Central America and also the West Indies.

The introduction of neonatal screening for phenylketonuria (PKU) started in Sweden just after my dissertation. This was one reason for the interest in Uppsala to build up a metabolic ward for dietary treatment. The first challenge for me to solve was to find the optimal dietetic treatment of the PKU patients from early age onwards. During these studies I realised that those who were breastfed seemed to get less metabolically provoked than those formula-fed. Stimulated by this finding, that human milk seemed to be favourable, I started to study what we could learn from Nature, analysing the characteristics of human milk quality. Of special interest for me were the studies by Dr Elsie Widdowson on the differences in milk composition among mammalian animals. Could it be that mammalian milk could be *the functional food provided* by Nature for man as well as for all

mammals, as the milk composition varied so much between the mammalian species? The extremely high rate of whey proteins in human milk interested me, especially as they comprise a number of protein fractions with specific physiologic functions, e.g. lactoferrin and immunoglobulins. Interestingly, this topic became most relevant at that time due to ongoing discussions regarding the complications for mankind of reduced breastfeeding in affluent and especially low-income countries. Suddenly I realised that studying rare cases of inborn errors of metabolism may, surprisingly, also help us to better understand global malnutrition problems in man.

In addition to studies on PKU patients, my screening programme also resulted in the diagnosis of a number of other inborn rare errors of metabolic disturbances, especially in amino acid and protein metabolism, e.g. tyrosinosis, homocystinuria, histidinemia and argininosuccinic aciduria. Some of them, e.g. homocystinuria and argininosuccinic aciduria had not been described in Sweden earlier. Both of them raised advanced nutritional aspects on dietary treatment, including vitamins, e.g. the role of pyridoxine in homocystinuria, or the very low protein tolerance in argininosuccinic aciduria, due to its malfunction in the urea cycle.

### **From studies of inborn errors of metabolism to nutrition**

It was obvious that my engagement in dietary treatment of inborn errors of metabolism and my interest in breastfeeding and the role of infant feeding for optimal health had led me into the field of nutrition research. I was therefore asked to start up a new nutrition unit in Uppsala with support from SIDA (Swedish International Development Authority) to study global problems of malnutrition. In addition, I was also asked to get involved in the Swedish Nutrition Foundation, which had been established about a decade before. I took over as its Executive Officer for a number of years. This resulted in a fruitful collaboration with the Nutrition Foundation and Professor William Darby in the US, and the British Nutrition Foundation led by Dorothy Hollingsworth in the UK. Through these organisations and the symposia they arranged, including not least by the Swedish Nutrition Foundation, I had the privilege to meet a number of outstanding scientists in the nutrition discipline. In the UK such great personalities as Sir Rudolph Peter, Sir David Cuthbertson, Egon Kodicek, Reg Passmore, Stewart Truswell, Elsie Widdowson, John Waterlow and Robert McCance; In the US: at Harvard, Mark Hegsted, Jean Mayer and Fred Stare, at MIT, Hamish Munro, Nevin Scrimshaw and Vernon Young. They all made a great impression on me and stimulated me to devote my academic interests to the science of nutrition.

In 1967 I visited the MRC Nutrition Unit in Kampala where Dr McCance presented his work at the nutrition unit. He also took care of me during a weekend and offered to take me bird watching on a Sunday morning on the shore of Lake Victoria. He was a great personality and I will never forget my surprise when he

started to talk about his memories being a pilot flying Camels, a single seater, during the 1st World War.

In 1968 I visited Jamaica and the Tropical Nutrition unit where Derrick Jelliffe and Professor John Waterlow worked. I was greatly impressed of Waterlow's laboratory work on protein turnover in kwashiorkor and marasmic children using stable isotope technique "in the fields". However, it was not "within reach" for me to set up stable isotope technique in my own institute at that time. Interestingly, two decades later both doubly-labelled water and stable isotopes were used in my studies on energy and protein turnover in the UPPCAL unit in Uppsala. Some years after my first meeting with Derrick Jelliffe we had contact regarding the problem of formula feeding versus breastmilk in the developing world. He was also very interested in my studies on the whey protein fractions in human milk and their potential physiological role.

In 1970 I visited Elsie Widdowson and Roger Whitehead at the Dunn Nutrition Laboratory in Cambridge. Elsie introduced me in her work on minipigs and her engagement in understanding the etiology of the malnutrition problems. I will never forget her brilliant intellect in combination with humbleness and humour, in addition to her excellence as a lecturer.

### **Formal introduction of nutrition in my academic career**

Nutrition was introduced as a new topic for education and research within the medical faculties in Sweden in the beginning of 1970's. In 1972 I got the new established Professorship in human nutrition in Uppsala. It had special reference to infant nutrition and global nutrition perspectives. I was welcomed to the first generation of professors in this discipline by the other members Björn Isacson, who was secretary general of the IUNS, and Arvid Wretling, a pioneer in the field of parenteral nutrition.

In order to learn from other nutritionists before establishing a new nutrition department in Uppsala, I got a Fulbright stipend, which gave me the opportunity to spend a year as visiting professor at MIT in Boston, the 'Mecca' of protein research in 1973-74. This was the start of a long-term collaboration with Nevin Scrimshaw and his collaborator, Vernon Young, which lasted for many years. Vernon came to be a close friend of mine and he also introduced me into the field of the use of stable isotopes in studies on protein and energy turnover in man.

Elsie Widdowson was one of the founders of the new Federation of European Nutrition Societies (FENS) and she stimulated me to take part in this organisation. Being one of her great fans, I followed Elsie's initiative with great interest and was happy to be able to arrange the third European Nutrition Conference in Uppsala in 1979. I was President of FENS 1979-83. I was very pleased to get His Majesty Carl Gustav XVI, the King of Sweden to officially open

the conference in the University Main Audience Hall, which gave the science of nutrition a special official status.

My interest in global nutrition problems also led me to participate in the International Union of Nutritional Sciences (IUNS) where I was a member of the board from 1981-89. Furthermore, I was involved in the food and nutrition policy discussions in Sweden. Thus I participated as staff member in the official delegation at the meeting at FAO in 1981 on the introduction of nutrition into FAO policy and programmes and, in 1992, in the International Conference on Nutrition.

I was especially happy to make good PR for nutrition science when I persuaded the Medical Faculty at the University Uppsala to confer honorary MD degrees to both Derrick Jelliffe and Vernon Young, as well as to one of my best postgraduate students, Bo Lönnerdal, who later moved to the US. I had introduced Bo, who was a protein biochemist, into the field of nutrition science, when we started the in-depth studies on whey proteins and lactoferrin. However he was soon “stolen” by my colleagues in the US, when the University of California in Davis offered him a professorship in Nutrition, where he made a very distinct career. On the other hand, it illustrates that international collaboration means that small countries not only send their students abroad to learn, but that they may also export some of their more mature “products” overseas later.

I am also proud of the fact that there was a balance between female (55%) and male (45%) graduate students in my group, and that about one third of my graduate and postgraduate collaborators continued their work in nutritional science as senior lecturers and/or full professors.

### **The use of IT in nutrition education**

With support from the SIDA we introduced a nutrition education programme for teachers in nutrition in low and middle income countries. The courses comprised a 5 week course in Uppsala followed by a one week seminar 6 months later in various countries in Africa, Southeast Asia and South America. Together with my postgraduate collaborator, Thorkild Tylleskär, now professor of international health at the University of Bergen, Norway, we introduced the use of IT in nutrition education and distance learning in this educational program. For this purpose I had close collaboration with Professor Steven Zeisel and his staff at the Nutrition Department of the University of North Carolina, Chapel Hill, US. They had developed the Nutrition in Medicine concept, a medical nutrition curriculum with clinically relevant, evidence-based education material for health care professionals, which first used CDs and later was available on line.

After retirement, I returned to Stockholm and was affiliated to the Unit for Preventive Nutrition at the department of Bioscience at NOVUM, Karolinska institute for another 15 years. I then continued my activities using IT in nutrition

education, based on the *Nutrition in Medicine* concept and started distance courses in nutrition also for undergraduate and postgraduate students. I also encouraged nutritionists to take action in food and nutrition policy discussions. It is essential to get a balance between agricultural production of the “four big F”: Food, Feed, Fibre and Fuel for optimal health in the national and international perspective. Green energy should neither be a threat for human nutrition but a complement, nor result in increased risk of malnutrition in low-income countries due to changed priorities in agricultural production!

### **Was there a potential/hidden engineer inside me?**

*Building automatic amino acid analyzers.*

When I started my studies on cystinuria, there was no economic chance to invest in a commercial equipment for automatic amino acid analysis of the Stein and Moores classical design. I had to build my own variant, based on Swedish made instruments from LKB, i.e. photometers and micropumps. The project had started some years before my introduction in the field but collapsed. However, as qualitative and quantitative amino acid analyses were central for my research programme regarding cystinuria, I decided to make a new trial. Fortunately, just after my decision, Professor Moore visited our lab. When he learnt that the first trial had collapsed, he persuaded me to make a new trial. He was eager to give me support and gave me advice how to continue. Finally I was successful and a Swedish “home-made” variant was born. When I moved to Uppsala I had the same tight economic situation and had to build my second home-made variant of an automatic amino acid analyzer. Only many years later could I raise enough money to buy a commercial setup.

*Building the UPPCAL unit for direct and indirect calorimetry.*

Another example of my “engineering interest” to develop advanced instruments occurred in the 1980’s, when I wanted to combine studies in protein metabolism with energy balance studies. When I was visiting the Memorial University of Newfoundland in St Johns, during a sabbatical leave from Uppsala, that happened to meet Dr Jan Snellen, who had a whole body calorimeter equipment. He was very experienced in the field of equipment for direct calorimetry measurements. Since I had read about a calorimeter suit equipment developed for NASA with interest, I discussed its potential for energy balance studies with Dr Snellen. He recommended me to take contact with Dr Paul Webb in Yellow Springs, Ohio, which I did. I found the suit calorimeter Paul had developed for NASA most fascinating and decided once more to build my own home-made advanced instrumental set-up following his description. Paul was kind enough to come as visiting scientist to my unit in Uppsala in order to help me build up the unit and also suggested its name to be “UPPCAL”. The program called for my engagement in writing computer programs for regulation and registration of data of the equipment, as well as to develop a unit for body composition studies using under-water weighing. In this project I was happy to involve two of my grown-up

children, who were now graduate students at the Royal Technical High School in Stockholm with experience in technical physics and calorimetry, respectively. Paul Webb was a wonderful and devoted collaborator and the programme was extremely successful.

With these new resources for metabolic studies I could also intensify the collaboration with Vernon Young at MIT. His experience of the use as stable isotopes for protein turnover studies in combination with our energy metabolic laboratory, UPPCAL with facilities for indirect and direct calorimetry resulted in a very fruitful and stimulating scientific collaboration during many years. Some of my graduate students could also meet with Vernon's graduates.

### **Hobbies are essential also for a scientist!**

In my "life concept" I include the importance of engaging yourself in activities outside your restricted academic circle. This will help you to see the world outside your own discipline and avoid being lost in academic contentions.

Being brought up in Stockholm, the Venice of Scandinavia, and its exotic archipelago, comprising more than 25,000 islands, offers unique possibilities to take part in water-related activities. Thus ever since my early teenage years, I have spent some time every summer aboard a sailing boat. Anything from a dinghy as a boy, a midget offshore sailing (JOG) boat as young adult, to offshore cruiser-racers as a "grown-up". As has been said: "the only difference between men and boys is the price of their toys". Sailing in the archipelago, the Baltic and North Atlantic and even participating in offshore racing with my family and friends is my "piece of the cake". In addition, my water interest made me also learn scuba diving, being dive master and certified in diving medicine.

My hobbies have however also initiated specific nutritional projects including studies on protein and energy balance in crews during offshore racing around the world (e.g. Whitbread Around the World and Volvo Ocean Race). Being a scuba diver I initiated studies on under-water physiology. These included seeing what heat losses to the environment meant for energy turnover, where the suit calorimeter had its advantages, as well as using underwater weighing for determination of body composition. In addition, another of my interests, long distance biking, initiated studies on nutrition problems in athletes especially for exercise conditioning for long distance skiers and cyclists. My photo interest starting from analogic to digital techniques, as well as the UPPCAL work introduced me in the computer world. During the last phase in my career, I thus introduced IT-technology in long distance training courses in nutrition science for lecturers in the developing world.

I will end this recollection with a citation of a poem written by my dear friend and colleague within the science of nutrition, the late Vernon Young:

*There are good ships and wood ships and ships that sail the sea,  
But there are no ships like friendships and ever may they be.*

Vernon has meant so much to me not only as a good friend but also as an enthusiastic collaborator and stimulator for my work in nutrition science. I sometimes wonder if he wrote this poem before or after knowing that I was not only a nutrition scientist but also a devoted sailor?

Nevertheless the "sense moral" from my life experience is that it is essential to build up international and interdisciplinary links between colleagues in the scientific world. The Nutrition Society is one excellent example how this goal can be reached.



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## Honorary Fellow **Professor Jo Hautvast**

MD PhD Knight in the Order of the Netherlands Lion

My first encounter with nutrition sciences I got around 1960 when I was a medical student at Nijmegen University. I did follow a non-curriculum course on Health in Developing Countries and a guest lecturer was Professor Dr H.A.P.C. Oomen MD who presented his findings on vitamin A deficiency and xerophtalmia in South East Asia based upon his assignment as consultant of the WHO.



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In April 1967 we – with my wife MaryLou and daughter Jeannine – travelled to Tanzania to work for a period of three years as M.O i/c of a 70-beds mission hospital run by Dutch Franciscan Sisters, called Igogwe Hospital, located in the South-Eastern highlands close to Tukuyu town. It became a fascinating period and the family welcomed another two children, Lucas and Birgitte, during these years. In the spare free time we visited primary schools to measure amongst others H/W and upper-arm circumference. We also studied the role of witch-doctors when treating diseases and many patients were asked whether they had consulted such a doctor before coming to our hospital. MaryLou was very much involved in fieldwork regarding child rearing as part of her Master Degree Programme in Social Anthropology.

In April 1970 we returned back to the Netherlands and I could continue my position at the Medical Faculty in the department of Anatomy. I was very sure that I did not plan to continue teaching and research in anatomy. I also did not see myself as a village GP somewhere up-country. However I started asking around how I could study and / or become trained in nutrition sciences. Should I start a specialisation in internal medicine, in pediatrics, in gastroenterology or even in social medicine. Several colleagues advised me to get in contact with Professor Dr C. den Hartog who was, in 1969, appointed as the first full-time professor in nutrition sciences in the Netherlands at the Agricultural University in Wageningen, a university world-wide known as a leading agricultural university. His task was to build up a BSc and MSc programme in nutrition sciences. Why such training had a basis in Wageningen? This, of course, has a history.

Around 1960 the WHO and FAO appointed a committee to review the status at academic level of nutrition training and research worldwide. The outcome of this consultation was, amongst others, a strong recommendation that countries should have such academic programmes. This recommendation was taken very seriously by the Dutch Ministers of Health and of Education. The next obvious step was to consult medical schools in my country and they were asked about their interest in starting such an academic programme. The outcome of this consultation was that

the medical schools did not show any interest in getting involved in starting such an academic programme. Then the Agricultural University was contacted about their interest. This university did already house a small department of nutrition to provide nutrition sciences to home-economic and food technology students. Wageningen reacted very positively to starting such a degree programme and the Minister of Agriculture, who was the ‘owner’ of the Agricultural University, also promised additional support. So in September 1969, Wageningen University started a BSc and MSc programme in nutrition sciences. When I visited Professor den Hartog in 1970 he invited me for a one-day a week lectureship teaching on nutrition problems in developing countries.

In the mean time, colleagues and friends advised me to go abroad to study for a nutrition degree programme. I successfully applied for a fellowship at the Niels Stensen Foundation showing my admission to Cambridge University (UK), this Foundation was fully supported by the well-known international clothing store C&A. In September 1971 we travelled to Cambridge to start my academic year. We enjoyed studying and living in Cambridge.

Around the end of March 1972 our Cambridge life became unexpectedly in a roller coaster. This was caused by a phone call I received from the Chairman of the Board of Wageningen University inviting me for an interview with regard to the position of Professor den Hartog who was going on retirement. I was completely confused and cycled directly home to tell MaryLou about this call. On 10 April I had a long interview in Wageningen and about one week later, I was informed by the Board that they had selected me to become the successor of Professor den Hartog with starting date 1 September 1972. The period until the exams in June was hectic. Of course I was studying for the exams but often I was thinking about the new position at Wageningen University. I did realise very well that I should prepare myself on serving the department of Human Nutrition, both staff and students. The unique position as the only full-time professor in human nutrition in my country gave me also other responsibilities outside the department. I remember very well a quote of Elsie Widdowson in that period: “We are so good that even our students are appointed as professor”. I also remember very well the oral exam taken by Professor Steward Truswell. He became a good friend in later years and spent a sabbatical at our department.

The first 5-10 years I spent mostly working at the department. In 1974 the first students graduated for a Master Degree and in 1978 the first PhD students graduated, amongst others Professor Daan Kromhout and Professor Frans Kok, Professor Wim Saris took after his MSc degree in Wageningen a PhD programme at Nijmegen University.

Around 1980 Professor John Kevany from Dublin called me and asked me whether I was willing to take the role of Project-Leader of a new Concerted-Action Project on Nutrition in the European Community. I accepted this position

and we named this Concerted Action (C.A) EURONUT. The objective of this C.A. was to strengthen nutrition research in Europe by standardising nutrition research methodologies and by stimulating cooperation in nutrition research. The EURONUT started with a three day meeting outside Wageningen. Several members of The Nutrition Society attended this first meeting and had a very constructive input. To mention several participants from the UK – Dr S. Bingham, Professor J.Durnin, Dr W.P.T. James, Dr J.W. Marr and Professor John Waterlow; from Ireland, Professor J. Kevany; from France, Dr S. Hercberg; from Italy Dr A. Ferro-Luzzi. Altogether 35 scientists did attend this meeting. After the first EURONUT meeting, another 10 meetings on different topics were organised, such as a meeting on nutrition in the elderly which led to the well-known SENECA research programme. I am very sure that the EURONUT programme has strengthened nutrition sciences in Europe and this was often told to my staff.

Another international orientation of the department was brought by teaching a five month postgraduate course on food and nutrition for students from developing countries. At my appointment in 1972, I also was asked to take the directorship of this course and the Minister of Developing Aid supported this programme by making 20-25 fellowships annually available. Within a few years we developed a very good co-operation with several institutions in these countries leading to a number of excellent PhD students.

During the first 15-20 years at the Agricultural University I had to apply often the tactics of peaceful infiltration into the agricultural stronghold. The agriculturists were very dominant and new departments such as for human nutrition had to 'fight' very hard to get a piece of the cake, it was a 'fight' between the greens and the red (red stands for blood). Early in the 1990s I was invited to present the Annual Lecture at the Dies Natalis of our University which was a great honour. Then, I took the liberty with the proposal to change the name of Agricultural University into the Food University. Several of my colleagues told me that this was a step too far! However the name Agricultural University changed about 20 years ago into Wageningen University.

The European Nutrition Leadership Program (ENLP) should also receive attention. In the early nineties of last century I contacted quite a number of colleagues in Europe to discuss with them ideas on preparing our PhD students for careers after obtaining a PhD certificate. These students should become aware that for a career, more is needed than nutrition research in humans or laboratory animals. Senior scientists from food industries were contacted and they were also aware that food is more than a bulk of energy and that nutritious foods will be asked for in future. Such a programme needs a budget and food companies like Unilever and Danone and also the European Community provided budgets to start. The ENLP is only open for PhD students and a critical selection takes place. The ENLP became a great success and an ENLP Society was established. Phil James played a critical role as the first Program Chairman, and he was succeeded

by Mike Gibney and later by Sean Strain. Both Mike and Sean were very involved in making ENLP sustainable for the future.

In 1999 I left the department of Human Nutrition and also Wageningen University as I was offered a four year position as the 2nd Director of a Leading Technology Institute in Food Sciences, named The Wageningen Center for Food Sciences (WCFS), which was established in 1996 by the Minister of Economic Affairs. The objective was that public research should strengthen private research and a large budget was made available by the government. At the department, Frans Kok was appointed as my successor and I was very pleased about this.

My position at Wageningen University brought me during my career into different national and international positions and committees such as:

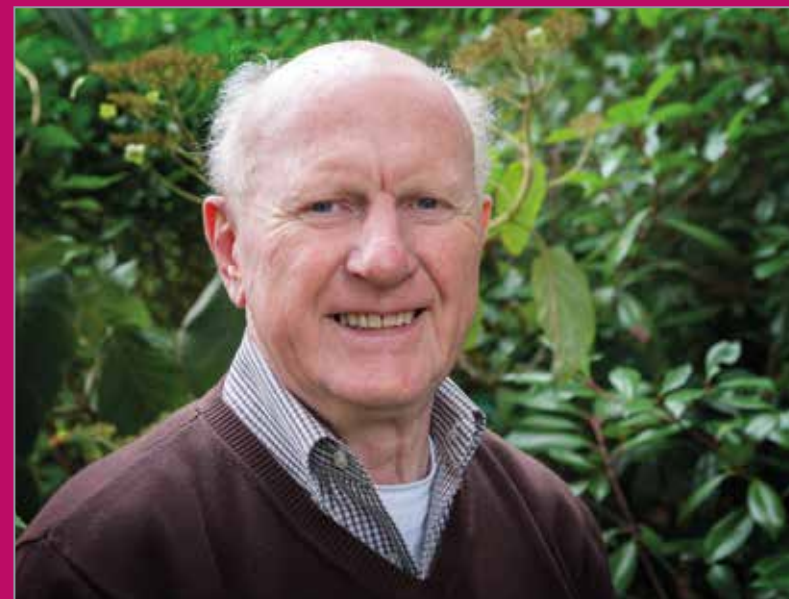
- The function as Secretary-General of the IUNS being the successor of Dorothy Hollingsworth, the director of the British Nutrition Foundation.
- Vice-Chairman of the Dutch Health Council and Board Member of the Dutch Institute of Public Health.
- Board Member of the Nestlé Foundation and the Nutricia Research Foundation.
- Member of the advisory board of the large Su-Vi-Max study in France under the leadership of Serge Hercberg.
- Member of a MRC-committee in the period that a review took place at Dunn Nutritional Laboratory including the appointment of a successor of Roger Whitehead which gave me mixed feelings; Sean Strain became my successor in this committee.
- Board member in the National German Institute of Nutrition in Potsdam directly after the reunion of East and West Germany.
- During these years I had many stimulating discussions with Mike Gibney and we also enjoyed sitting together discussing research programmes. The late Professor Prakash Shetty was often invited to teach in Wageningen in international courses and he became a very good friend. I also like to mention John Cummings for all his valuable input and discussions we had.
- I was elected as Honorary Member of The American Society of Nutrition, of the German Society of Nutrition and of the Netherlands Academy of Nutrition Scientists.
- I was appointed as correspondent member of the French Academy of Agricultural Sciences.



- I was honoured with a Honorary Doctorate at Potchefstroom University (South-Africa). This University has a leading nutrition department which is one of the best in Africa. In this department Professor Johann Jerling has established the very successful African Nutrition Leadership Program (ANLP) as a seed and comparable of the ENLP.
- I was honoured by the former Queen Beatrix by receiving the royal decoration : Knight in the Order of the Netherlands Lion.

I must come to the conclusion that quite a number of UK nutrition scientists, all members of The Nutrition Society, supported me and my colleagues at the department substantially during my career in Wageningen. We, at Wageningen University, could build up a strong and successful nutrition department and after more than fifty years since the start of academic teaching and research in nutrition sciences the department is still strong and innovative. I could have presented highlights in our research findings such as the role of trans fatty acids (Katan and Mensink) and the bio-availability of carotenoids (West), but I choose not to do so as part of this contribution.

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## Honorary Fellow **Professor Mark L. Wahlqvist**

AO, B Med Sc, MD, BS (Adelaide), MD (Uppsala), FRACP, FAIFST,  
FACN, FAFPHM, FTSE

It is a perennial question whether and to what extent we are prepared or destined to do what we do in adult life. Historical events in play before and when we are born and raised as children, unbeknown to us at the time, create opportunities, barriers, and junctures for later life. We will never know this with any certainty since we can tread only one path in life amid many possibilities.



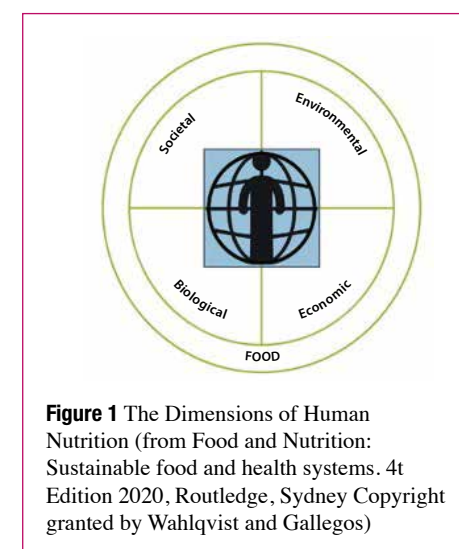
It is a perennial question whether and to what extent we are prepared or destined to do what we do in adult life. Historical events in play before and when we are born and raised as children, unbeknown to us at the time, create opportunities, barriers, and junctures for later life. We will never know this with any certainty since we can tread only one path in life amid many possibilities. What we do know is that concomitant circumstances make a pathway more or less opportune. As an exercise, I have enumerated some events surrounding my upbringing and people with whom I have intersected, who have probably accounted for some of my perspective and engagement in food and health affairs, their science, practice, and policy direction. I have unquestionably ‘stood on the shoulders’ of many. Most enlightening has been the increasing awareness and keen sense of my socioecological self. This is largely because of my exposure to fellow food, nutrition and health scientists and practitioners, and kindred Societies, along with my diverse ancestry, extended by a maritally Chinese family and progeny. I should add that exposure to Indigenous patients as a young doctor, and lengthy conversations with them as the traditional owners of Australia for storied ‘dreamtime’ millennia, provided a greater *raison d’être* for my connectedness belief system. Reconceptualisations of nutrition science, nutritional biology and of the critical importance of ecosystems and our sourcing of energy in health, which quickened during my tenure of the IUNS Presidency, are embedded in the new edition of my textbook first published in 1981; indicative graphics from it are reproduced here. The most cogent lesson of my journey has been ‘not to lose contact with nature’ and the connectedness it provides -without it, we are lost. To be livelihood-centred will become an imperative.

### Nutritionists are eventually Society inter-dependent

Even before and as we are conceived and born, *memories, stories, events, and institutions are shaping who we are and our future*. My oldest memory is of sirens followed by darkness on account of air attacks on Australia by the Japanese air force (Darwin was bombed when I was 2 weeks old; my uncle, as I was born, taken as a POW in Singapore and transported to Kanchanaburi with a future medical colleague ‘Weary’ Dunlop. Unbeknown at the time, Australian soldiers were being hidden in the ceiling of my future wife’s home in Singapore; the second oldest memory, gardening with my father (who ultimately died, I would say, of ‘climate change’, a heat stroke, in his 90s when ‘saving’ his garden at 43°C). My earliest sense of identity was provided by my Swedish name, where we lived, what we ate, wore, how we travelled (on foot, by bicycle and public transport), and stories told by my grandparents, the characteristics of our basic livelihood. A year before my wartime birth in Australia of Swedish, German, Cornish, and Scottish grandparents, The Nutrition Society in the United Kingdom was established, in 1941. A learned not-for-profit society with global standing, it remains “dedicated to delivering its mission of advancing the scientific study of nutrition and its application to the maintenance of human and animal health”. Membership is individual, worldwide, and “available to

those with a genuine interest in the science of human or animal nutrition”. It is a publisher of its science, basic, applied and in public health, enabling it to foster its disciplinary base. It has served as a model nutrition society where these have national orientations. Whether serendipitous or not, reflection reveals that intersection with the Society has contributed somewhat to my identity, even if the lag time has been long. In a piece I wrote for the Society’s Gazette on admission to its Fellowship, I reckoned I had stumbled into nutrition science and practice. But there is much that would not have eventuated in my career without institutionalisation of the food and health nexus by nutrition societies, not least that in Britain. The future was and is uncertain, now principally on account of escalating climate change, but with opportunity and responsibility, explored as ‘NS Challenges’ in the Society’s Gazette. The many nations across the globe with nutrition societies interact through regional and international events, albeit more and more virtual, in problem-solving and about shared policy concerns. They and their members constitute *a powerful network with the capacity to define, develop and determine better nutritionally related health outcomes*. Their impact can be enhanced by umbrella international agencies like the International Union of Nutritional Sciences (IUNS) or the UN system. Their capacity to respond usefully to the present challenges began long ago by those with vision enough to form the institutions which we now need. It is also evident that there have been gaps in their evolution which must be filled to stay relevant. Leadership initiatives can and are one way to address this need.

Wartime food security was a catalyst for the formation of The Nutrition Society, and enabled it to develop and apply its science to public policy affecting food availability and choice, beginning in Britain, but extending across the globe from early to later life. Historically and ordinarily, these have been determined



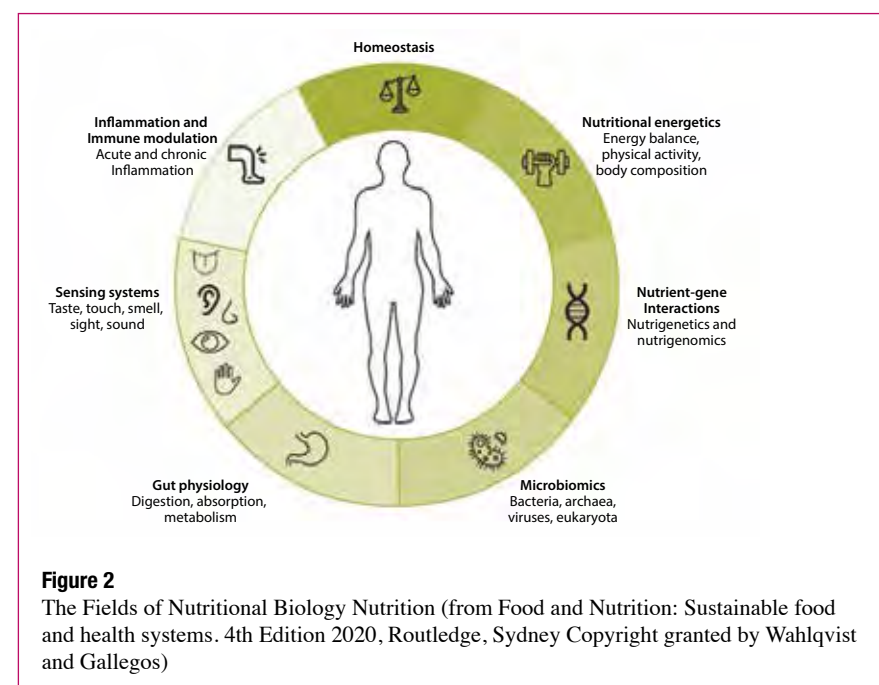
by family, place, and time, with the insinuation of ethno-cultural, food system and socio-political factors which themselves have progressively taken their place in institutionalised food, nutrition, and health science. Most recently, in 2005, *the International Union of Nutritional Sciences* (<http://www.iuns.org>), of which national nutrition societies and their regional affiliations are members, in its Giessen declaration, articulated the need to understand and operationalise *nutrition science as biomedical, societal, environmental, and economic* (Figure 1). A Nutrition Society journal, Public

Health Nutrition, carried the deliberations to this declaration, co-convened by *Geoffrey Cannon* and *Claus Leitzmann* There are corresponding regional initiatives, as illustrated by the Asia Pacific FIHS (Food in Health Security) .

Being challenged about food and health at home, school and in career development, notwithstanding competing options, is not uncommon. Tipping points towards vocational food studies and nutrition might depend on the belief, food, social, financial, educational and health systems with which one is surrounded. As a case in point and by good fortune, our family had an urban garden and could grow enough fruit, vegetables, and culinary herbs, have hens to lay eggs, catch rabbits and fish, have fresh milk, wholemeal bread (a parental belief), and be provided with smallgoods by immigrant relatives. Refrigeration was unusual, and we used evaporative ‘cool safes’ known as Coolgardie safes ( Australian food history timeline-Coolgardie safe invented (australianfoodtimeline.com.au) in its stead. We preserved gathered or over-produced food by drying in it the sun or bottling it for out of season consumption. Canned food, with its history from the early 19th century for wartime, long journeys, and convenience, was a standby. As children we were involved in the household economy by its customised food system from production to preparation and cooking, while connected with neighbours, shopkeepers, and various purveyors to the door for breads, milk, game like rabbits, fish and more. It was a biodiverse, sustainable, affordable, agreeable, and healthful urban food system. It may seem like romantic nostalgia and, to some extent it is. But it happened and was given credence by emergent food, nutrition and health sciences captured and given public policy relevance by nascent nutrition societies, notably that in Britain, but also in Europe and north America. It should not be overlooked that societal preparedness for investigatory methodology, science, and rational decision-making to inform and guide public health and healthcare depended on the long struggle towards the Enlightenment.

Nutrition science in Australia was activated in part, as in Britain, by the risk of food insecurity in wartime. *Sir Stanton Hicks*, Professor of Physiology at Adelaide University formulated the national dietary guidelines during WW2, but they were skewed towards the armed forces rather than the public. He retired as I began my medical studies at the same university, whose attractiveness in nutrition curriculum was more the province of *Sir Mark Mitchell* in nutritional biochemistry – inspiring me to be, as far as I knew, the only medical student to have a nutrition textbook, by Davidson, Meiklejohn and Passmore, associated with the Society. It later had the enduring co-editorship of Davidson, Passmore, Brock, and *Stewart Truswell*, the latter at Queen Elizabeth College (QEC) in London. Truswell was ultimately installed as the Boden Chair of Human Nutrition at Sydney University, the second in Australia. My *Chair of Human Nutrition at Deakin University* was the first in Australia, when I was appointed to it in 1977. We had the good fortune to appoint a field nutrition investigator with indigenous nutrition experience, Ingrid Rutishauser from the Dunn Laboratories

at Cambridge University, and Dr Gwyn Jones, a food chemist from Reading University, along with the English-born gold-medalled Ken Collins in Food Service, President of the Australian Guild of Cooks. The Nutrition Society of Australia (NSA) was founded in 1976 by a small group of basic, animal, and clinical nutrition scientists and practitioners, especially Delia Flint (who had been at QEC) and Richard Read (an agricultural scientist) at what was to become Deakin University, Dr John Black at CSIRO (Commonwealth Science and Industrial Research Organisation) and Dr John Court at the Royal Children’s Hospital in Melbourne. It coincided with the creation of the *CSIRO Division of Human Nutrition in Adelaide* headed by *Professor Basil Hetzel*, who had been one of my Professors of Medicine at Adelaide University, and who led international efforts to prevent iodine deficiency disorders (IDD). NSA had its first conference with Proceedings in 1976. In what was the first Department



of Human Nutrition in an Australian University, these somewhat tenuous connections with British nutrition science stood us in good stead. Together, we wrote a textbook relevant to Australasia and the Asia Pacific Region “Food and Nutrition”, published in 1981. Its latest edition, 40 years on, now embeds the Giessen recommendations for nutrition science as its framework and ‘Toolkit’ acquisition agenda. *Nutrition Biology* is reconceptualised as ecologically integral (Figure 2)



## Purposeful Organisational Nutrition

The IUNS congress in San Diego in 1981 reformatted its Committee on Nutrition in Medical Education with Professors Mark L Wahlqvist as Chair and Jitka S Vobecky as Co-Chair. The aim was to build jointly the capacity of Clinical Instructors to teach and students to learn how to recognise clinical nutrition problems and provide evidence-based solutions or approaches to their management. A Manual whereby teacher and student could learn together was produced under the auspices of WHO and IUNS. Published by the British-French publisher J Libbey in 1987, it found its way into medical schools around the world and was translated into Chinese for Medical Schools in China. The IUNS congress in Brighton in 1985 was a pivotal event for a further and growing connection with British and International nutrition in medical education, but also in emerging needs in food and nutrition policy and its publication. By way of illustration, Wahlqvist assumed the chair of the IUNS Committee on Nutrition and Ageing with the retirement of Hamish Munro. It determined to document the food habits of elders in disappearing food cultures where relatively successful health outcomes were evident, hypothesising that there was a range of dietary patterns conducive to successful ageing. This required a culturally diverse committee, and methodology which was open and widely applicable. With input from Nevin Scrimshaw (RAP, Rapid Assessment Procedures), Louise Davies (UK dietetics), Noel Solomons (Guatemala), Bertil Steen and Elisabeth Rothenberg (Swedish cohorts), Yoshimitsu and Kazuo Horie (Japan), Irene Darmadi and Widjaja Lukito (Indonesia), Antigone Kouris-Blazos and Bridget Hsu-Hage (Australia) Gu Chin-Fan and Sun Ming-Tan (China) among others and cooperation with a counterpart European initiative (SENECA) through Jo Hautvast, Wija van Staveren and Lisa de Groot (Netherlands), Antonia Trichopoulos (Greece), the Food Habits in Later Life (FHILL) project was initiated.

The paucity of Clinical Nutrition in patient care encouraged its greater recognition by IUNS such that its erstwhile Secretary General, *Professor Bjorn Isaksson* and Medical Education committee chair published the case for training in the Lancet in 1983 given its relevance and need for greater recognition in medicine. There were corresponding developments through International Symposia in Clinical Nutrition (ISCN) beginning at the Royal College of Physicians (RCP) in July 1980, then intercurrently with IUNS Congresses, often joint with the Asia Pacific Clinical Nutrition Society (APCNS) conferences, until the latter have prevailed in their own right as IUNS events. It is encouraging that BAPEN (the British Association of Parenteral and Enteral Nutrition) now collaborates with the NS, and clinical nutrition is well-placed in Europe and North America. Several journals devoted to clinical nutrition play a key role in fostering the discipline. British nutrition science publishers have played a defining role in the development of at least two of these, the European Journal of Clinical Nutrition (EJCN) and the Asia Pacific Journal of Clinical Nutrition (APJCN), both having had the input of *John Waterlow* and *Eldred Smith-Gordon*.

In the case of APJCN, the co-founding editors were Mark Wahlqvist (Australia), Akira Okada (Japan) and Vichai Tanphaichitr (Thailand); it is an IUNS, APCNS and CNS (Chinese Nutrition Society) journal.

Several *British nutrition scientists* not mentioned elsewhere have been of personal and wider professional consequence to me at various junctures. These would include *John Durnin* for his perceptive and refreshing understanding of nutrition principles, *John Garrow* for timely realism and cynicism about obesity pathogenesis and management and a contributor to the debate in Australia in the mid-1980s. *Phil James* for his tenacious, exhaustive and transformative nutrition know-how, and *Elsie Widdowson* without whom nutrition science would not have materialised as we know it, and who made the epic journey from her Cambridge home to the Antipodes and Melbourne in 1989 to open our Body Composition facility at Monash University and the Monash Medical Centre. In a 1993 Review of Margaret Ashwell's book on McCance and Widdowson, I wrote:

*“..it is inspiring to see how sustained research has been in peace and war, from continent to continent, and amongst both the economically deprived and advantaged.*

*There are many tales told, and it is worth noting they have, through the students and co-workers of McCance and Widdowson become part of the nutrition legend of the Antipodes as well. In Australia, Ingrid Rutishauser, who worked with McCance in Uganda and who now has been a member of the Department of Human Nutrition at Deakin University, Geelong, Victoria for some 13 years – and in New Zealand, Marion Robinson (nee Harrison) who worked with McCance and Widdowson in the late 1970s and early 1980s, and became Professor of Nutrition at the University of Otago, Dunedin, retiring in 1989 – these two proteges alone would have made the contributions and lives of the redoubtable pair available for Australasia. But eventually, we were able, after her aged mother, for whom she cared, died, to entice Elsie Widdowson to Australia and New Zealand. On 19 May 1989 she opened the new Body Composition Laboratory at Prince Henry's Hospital, now the Monash Medical Centre, Melbourne, in the presence of an old friend Prof Donald Cheek, a distinguished Australian nutrition scientist and paediatrician. Afterwards she proceeded to the Festschrift in Dunedin of her former student, Prof Marion Robinson. Sydney's Human Nutrition unit, headed by Professor A Stewart Truswell, also had the pleasure of her distinguished company. A new generation of Australian nutrition students and scientists had made her acquaintance! For many years, when I was Professor of Human Nutrition at Deakin University, Professor McCance's greetings and encouragement would regularly be relayed to us by Ingrid Rutishauser, whom he much admired.*

*We used deferentially to refer to the physical differences between Robert McCance, and Elsie Widdowson, both endowed with longevity and each with a profound personal knowledge of food and human physiology (McCance the*

*cyclist and massive consumer of vegetables; Widdowson the enjoyer of the delights of a Melbourne Chinese and many another table), as signalling the nutritional resilience of the human species as well as, perhaps, the great merit of enjoying life through the intellectual and professional pursuits of nutrition science!*

*Well into his 80s, I found Robert McCance interested, receptive and critical company. Elsie Widdowson wrote in our home guest book, 'I've had a busy day. . (it) is finishing with a lovely evening and meal. . .', the perfect juxtaposition!"*



Successive Heads of Medicine at Monash University and spouses, Bryan Hudson and Norma Hudson, Colin and Suzanne Johnston, Mark Wahlqvist and Dr Huang Soo Sien

One cannot speak of McCance and Widdowson without admiring the contributions of *Alison Paul* and *David Southgate* to the succession of Britain's contribution to the knowledge and understanding of food composition in The Tables which bear their name. David Southgate

also contributed to the lineage of dietary fibre nutrition from Dennis Burkitt. New Zealand and Australian dietary recommendations and food habits drew heavily on this body of nutritionally oriented food science.

The resurgence of food and nutrition science and its relevance to health and well-being in the 1970s unsettled entrenched public nutrition policy with its implications for food systems. The social unrest of the 1960s prepared a cohort of young graduates ready to challenge prevailing assumptions as new evidence emerged. The problems in economically advantaged societies, although more so the disadvantaged within them, were shifting from the food insecurity and infectious diseases prevalent before and after the second world war to macrovascular disease, obesity type 2 diabetes, osteoporosis, degenerative joint disease, certain cancers, alcohol-related problems and gastrointestinal disease such as peptic ulcer, reflux oesophagitis, constipation, haemorrhoids and diverticulitis. Drawing on an era of impressive discovery of nutrients and their functions, these constructs dominated dietary guideline revision. Excesses and deficiencies of energy, macronutrients, including dietary fibre, micronutrients (vitamins and minerals) were considered the principal problems and opportunities for solutions. Food industry and the nutrient supplement industry thrived, and the problems worsened. Fortunately, more by nutritional common sense than evidence, two dietary guidelines were given highest priority- breast feeding

and dietary biodiversity – and persistently through until and including the Food Based Dietary Guidelines (FBDGs) of the UN System were promulgated in the Cyprus Declaration of 1995. Notable British nutrition and culinary activists of this era to have promoted healthful shifts in food patterns have included *Caroline Walker*, *Geoffrey Cannon*, *Jamie Oliver*, and *Tim Lang*. A more comprehensive public health and clinical approach to food and nutrition in human health has evolved from the earlier particularised concerns. Notwithstanding Caroline Walker's untimely death, the commitment of such individuals has prospered nutrition and health not only in Britain, but internationally. Unfortunately, the extended duration of a dominantly macro- and micro- nutrient construct of food and nutrition science, and relegation of its microbiology away from nutritional biology to the important if narrow confines of food safety and hygiene, left a hiatus in which nutritional immunology, microbiomics and food microbiology were not mainstream, even neglected. This is strikingly evident now as pandemics consequent on ecosystem dysfunctionality overwhelm us. Again, although we first published evidence that foods could be exogenously oestrogenic in humans (endogenously oestrogen deficient post-menopausal women) in 1990, it took several years for this paradigm shift in nutritional biology to be adopted and, in turn, to underpin what we now understand about so-called phyto-oestrogens, xeno-oestrogens, and endocrine disruptors.

In the early years of my academic responsibilities in the application of food and nutrition science to public health and clinical practice, I was and remain concerned about its *methodological vulnerabilities*, evident when nutrition biochemistry and physiology are found limiting. This is especially so for *nutritional epidemiology* and *clinical nutrition practice*, notably nutritional diagnosis, and its ultimate health outcomes of morbidity and mortality where intermediates or biomarkers are considered endpoints rather than pathways. Moreover, non-nutritional pathogenesis may masquerade as nutritional or the reverse. *Nutrition pathway analysis* may provide the required insight, but requires reliable information about what, why and when people ate, and the entire *food system* involved. It frustrates nutritional enquiry if no background food intake data are available or lost by presentation as nutrients rather than foods, let alone the systems which provide them. An appreciation that any *bodily organ or system* is susceptible to dysnutrition is necessary. *Food intake measurement* needs to be comprehensive and integrative rather than nutrient reductionist; the development of concise food intake methods which provide intake patterns, such as the degree of biodiversity, enhances practice. *Energy status interpretation* is flawed if not cognisant of when disruption has occurred and of the nature of its throughput. *Bjorn Isaksson*, *John Durnin*, *John Garrow* and *Phil James* kept this critique alive. It is, firstly, that the aetiology of what we currently see may be misinterpreted since it usually occurred in the obscure past, and, secondly, that the health challenge is generally to achieve a higher plane of energy throughput through physical activity and provide resilience with the needed dietary quality. Body weight with other anthropometry including stature provides for *growth* and body *compositional assessments*, but

to what extent their determinants were actually nutritional was not necessarily clear. Elsie Widdowson disabused us of simplistic interpretations about growth and development in the recognition of societal determinants, which we continue to confirm. An impressive example of the paradigm shift in nutritionally-related health as a consequence of a more integrative nutrition science flowed from the finding that dietary biodiversity could account for a substantial and early part of the variance in arterial pathology with or without diabetes. This added strength to the foremost dietary guideline about dietary variety in many jurisdictions, and drew attention to the multiple pathways which can connect diet to disease beyond that pathway to do with food fat.

### Econutrition (and socioecology)

It is tautological to say, but necessary to iterate, that *changing food systems* at any point may be associated with changing health profiles, but the recognition of this may be obscured and delayed. We are now familiar with the link between ‘*ultraprocessed food*’ (UPF) and nutritionally related so-called chronic disease like obesity, cardiometabolic diseases and certain cancers, as indicated earlier. But it took a long while before the role of not just dietary fibre, but food structure and phytochemistry in general were invoked over and above accepted nutrients as contributory. Even now, we do not fully understand why, despite decades of food and dietary policy development, the problems persist. In the *case of obesity and diabetes*, we now see a tandem with neoplastic disease; we recognise intergenerational pathways which may be epigenetic as well as genomic; microbiomic-prokaryotic as well as eukaryotic; as much body compositional, abdominally distributive and brown or beige fat type as much as fat mass; about physical and social activity as well as diet; about endocrine disruptors such as nano-and micro-plastics rather than nutrients; about food packaging as much as the food or beverage itself; and to do with pollutant particle delivery systems of bioactive compounds.

We proceed as though we know enough to engage in ‘*precision nutrition*’ with detail, which maybe justifiable in therapeutic nutrition on risk analysis, but not in public health nutrition, when we know so little about the whole. Partly for these limitations, we ought to prefer more ecological approaches to our professional responsibilities, which is to say be more econutritional. To capture and promulgate this realisation, Wahlqvist and Specht neologistically wrote about ‘*econutrition*’. Coincidentally and unbeknown to them at the time, Stig Bengmark, in 1996 a Swedish gastroenterological surgeon used the term to describe what he had come to understand as the pathophysiological microbiomic scenario in the human gut. With the increased appreciation of the human microbiotal interface, the work of Wahlqvist and Bengmark has converged. The macro view of econutrition is that our survival depends on how integral we are with our environment and that our nutritional well-being depends on our respective ecosystems. Communities and households need ecosystem measures as over-arching reference points for

sustainable development. Econutritional approaches provide for healthier and more secure lives. Econutrition has come to be *defined as* ‘the interrelationships among nutrition and human health, agriculture and food production, environmental health, and economic development, commensurate with the Giessen declaration (Institute of Human Nutrition and Food, College of Human Ecology (IHNF-CHE), University of the Philippines, Los Banos, July 2013)

To summarise, the *rationale for econutrition* is that it:

- I. captures the notion that nutritionally related health (NRH) is environmentally dependent
- II. underscores the link between dietary diversity and biodiversity
- III. emphasises the buffer and resilience that the environment provides
- IV. reflects the broader socio ecological role of food systems beyond the immediate biomedical
- V. indicates that being synchronous with nature is a marker of our health

Conceptually, econutrition, as an integrative and comprehensive approach, has the capacity to deal with the growing threat to the food and health sciences of what has come to be known as *agnotology*, the propagation of ignorance and doubt. In order to undermine science in general, malicious pursuits purposefully produce doubt, as opposed to the state of uncertainty which generates scientific enquiry, distract useful research, or consume time and resources which might otherwise address priorities. It is presently undermining food and health security, and requires the diligent application of benefit-risk-cost analysis to the policy relevance of our science. A monumental example is the plastics industry where endocrine disruptors like bisphenols and phthalates now extensively contaminate the oceans and water ways and derivative food supply, largely on account of packaging and storage while purporting to recycle. There was never an evidence-based study of plastic and human health at or since its massive introduction into the food system, or any monitoring and surveillance in some 60 years of usage. It has now contaminated virtually every morsel of food or beverage we consume – and continues to do so, while we pursue countless studies of, for example obesity and its consequences with little or no reference to the grave environmental risks we face on a daily basis, not knowing what we do not know. Ignorance is not bliss, but knowing that we do not know is a virtue! Socrates warned us of this problem, and was executed for it. Our food and health systems find themselves similarly threatened today.

Food serves our biological needs best and for optimal health at all ages if we behave as socioecological beings, intimately connected with, and actually part of, nature, while not demanding of it more than we need. Father and son Robert and Edward Skidelsky in ‘How much is enough?’ show how identifiable basic goods are enough for a good life. Here it will be advanced that we should endeavour to be satisfied with the availability of a Livelihood, one which is sustainable in



a habitable planet, equitable, conducive to personal and community security, healthful, respectful, educational, and recreational. Its achievement will require sharing of those Commons which provide basic needs like public open space (POS), air, water and food as evidenced by Elinor Ostrom in her Nobel Prize winning treatise on The Commons. This requires Collective Action and sanctions for those who compromise the common good. Enough is enough.

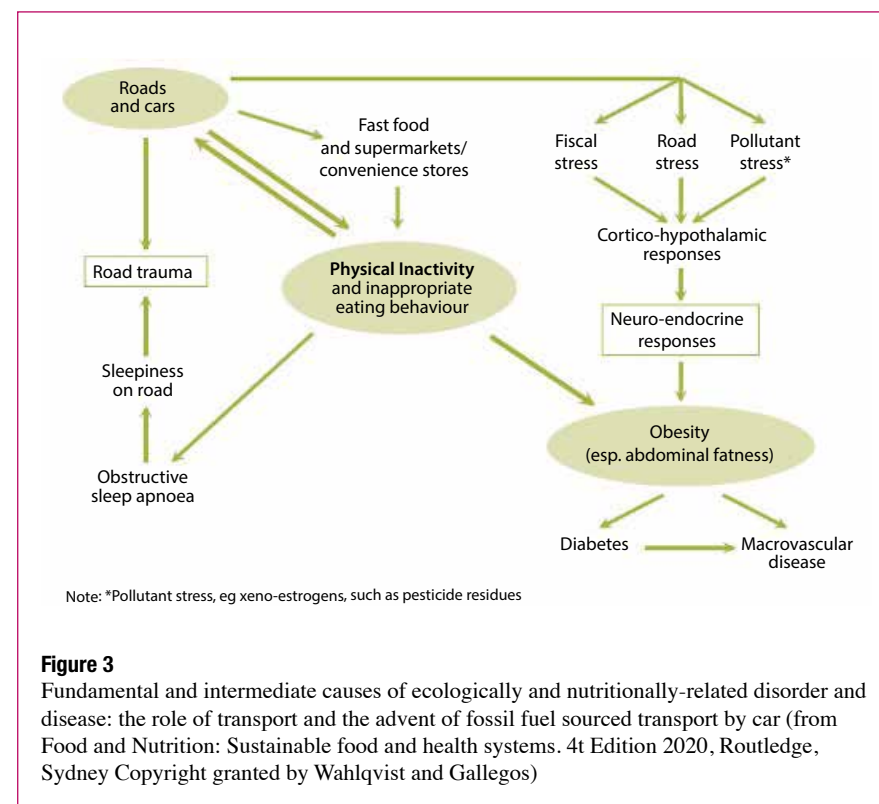
## Livelihoods

In an era where ecosystem loss and dysfunction now threaten our very survival as socioecological beings, *the imperative to live with the essentials* is growing. These include the sustainable resources of air, food, water, shelter, clothing, hygiene, healthcare, education, public open space (POS), transport, personal security, family, and community as contributors to sustainable livelihoods (SL). They constitute our livelihood and, having the means to acquire them, provides for dignity. Not to have these resources of one sort or another is to be impoverished, a concept which is usually and arguably inappropriately monetised since the solutions are to be found in a broader socioecological framework. Indeed, the SL concept should offer a more coherent and integrated approach to poverty as understood by the Brundtland Commission on Environment and Development, and the 1992 United Nations Conference on Environment and Development. Wahlqvist has proposed that non-monetary Liveability Units (LUs) be adopted as a Livelihood facilitator .

Chambers and Conway have proposed a composite definition of a sustainable rural livelihood, applied at the household and hearth level: “A *livelihood* comprises the capabilities, assets (stores, resources, claims and access) and activities required for a means of living: a livelihood is sustainable which can cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in the short and long term.”

FAO and others recognise five types of *livelihood assets*: human, physical, natural, financial, social and, by some analysts, a 6th, namely informational. These may be the province of an individual, family, or other social group whose legal rights are recognised. Elinor Ostrom’s Nobel Prize winning work on The Commons was awarded for “her ground-breaking research demonstrating that ordinary people are capable of creating rules and institutions that allow for the sustainable and equitable management of shared resources”. It identified those assets that we need and may determine to be held collectively, such as air, water, and natural ecosystems. Transgressors are to be sanctioned. Her approach is evident at different stages of economic development.

*Liveability* is intricately connected to livelihood, although mostly studied in



regard to urban precincts. To someone who counts Melbourne as a home, it is somewhat surprising that it is a city which frequently features as the most livable city in the world – something that seems likely to change with global warming and federal governmental denial of climate science, notably in regard to natural disasters. Nevertheless, there are useful studies, reports, and programs on the state of Australian cities. A *ULI (Urban Liveability Index)* for Melbourne captures resource, food system and healthcare associations and finds that the ‘physical characteristics that contribute to the liveability of cities include



Cycling by Grand Canal, Hangzhou – working at Zhejiang University



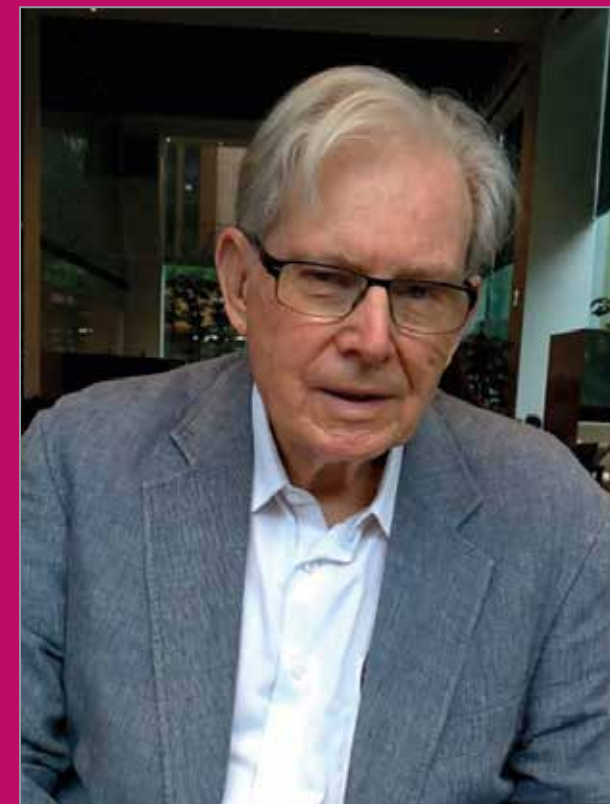
land use, built form, quality and conservation of public spaces and natural environments, efficiency of transport networks, accessibility to work, education, health and community services and social and recreational opportunities’.

It is noteworthy how relevant green or public open space (POS) and forms of transport, as spatial indicators, are to liveability in the Australian and other studies, and also how they favourably affect health outcomes in many settings, even among the aged in China. Walkability, use of bicycles, and public transport in preference to gasoline powered vehicles provide major environmental, energy utilisation, health, nutritional and wellbeing advantage. It is sobering that the introduction of the internal combustion engine just over a century ago, with its complex consequences (Figure 3), has taken us beyond our socioecological resilience to the brink of extinction. We continue to engage in policy development with scant regard for longer term unintended consequences. Ill-informed advocacy, expediency, a quest for abundancy, fashionability, palatability, survivability and profitability have contributed to monocultural cropping and selective animal husbandry, loss of biodiversity, pestilence and pandemic, famine, and climate change. If we had paid more attention to family planning, the provision of sustainable energy sources, and our socioecology, whatever our career or discipline, a sustainably habitable planet would have been more likely.

## Conclusions

Our survivability depends on the awareness of ourselves as socioecological beings whose identity is embedded in planet earth, and who now draw on its resources well in excess of what it can be expected to deliver. It will be necessary to behave in accordance with our basic needs, our livelihoods.

The food, nutrition and health workforce required to enable this will be one with a capability, adaptability, and resilience beyond the prospective personal or societal mindset or expectations of any nutritionist born or institution extant in the early 1940s! The global Network of Nutrition Societies may well be a vehicle for this livelihood imperative.



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## Honorary Fellow **Professor Keith N. Frayn**

PhD ScD FRCPath

My undergraduate degree, from the University of Cambridge, was in Biochemistry. I was offered two possibilities for PhD studentships: I could have stayed in Cambridge and joined the then-new molecular genetics research (this was the 1960s, and we had had inspiring lectures from Nobel Prize-winners such as Max Perutz), or I could have gone to Cardiff to study bacterial genetics (this was an offer from Mark Richmond, with whom I had worked at the National Institute for Medical Research between school and university). Neither seemed to me to have much relevance to real life (how short-sighted I was).



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### Setting out as a biochemist

Then I saw an advertisement in *New Scientist* for a research assistant position at St Bartholomew's Hospital, London, looking at the mechanism of action of a then-new antidiabetic drug. (It was metformin. In those days nobody knew how it worked. To my amazement, metformin use has surged in recent years and it is now even touted as a preventative for ageing and for cancer. And we still don't know how it works.) This set me on a course of clinical research with a nutritional sideline. I was giving diabetic patients various sugars to drink, such as 3-O-methyl-D-glucose, and collecting 24-hour urine samples, to look at intestinal absorption. I well remember mouth-pipetting old diabetic urine collections for analysis.

As my PhD was coming to an end, I looked at possibilities for postdoctoral work. A post was advertised at the MRC's laboratories in Carshalton, south London. My wife Theresa and I had by then bought our first house in Ealing, west London, and didn't want to move. So one Sunday afternoon we drove over to Carshalton. I had two letters with me: acceptance, if the drive took 40 minutes or less, and rejection should it take longer. It took just 40 minutes, so I accepted the post – overlooking the fact that driving round the South Circular Road in the rush hour was to be a very different experience. The four years I spent at Carshalton convinced me never again to live somewhere where I needed to drive to work – soon after we moved to Manchester (see later) I started cycling to work, and was able to do so for the rest of my career. In Carshalton we were working on metabolic responses to injury, using animal models. I didn't like working with animals, although to be honest my main reason at the time was a terrible allergy that I developed to rats. In 1976 the MRC created a new research unit linked to the University of Manchester, the MRC Trauma Unit, and I moved there (with Theresa and two young children) to start the next phase of my research.

### Getting immersed in clinical research: 10 years with the MRC in Manchester

In Manchester, and especially at our clinical base at Hope Hospital, Salford (now Salford Royal Hospital), I began to learn the techniques of human metabolic research. One reason for the MRC's decision to base the unit in Manchester was

that the Professor of Surgery, Miles Irving, had established a strong research base and had built a unit for clinical nutrition of severely ill patients. At first I worked with colleagues mainly on recently-injured patients arriving at Hope Hospital's Accident and Emergency Department. The most one could do with such patients was obtain blood samples, and, with some blurring of lines over informed consent I now fear, make measurements of O<sub>2</sub> consumption and CO<sub>2</sub> production, which gave us information on what metabolic fuels were being used. I used some spare time during a research visit to Yale University (of which more below) to do some theoretical work on what could be calculated from measurements of respiratory gas exchange. That paper turned out to be by a very long way my most highly-cited<sup>(1)</sup>.

Attending meetings concerned with 'injury metabolism' brought me into contact with many people in the field of clinical nutrition. One of the pioneers of research into injury was Sir David Cuthbertson, a Glasgow biochemist and physician. Sir David was President of The Nutrition Society 1962 – 1965 and had been director of the Rowett Research Institute. He was still active when I was working in this field and I had the opportunity of getting to know him a little. Our meeting was facilitated by Alan Shenkin, Chemical Pathologist, then in Glasgow, later in Liverpool. Alan is currently President of the British Nutrition Foundation (BNF).

Because of our interest in acute responses to injury, I wanted to measure plasma catecholamine concentrations. I was helped to set up the method by a visit to Ian Macdonald in Nottingham (later President of The Nutrition Society, 2007 – 2010), with whom I later had many collaborations. Measurement of plasma adrenaline and noradrenaline concentrations, and seeing their strong relationships with metabolic changes in the critically ill<sup>(2)</sup>, led me to a view that this was how metabolism was normally governed. That view was to change later in my career when I worked on more 'normal' physiology.

During my 10 years in Manchester, I moved gradually from work on the recently-injured to work on patients recovering from injury, or suffering from other acute conditions such as post-operative sepsis. Some of our work was done with patients in the Nutritional Support Unit, some in the Intensive Care Unit, and some on the orthopaedic wards. Parenteral nutrition was a fairly new field



**Figure 1**

A glucose clamp experiment on a patient in the Clinical Nutrition Unit at Hope Hospital, Salford, UK in 1982–1983, conducted as part of the Medical Research Council Trauma Unit's research. Roger White, clinical research fellow, on left; the author on right measuring glucose concentrations. Reproduced from reference<sup>(6)</sup>.

at the time, and I had the chance to meet people who were involved in this new science, including Arvid Wretling of Sweden, who has been called ‘the father of parenteral nutrition’ and is perhaps best known now for introduction of Intralipid, a fat emulsion that could be safely administered intravenously. My visit to Yale, mentioned earlier, was to learn at first hand the technique known as the ‘glucose clamp’. I worked with the renal physician Ralph DeFronzo, who had popularised this technique, invented initially by his geriatrician colleague Reubin Andres. The glucose clamp technique enables an experimenter to control glucose and insulin concentrations by frequent monitoring at the bedside. We established this technique in Manchester, certainly the first time it had been used in critically-ill patients (Figure 1). One application is the so-called hyperinsulinaemic clamp, in which insulin is infused to raise the plasma insulin concentration, whilst also infusing glucose at a variable rate to maintain euglycaemia. We applied this to patients after injury on the orthopaedic wards. We wanted to look at the dose-response curve to insulin of glucose uptake into forearm muscle. For this purpose, we infused a range of doses of insulin, right up to very high levels. I was the first recipient of this very high-dose infusion. The procedure went well until, after disconnection of all the lines (and, unfortunately, withdrawal of the cannulae), I got off the bed and started to help with the clear-up – almost collapsing as the excess of insulin still present in my interstitial fluid (not in the plasma) worked to move glucose into my muscles. (This necessitated rapid re-insertion of a cannula and infusion of a lot of glucose.) This was a lesson often repeated, I am afraid, for the clinical fellows who worked with us over the years and insisted ‘It’s OK, insulin has a very short half-life, it will be fine for the patient to go home now....’. These studies showed clearly the ‘insulin resistance’ that follows injury, along with ‘hypermetabolism’, complicating efforts at refeeding. There was one incidental and anecdotal finding from these experiments that I wish we had followed up. Alastair Henderson was an orthopaedic surgeon performing ‘clamps’ as part of his MD thesis. On the morning after the experiment, he would go to see the patient to check all was well. Alastair reported to me that, consistently, those who had received the very high dose insulin infusion (together with a lot of glucose) reported suddenly feeling a lot better. Presumably we had restocked their depleted glycogen stores.

We did these experiments in the context of growing realisation that infusion of glucose and amino acids in parenteral nutrition was not having the effects the clinicians desired. The aim was to restore lean body mass. But it was increasingly realised that patients might put on weight, but what was accumulating was not muscle but fat. Rod King, a contemporary of mine working in Leeds, showed this beautifully using the principles of indirect calorimetry mentioned earlier. Rod showed that net fat synthesis increased steadily during glucose-based parenteral nutrition.

### Changing views of fat deposition

At that time, then, I personally (not necessarily others) was getting the impression

that human fat synthesis was easily turned on by glucose intake. That was not surprising, in a way: glucose stimulates insulin secretion, and insulin stimulates the pathway of fat synthesis.

But a series of papers appearing at about that time from the Laboratory of Physiology in Lausanne, under Eric Jéquier, turned these views on their head. Kevin Acheson and his colleagues tested the idea that carbohydrates would lead to net fat deposition. They fed healthy volunteers a very large carbohydrate ‘breakfast’ (500 g). The volunteers were then studied in the laboratory’s indirect calorimetry chambers. Over a 10-hour period, there was no net synthesis of fat – fat synthesis may have occurred, but it was outweighed by on-going fat oxidation. Another longer-term experiment showed the significance in humans of the pathway of net fat synthesis from carbohydrate (known as *de novo* lipogenesis). Volunteers were fed more than their energy requirements (‘overfeeding’) for 7 days. At first the glycogen stores (which had been depleted by prior exercise) were filled, then there was nowhere for the excess glucose to go other than fat synthesis, which increased during the week of the study<sup>(3)</sup>.

So it began to seem that, contrary to my impression from the intravenous feeding observations, we do not normally lay down fat (in a net sense) from carbohydrate. We must, therefore, derive our fat stores mostly from ingested fat. This should not have been surprising as it was well known at that time that the fatty acid composition of our adipose tissue triacylglycerol stores resembles our usual dietary fat intake. But this pathway – involving the entry of dietary fat into the circulation, in the form of chylomicrons, and the hydrolysis of chylomicron triacylglycerol by the enzyme lipoprotein lipase (LPL) in adipose tissue capillaries – was not an easy one to study. Human fat cells are easily prepared. But the ‘LPL pathway’ is not reproduced in isolated cells. For that, one needs an intact person. These were my thoughts as, in 1986, I accepted a new position in Oxford.

### Moving to Oxford, 1986

The MRC had formally dissolved the Trauma Unit after the retirement of its founding director, HB Stoner. We were continuing as an MRC Group, but I was searching for an environment where I might change my direction of research away from ‘injury’, with all its attendant difficulties (call-outs in the middle of the night when there was a big accident, gross difficulties standardising anything, etc), to more day-to-day human metabolic physiology. A position was advertised in a small diabetes research unit lead by Dr Derek Hockaday. I knew the people there already a little. Initially this unit operated within the NHS although had close links to University of Oxford groups operating in a similar area. After Derek Hockaday retired a few years later, we were formally incorporated into the University of Oxford’s Nuffield Department of Clinical Medicine, and I became an independent University researcher.



This gave me the chance to look at the pathway that now fascinated me, the route by which we lay down fat in daily life. In Manchester I had made extensive use of the ‘arterio-venous difference technique’ to look at glucose uptake in muscle – sampling the blood in an artery and in the vein leaving a tissue to see what has happened during the blood’s passage through the capillaries. I wondered if something similar could be done for adipose tissue. I had many conversations with my clinical colleagues, and with colleagues in the Anatomy Department. We realised that the veins that drain what is usually the largest fat depot, the subcutaneous anterior abdominal, run generally towards the groin, merging before reaching the external iliac vein (and thence the inferior vena cava). What is more, that fat depot is largely separated from the underlying muscle by a fibrous sheet, the aponeurosis of the external oblique muscle. So, if we could sample blood from one of those tiny veins, we would be able to look at arterio-venous differences across an adipose tissue bed. But it was a big ‘if’. Many frustrating mornings spent with needles and colleagues’ exposed abdomens made this seem a daunting task. But slowly, we ‘cracked it’. We found the right lighting to visualise the veins through the skin, and introduced a fine, flexible catheter (in fact a paediatric central line) into the vein, where it could sit for a matter of hours whilst we drew (small) blood samples.

I had always enjoyed laboratory work, and was very fortunate to work on this project with an expert technician, Sandy Humphreys, who had trained in Sir Hans Krebs’ laboratory. Sandy was never fazed when handed a microcentrifuge tube containing a tiny drop of blood, and asked to measure about six different metabolites. We jointly adapted methods to smaller and smaller blood samples.

So began the next stage of my career, studying human adipose tissue metabolism, and especially routes by which we lay down, and mobilise, fat. During my time in Manchester I had presented my results (other than at specialised injury research, or surgical metabolism groups) to the Biochemical Society and the British Diabetic Association (now Diabetes UK). Now I began to take an interest in The Nutrition Society, and indeed in 1988 presented the first results of our new experiments on human adipose tissue there<sup>(4)</sup>. The Chair of my session was Andrew Prentice, then of the MRC Dunn Nutrition Unit in Cambridge, now Professor of International Nutrition at the London School of Hygiene & Tropical Medicine and leader of the Nutrition Theme at MRC Unit The Gambia. I remember Andrew asking an awkward question about the difficulty of the technique, and how we could expect it to be adopted by other laboratories.

In our early experiments, we looked at the effects of glucose ingestion and insulin infusion on human adipose tissue metabolism, but fairly quickly we progressed to study what happens after ingestion of a typical ‘mixed meal’. This work was done by Simon Coppack, a diabetes physician who obtained an MRC Training Fellowship to work with me. Karin Harnden (née Rice) was a dietician working in the unit on a British Diabetic Association-funded project led by Derek Hockaday

and Jim Mann – this was before Jim’s departure to New Zealand where he held the post of Professor in Human Nutrition and Medicine at the University of Otago. We asked Karin to design a meal that would represent one-third of the average UK intake of the major nutrients. This was the first of many ‘test meals’ that we used for various purposes. It consisted of some chicken with tinned potatoes, carrots and sweetcorn, with, for dessert, some ice cream and tinned pineapple and a digestive biscuit. I can say from several experiences that it was a bit dry for breakfast but, given an overnight fast and then some hours of fiddling to install the cannulae and take baseline blood samples, it felt quite welcome.

### Getting involved with The Nutrition Society

In the early 1990s I was asked to become Secretary of the Clinical Metabolism and Nutritional Support Group (CMNSG) of The Nutrition Society – it was one of the then special-interest themes and had been formed in order to keep those with clinical interests in the Society. As Secretary of CMNSG, I also sat on the Councils of both Nutrition Society and British Association for Parenteral and Enteral Nutrition (BAPEN). I got to know many of those working with clinical nutrition in the UK. Around 1994, we learned that David Southgate, then Editor-in-Chief of *British Journal of Nutrition* (BJN), wished to step down from his role. Although I’m not quite sure now how it happened, somehow words were had and it was suggested that, were I put my name forward as his successor, I could define the job in my own way. (I was already a member of the Editorial Board.) And so, in 1995 I was appointed Editor in Chief of BJN, and with this, Honorary Publications Officer to The Nutrition Society. (Later in my tenure I proposed that these two roles be separated, which they were, and remain so today.) In the latter role, it was a case of ‘thrown in at the deep end’ as the Society was about to renegotiate its contract for publishing its journals (then with Cambridge University Press, CUP). A small group of us went to visit a number of publishers, and decided to move our journals publishing to CABI (formerly Commonwealth Agricultural Bureaux – I for International), a not-for-profit organisation based in Wallingford, near Oxford. This seemed a successful move at the time, although the journals are now back with CUP. Also, Barrie Margetts from Southampton and Judy Buttriss (then with the National Dairy Council, now Director General of the BNF) had proposed to the Society a new journal, ‘*Public Health Nutrition*’ (PHN). I was able to see this proposal through Council, and PHN was launched in 1998 with Barrie Margetts as Editor, and has gone from strength to strength.

I remained as Editor-in-Chief of BJN until 1999, when I handed over to Paul Trayhurn, now also an Honorary Fellow. During those years I introduced new features such as reviews and supplements – and

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then took the role of Supplements Editor until 2004. In my time as Editor, I faced a number of dilemmas. One I especially remember was a paper by Mike Stroud arriving on my desk. Mike had made an unsupported 2,300 km crossing of Antarctica with the explorer Sir Ranulph Fiennes in 1992-1993. He had made scientific measurements during the expedition, including measurements of protein turnover using  $^{15}\text{N}$ -glycine. The results tended to show that rates of synthesis of new proteins were maintained under these extreme conditions. Mike wrote these results up and submitted the paper for publication in BJN. This presented an interesting problem. The journal had historically prided itself upon high standards of statistical analysis, and indeed we had a number of statistical editors to scrutinise newly-submitted papers. One thing the statistical editors regularly picked up was that often studies were based on too few subjects to give generalisable results. In this case, I had to overrule the call for the authors to repeat the experiment on larger numbers of volunteers. Indeed, I looked into this, and discovered that many nutritionists had pioneered experimental work on themselves, a topic I summarised in an editorial entitled 'Nutritionists as guinea pigs' to accompany Mike Stroud's paper in 1996<sup>(5)</sup>.

So now my main UK scientific meeting became The Nutrition Society's summer meeting. But I had also been drawn into a less formal group, the Adipose Tissue Discussion Group (ATDG), which had been started by Margaret Ashwell, Mike Gurr and Mike Cawthorne in 1973. Initially this group had met for informal discussions, as its name implied, but by the time I got involved it had adopted a more formal type of annual meeting. Through this group and The Nutrition Society, I got to meet many important nutritionists, including the ATDG's three founders, and John Garrow (the first Rank Professor of Human Nutrition) – with whom I had some very lively correspondence about the causes and management of obesity – and Christine Williams, then at University of Surrey, soon to move to University of Reading as the first Hugh Sinclair Professor in Human Nutrition (and President of Nutrition Society 1998-2001). Christine and I later had some close collaborations over the pathway for entry of ingested fat into the circulation.

## Two textbooks

In the 1990s, having for some time researched what happens when people eat meals, and taught the topic of 'metabolic integration', I had the idea of writing a popular science book on this topic. I talked to Portland Press, the publishing arm

of the Biochemical Society, about this idea, and they persuaded me that I should instead write an undergraduate textbook. This I did, and 'Metabolic Regulation: a Human Perspective' was launched in 1996. It rather unexpectedly became a best-seller for Portland Press. Wisepress, who exhibited their books at conferences, claimed that it was the most frequently stolen of all their display copies. The 4<sup>th</sup> edition has just been published (2019, Wiley) with the title 'Human Metabolism: a Regulatory Perspective', and Dr Rhys Evans as co-author. The textbook is used by students in a number of fields including nutrition.

Earlier I mentioned Mike Gurr, eminent lipid biochemist and nutritionist, whom I had got to know through both Nutrition Society and Adipose Tissue Discussion Group. In 1998 or 1999 Mike approached me to say that he and John Harwood, from Cardiff, were going to prepare the 5<sup>th</sup> edition of their well-known textbook 'Lipid Biochemistry'. We agreed to have a chat. Mike told me 'It can be quite short. You can just say you don't want to do it'. But I decided I did, and 'Lipid Biochemistry: an Introduction 5<sup>th</sup> edn' (Gurr, Harwood and Frayn, Blackwell Science) appeared in 2002. I think it's fair to say that this edition was never very satisfactory – we had introduced new material but not integrated it well. Some years later we discussed another edition, and co-opted Denis Murphy from the University of South Wales and Bob Michel from University of Birmingham, who both provided ideas for restructuring, and brought in new aspects. The 6<sup>th</sup> edition, now called 'Lipids: Biochemistry, Biotechnology and Health', appeared in 2016 (Wiley-Blackwell).

## Later years

The University of Oxford had earlier awarded me the title of Reader in Lipid Metabolism, and in 1999 I became Professor of Human Metabolism. Our research on adipose tissue metabolism, and its responses to feeding and fasting, continued. Initially funding had come from British Heart Foundation, MRC and Ministry of Agriculture, Fisheries and Food (later, Food Standards Agency). As time went on, I received grants from Wellcome Trust and BBSRC, and also was involved in several European consortia. In 2009 I was invited to join the Nutrition Committee of the Rank Prize Funds, and had an enjoyable time with a prestigious committee deciding on 2-yearly prize-winners, and planning



Keith Frayn with Professor John Garrow, then of the MRC's Clinical Research Centre, Northwick Park, at the European Society for Parenteral and Enteral Nutrition Meeting, Antwerp, 1991



**Figure 2**  
The author receiving The Nutrition Society's Blaxter Award from Professor Sue Lanham-New, Honorary Secretary, at the Society's summer meeting, Leeds, 2018.

small, intimate symposia on nutritional topics, held in Grasmere in the English Lake District. In the year 2000 the British Nutrition Foundation asked if I would chair a Task Force on Cardiovascular Disease (with emphasis on ‘emerging risk factors’). This work took a few years, and our report was published by Blackwells in 2005. It was greatly facilitated by the BNF staff, especially Sara Stanner, now BNF Science Director. The report was popular, and in 2012 Sara contacted me to ask if I would chair an update of the Task Force. This went ahead with several of the original members, and some new, and the updated report was published (Wiley Blackwell) in 2019.

It was difficult by now to think of myself just as a metabolic physiologist: somehow I had morphed into a nutritionist of some sort. In 2014 I was honoured to be awarded the BNF Prize, and in 2016 to my delight was invited to become an Honorary Fellow of The Nutrition Society (alongside Ann Prentice, Christine Williams and George Alberti, all fellow members of the Rank Prize Funds Nutrition Committee, and Catherine Geissler). By that time, I had completely retired from experimental work and had resolved not to give any more lectures. So I was a little uncertain when in 2018 I received a phone call from Paul Trayhurn, then a Trustee of The Nutrition Society, who told me that the Society had decided to introduce three named lectures for ‘senior people’ in the nutrition field, and that I was to be honoured as the first recipient of the Blaxter Award for work in ‘Whole body metabolism and animal nutrition’, named after Sir Kenneth Blaxter, former director of the Rowett Research Institute, and Nutrition Society President 1974-77. My award lecture, delivered at The Nutrition Society’s summer meeting in Leeds that year, was definitely my last scientific lecture (Figure 2), and the accompanying paper probably my last paper<sup>(6)</sup>.

So my career evolved, as careers do, from biochemist with an interest in clinical metabolism, to a sort of nutritionist/physiologist/biochemist with interests in human nutrition and metabolism. The Nutrition Society has played an important part in this transition, and I am deeply grateful for having been a part of this organisation.

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## Honorary Fellow **Professor Judith Buttriss**

BSc, DipDiet, PhD, RNutr, FAFN

I first encountered The Nutrition Society when I was an undergraduate at Surrey in the 1970s, and from time to time attended scientific meetings held at the Royal Society of Medicine (RSM) in Central London. Although on the same site, this was a very different RSM to the one we know today following the extensive modernisation that took place some years ago; it was very austere as I recall.





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It was some time after that – in 1989 – before I experienced a Nutrition Society Summer Meeting – possibly one of the first that had the current structure. It was held at Oxford Brookes. I had totally forgotten until very recently that at the time I was encouraged to submit a short piece about the event, presumably to the *News Letter*. I can't recall much about the science – though I'm sure it was excellent. But what has stuck in my mind for decades is the conference dinner held at Keeble College. It was black tie and the women were dressed in their posh frocks – an excellent tradition of the Summer Meeting dinners for a number of years – and it was a beautiful Summer's evening enabling us to sip our flutes of champagne on the lawn.

Between 1992 and 1994, I served as a Nutrition Society Council member. Meetings were always held in the Marcus Beck library at the RSM – a very traditional academic setting – and for at least some of the time I recall being the only female Council member. Professor John Webster was President at the time and encouraged me to become involved in the very early stages of the development of the Register of Nutritionists and in the work that helped define 'public health nutrition'. I re-joined Council in 1997 and in 1999 I was elected Honorary Secretary, a post I held until 2005, serving on the Executive Committee alongside Presidents Professor Mike Gibney, Professor Christine Williams and Professor John Mathers. During this time, I continued my involvement in the

work associated with the development of The Nutrition Society's Register that now resides with the Association for Nutrition. I was a Member of The Nutrition Society's Registration Committee from 1998-2007, a Member of the Society's Professional Development Committee (later Professional Affairs Committee) (from 2000-2007) and Chair of The Nutrition Society's Course Accreditation Committee (from 2002-2007). The committees were involved with establishing the criteria for admission to the Register and assessing applications, establishing core competences for nutrition courses that would enable fast track entry to the register for new graduates, as Associate Nutritionists. The early work on the Register was ably supported for a while by Dr David Buss, who worked as a volunteer with the Society after his retirement from MAFF – a lovely man who sadly died before his time.

One of the areas of work of the Professional Development Committee was to pursue and maintain a strong working relationship between The Nutrition Society and the British Dietetic Association. This important work paved the way for the Academy of Nutrition Sciences, a collaboration between the Association for Nutrition, British Dietetic Association, British Nutrition Foundation and Nutrition Society that became a registered charity in 2019 and of which I am proud to be a Trustee.

The Nutrition Society has been an important part of my life since my student days – as well as serving as an Honorary Officer and on committees, I was an editor of the second edition of the Society's textbook on Public Health Nutrition. I am proud to have served the Society and to have contributed to some important initiatives. But most of all, I have fond memories of the many summer meetings I attended and also the IUNS meetings in Vienna and Durban – in particular the friendships that were struck during those meetings, many of which continue to this day. The Society does science exceptionally well, but in my humble opinion the Society is particularly good at the social programme that accompanies the science. Who could forget those ceilidhs!

### Reflections on a career in nutrition science

From time to time I have been asked to talk about my career path – how I got to become Director General at British Nutrition Foundation – and it's been suggested to me that this would be a good place to chart the journey. My interest in nutrition began when I was just into my teens and a close family member was diagnosed with type 1 diabetes. The dietitian was the person who unlocked the black box about 'living with diabetes' and enabled my family to come to terms with the day to day practicalities. I decided almost immediately what I wanted to do – become a dietitian – and being the eldest took a keen interest in getting to grips with 'carb unit counting', which was the way diabetes was managed in those days. My parents got a leaflet for me from the dietitian when they next visited, which told me what I needed to study, and my immediate career path was

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set – saving the careers officer at school a lot of effort! I studied nutrition and dietetics at Surrey, which provided me with an honours degree and a diploma in dietetics. The degree included a placement year that was split between a series of dietetic placements, principally focused on hospital dietetics as work in the community was in its infancy at that time, and a placement in a different setting. I elected to work at the Institute of Child Health and was given my own little lab and a project involving measuring vitamin B6 (as I recall) in urine samples from children who had suffered severe burns. I even got a paper published from the work and enjoyed the lab environment so much that I decided that I wanted to go into research rather than into hospital dietetics.

Towards the end of my final year, I was offered a PhD studentship at Surrey that would have led me into the world of toxicology. For some reason the funding fell through at the final hurdle. However, after graduating I was appointed as a research dietitian on a maternity-cover contract in the legendary Professor John Waterlow's Clinical Nutrition and Metabolism Unit, working alongside well-known folk in the protein-turnover world such as Joe Millward, Eddie Fern, Peter Garlick and also two young medics Graham Clugston and Andrew Tomkins. Once a week, Professor, Graham and I ran an obesity clinic at University College Hospital, and the rest of the time I provided dietetic support on the metabolic ward. At the time, I assumed that the Friday seminars, when visiting lecturers from around the world were grilled and science debated over a cup of tea – followed by a visit to a curry house paid for by 'the prof' – were the norm everywhere. But it was only afterwards that I appreciated the value and future impact of the environment in which I was immersed for a few months, which set the bar high in terms of establishing my own professional standards, and the importance of peer review and basing assumptions on solid evidence.

When the contract ended I returned to undertake a PhD at Surrey supervised by Professor John Dickerson and Dr Tapan Basu – my thesis was on vitamin C and drug metabolising enzymes, which was described at the time as bridging nutrition, biochemistry and toxicology. Thinking about my time spent studying nutrition in Guildford brings back many fond memories – it set me up with a fascinating career that has continued to be enjoyable, challenging and personally rewarding, plus some life-long friends and a husband.

There followed several post doc grants, the first at UMIST (Manchester), where I worked on a copper containing enzyme, and the others with Professor Tony Diplock at Guys Hospital Medical School, where the focus of my efforts was vitamin E and selenium. Tony was another major influence on my career – he always made the time to stop by my lab to introduce me to visiting scientists and to involve me in things that helped shape my development as a scientist.

At that time, I imagined my future would be as a university academic but fate intervened. An opportunity came my way to join the staff of the National Dairy

Council as Senior Nutritionist, working alongside a multidisciplinary team with expertise in producing resources for schools, advertising, marketing, public relations (PR), as well as dairy science. I made the leap. At first it was quite scary as the pace was far faster than I had grown accustomed to in academia. I learned very quickly that, when responding to questions from the PR and marketing teams, there was no room for ambiguity or fudging. There was always a risk that 'tends to' or 'might' would be interpreted as 'does' or 'will'. In this job, lots of opportunities came my way. I learned to write in different styles and for different audiences, from health professionals to farmers, from fellow scientists to the Sun reader, and of course teachers and their pupils. I was media trained by then newsreader John Humphries, learned about food legislation, experienced collaboration with people from lots of different disciplines, and represented the sector at meetings and committees here in the UK and in Brussels.

My original intention was for this job to be a short term deviation but it opened doors I didn't even know existed. And I've never looked back. I enjoyed the work immensely and ended up staying there for almost 14 years. Little did I know back in the mid 1980s that the move would lead to the career path I have pursued ever since – nutrition science communication – collating and evaluating the research of others, and presenting this in an evidence-based, relevant and user-friendly way.

By 1998 I was looking for more challenges and joined the British Nutrition Foundation as Science Director, and subsequently became Director General in 2007. Again, both have been hugely enjoyable jobs, with no two days ever being the same. It has been a huge privilege to lead the British Nutrition Foundation, a charity established in 1967, for the past 14 years and to help develop our reputation as a hub for the understanding and dissemination of evidence-based nutrition science.

We are also very fortunate to have an active and supportive patron – HRH The Princess Royal, who regularly attends our events and engages with our work. The roles have enabled me to combine my thirst for new knowledge, and its onward communication to others, with membership of numerous external committees.

On reflection, one of the most impactful committees on my personal development was my membership of the Government Office of Science's Food Research Partnership (2009-2015), chaired by Professor Sir John Beddington, which really opened my eyes to the multidisciplinary world in which nutrition sits. I have also learned much from opportunities to advise the boards of businesses on nutrition/sustainability matters via membership of advisory committees and from invitations to join Research Council funding panels. I have represented the British Nutrition Foundation on numerous government committees, including those focusing on nutrient profiling, the eatwell guide, 5-a-day, school food standards, and Defra's Family Food Survey (formerly the National Food Survey).

During the 23 years that I have worked for the British Nutrition Foundation, many people have joined the Foundation as employees, placement students and interns. We have also issued Awards, these days funded through the Drummond Memorial Fund, to recognise the work of numerous budding nutritionists and their teachers in schools and colleges, as well as the contributions of academics operating at the leading edge of nutrition science at all stages of their careers. It has been particularly rewarding for me to have had the opportunity to support the development of some of our nutritionists of the future and a delight to watch so many people who started their careers within the Foundation move on to top flight jobs within the sector. I have decided to step back from the role of Director General at the end of 2021, but won't be retiring entirely. I hope to maintain my association with the Foundation for the time being and have recently become the second Chair of Trustees. I shall also continue to serve on several committees including the UK Nutrition and Health Claims Committee and the Strategic Advisory Board of the UK's Global Food Security Programme.

Looking back, I realise that I have been so fortunate to work in some of the most rewarding and interesting jobs in nutrition science, working with fabulous teams of people. I have never set myself a rigid path, instead I have considered new opportunities as they arise. Often these have taken me right out of my comfort zone – such as when I started to do media interviews, or joined prestigious multidisciplinary committees. On reflection, the biggest difference over the years has to be the impact of IT on how we gather information. Back in the 1970s, we gained our knowledge directly from our lecturers, and from text books and publications available in the library. There was no internet, no google, no PubMed, no web of science, no PowerPoint presentations. And no social media!

The Internet has revolutionized communications, to the extent that it is now the preferred medium for information gathering and sharing, and for everyday communication. Without it, how would we have managed to operate with a semblance of normality during the COVID-19 pandemic? But, given the dominance of the Internet, herein lies the challenge – who to believe. In many respects it was simpler in my student days – to a large extent our lecturers were the gatekeepers of the knowledge we accessed. Today, immense quantities of information are uploaded and downloaded over this electronic super-highway, every minute of the day. We can all be commentators, publishers and creators.

I have played my part in signposting 'experts' in the nutrition world – I was involved in establishing the Register of Nutritionists, now lodged with the Association for Nutrition, and in particular development of the processes for registration in public health nutrition and accreditation of training courses in nutrition. For me, this has to be one of my career highlights. Up there too are the invitation to address graduates and their parents in Guildford Cathedral at the 2018 Surrey graduation ceremony, my appointment as a Visiting Professor at

University of Surrey in 2019, election as an Honorary Fellow of The Nutrition Society in 2018, and appointment in 2020 to the UK Nutrition and Health Claims Committee. Another highlight, achieved in collaboration with my counterparts at The Nutrition Society, British Dietetic Association and the Association of Nutrition, is the creation in 2019 of the Academy of Nutrition Sciences ([www.academyofnutritionsciences.com](http://www.academyofnutritionsciences.com)), a registered charity that provides a collective voice on evidence based nutrition science. I am proud to be one of its first cohort of Trustees and to have recently become the second Chair of Trustees. Looking back, I wouldn't change any of the career decisions I have taken along the way or the opportunities and challenges I've grasped. Together, these have broadened my perspective and understanding of the complex discipline that is nutrition science.



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## Honorary Fellow **Dr Margaret Ashwell**

OBE, PhD, DSc, FAFN, RNutr (Public Health)

Looking back over my career, I set myself the task of describing it in three objects. I decided upon a boomerang, a fishing net and a piece of string. You will meet them all a few times in this article.



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## The early years

I will have to start with a terrible confession. I studied Physiology and Biochemistry at Southampton University from 1964 to 1967. We had just one module on nutrition and that was in our third year. It was not compulsory. I chose to miss it and go Christmas shopping instead. This decision seemed to set a pattern which I can only describe as a “boomerang” pattern. Whatever I have dodged at some point in my career has come back to hit me later.

I did my PhD at the National Institute for Medical Research (NIMR) in Mill Hill in North London, funded by the Medical Research Council (MRC). The Director was Sir Peter Medawar who became a really good friend, mainly due to our shared interests of tennis and cricket. What was my research? Well, in 1964 it was revealed that mitochondria had a discrete circular DNA and, naturally, there was excitement that this mDNA might code for all the mitochondrial proteins. My project was called “Studies on the degree of autonomy of mitochondrial biosynthesis”. I had to look up what autonomy meant. After three years I rather sheepishly proclaimed that, at most, this DNA only coded for a maximum 3-5 % of its own proteins. At the time I thought that was a bit of a miserable conclusion, but those few proteins produced by the 37 genes on the mDNA (all for oxidative phosphorylation) are extremely important and many researchers have spent all their time on mitochondrial neurodegenerative diseases which can have horrible implications for the sufferers such as the little boy, Charlie Gard, who made the headlines a few years back. And of course, mDNA’s unique maternal inheritance has meant it is a godsend for forensic scientists and was the critical evidence in deciding that it really was Richard III under the Leicester car park! Strangely enough, it has recently been suggested that defects in mitochondrial biogenesis could be responsible for the genetic tendency to obesity, the subject which has dominated my life ever since my PhD years.

Sitting in the wonderful library at NIMR writing my thesis, I began to wonder about the value of writing words that only three people would read – my supervisor, Dr Tommy Work (a wonderful guy from outer Orkney with a glass eye), my external examiner and of course my dear auntie who typed it all with five carbon copies. She did this perfectly and only asked me one question. I had taken the liberty of naming the ribosomes within mitochondria as mitoribosomes. What are these mitori bosoms? she questioned.

I decided I would like to be a TV researcher on Horizon, but that dream ended when I got a stuffy letter back from the BBC telling me they only employed Oxbridge graduates; I don’t think they would get away with that now. My request

to work as a researcher for the Consumers’ Association, was greeted more favourably and I became the editorial research officer for the very first Which? Slimming Guide. So that was how I got into nutrition for the first time (although I only really had to know about energy balance). I assembled a small group of advisers to help me to research the topic. They included John Garrow, Derek Miller, John Durnin and Trevor Silverstone. The book was published in 1972 and, at this point, Tommy Work tried to interest me in going to Canada to do a post doc. However, I had already met my future husband, Allan, and so I said no thank you. Instead, I crawled back to the MRC to work with John Garrow at the fairly new Clinical Research Centre (CRC) in Harrow. My special memory of John Garrow was the time when he showed me the back of an envelope on which he had sketched a graph of weight against height- the very first BMI chart. I worked on various obesity projects, mainly on white adipose tissue but I felt I needed expertise from elsewhere. I was grateful, therefore, to go to a meeting on adipose tissue held in Marseille and this was where I met Mike Gurr who was working at Unilever at the time. This was the first time I felt the need for my fishing net – in other words a networking group. Nothing existed so we got on and started one. The Adipose Tissue Discussion Group is still going strong.

I reconnected with Sir Peter Medawar at the CRC. He and his group had moved there after Peter’s stroke in 1969. My happiest times were working with him and his new young post doc, Chris Meade, on the transplantation of adipose tissue. Peter’s blue plaque on his Hampstead house describes him as pioneer of Transplantation Biology and does not even mention his Nobel prize. How lucky was I to be part of his transplantation work?

## The Cambridge years

In 1980, I got my tenure with the MRC, and Roger Whitehead and Philip James asked me to work with them at the MRC Dunn Nutrition Unit in Cambridge. This was a pivotal moment in my career. It meant moving house to the village of Ashwell, about 20 miles west of Cambridge and staying there, for what is now over 40 years. I became Dr Ashwell of Ashwell. At the Dunn, I was working mainly on brown adipose tissue with Paul Trayhurn, so I still not really need to know very much about nutrition.



With John Rivers from LSHTM in the late 1980s. We were the last two Editors of ‘Nutrition News and Notes’ – the fun newsletter of the Society.

I joined The Nutrition Society in about 1972 but I only got fully involved with the Society when Professor John Waterlow asked me if I would stand for Honorary Secretary in 1984. This came like a bolt out of the blue. Surely, I was much too young for a prestigious position like this? As it happened, saying yes changed my career path! The first question I asked before agreeing to stand as Honorary Secretary was ‘Will I have to plan the International Congress in Brighton in 1985? ‘No’, I was told ‘there is a separate committee and plans are well underway’. This was true. My steep learning curve came later, though, when David Buss, the then Treasurer, and I had to help the Society’s accountant sort out how the Congress could have made such a large financial loss. This taught me more about financial management than any subsequent course on the subject. It was also my first experience of the business and management side of life, and I was told later, was what impressed the head-hunter (see later) who persuaded me to leave behind the hands-on world of research for pastures new!

As Honorary Secretary, I chaired the Society’s Programme Committee meetings between 1984 and 1988. One day, we had a great idea! The evening’s entertainment should bear some relation to the theme of the Conference. So we planned a barbecue to follow the Conference on Animal Nutrition and a Fun Run to follow the Conference on Exercise and Nutrition. Then a committee member, who had remained silent until then, spoke up. ‘I wonder if anyone could give me a suggestion for the evening’s entertainment at the conference I am organising next year?’ ‘What’s that?’ we said, ready to put on our thinking caps. ‘Nutrition and reproduction’, was the solemn reply!

I remember Council meetings held upstairs in the RSM library and this was the scene for the next “boomerang” moment in my career. As early as 1984, Council started talking about the regulation of the nutrition profession and the setting up of a Register. I have to admit it was one of those items on the agenda which did not exactly ‘grab’ me. Luckily, a lovely lady, Dr Ann Walker from the University of Reading, the Minutes Secretary, volunteered to take on the task of exploring options for the Register. It was Ann who did all the work and all negotiations with the Institute of Biology up until the time the Register was officially launched in 1990. Why the “boomerang”? During the last six years I have been President of the Association for Nutrition, which has held the Register for Nutritionists since 2010. I often think back to those early days, feeling somewhat guilty that it was probably my role as Honorary Secretary to get involved with the regulation of the profession. I have been heartily grateful for what Ann did ever since.

During my time at the Dunn, I acted as Honorary Secretary/Treasurer of the Association for the Study of Obesity (ASO). In 1983, I went to an international conference on obesity in New York and got frustrated at how the American speakers never acknowledged anything done by anyone outside the USA. Here comes the fishing net again! I moaned about this situation to Dr Marcelle Lavau

from Paris and we decided to go back to our national societies to see if we could persuade them to set up a European Association. In 1985, I sat with Professor Per Bjorntorp from Sweden in a wonderful Mediterranean cafe writing the draft constitution for The European Association for the Study of Obesity (EASO). It was established in 1986 and is very much a driving force today.

Although I was studying adipose tissue at the CRC and at the Dunn, I was always interested in the wider picture of fat distribution. If I ever have to name the scientific paper which inspired my career I will always say it was not a paper but a saucy postcard which I discovered in the 70s. The card shows a woman with a small bust and large buttocks saying to her doctor “No doctor I don’t want to lose weight I just want to transfer it”. This inspired me to look into the works of Jean Vague, a French scientist who described the typical female fat distribution as gynoid and the male fat distribution as android. He had published a book in French in 1946 showing that people with android fat distribution were more prone to diabetes than those with a gynoid fat distribution. Thank goodness for my mediocre French O-level! His method for distinguishing android from gynoid fat distribution was extremely complicated and involved about 27 different skinfold and circumference measurements. While I was in Cambridge, I was introduced to Adrian Dixon in the Addenbrookes radiology department who was the proud owner of a brand-new Computed Tomography (CT) machine. We set up an experiment where women would have their waist circumference and hip circumference measured together with their weight and height and then they would have their visceral fat measured by CT. I always remember the day that Adrian rang me and said, “Guess what? Your two and sixpenny Woolworths’ tape measure is as good as my £100k CT machine.” In other words, measuring waist circumference was a good proxy for the amount of visceral fat and much better than BMI calculated from weight and height. Later we showed that using waist to height ratio was even better.

I very much enjoyed my time at the Dunn and saw myself staying with the MRC as a lab scientist for ever more. Not to be. Another boomerang moment. An unexpected phone call from a head-hunter changed all that. Was I interested in being the Principal of the Good Housekeeping Institute (GHI)? Not really was my first thought because I hate housekeeping! However, I agreed to see him and the Editor and, before I knew it, I was being offered the job. Apparently, he had been impressed by my knowledge of financial management gained, as I mentioned above, from sorting out the finances of the Brighton International Congress in 1985. What a decision. What a pivotal moment. It would mean taking on a job that was full time in London as opposed to a part time job in Cambridge which had allowed me to meet my daughters, Alex and Lynsey, at the school gates. I agonised and changed my mind many, many times. Eventually I said “Yes” and I started my new post in March 1986.

## The London years

The transition from “Good Mousekeeping” to “Good Housekeeping” was enormous. A totally different life dealing with journalists, publishers and PR folks instead of scientists. I learned a lot about people management, but I still did not need to learn much about nutrition as I always had a good nutritionist on my staff to deal with all that. The most significant outcome from my role as Principal of GHI was the invitation from the Ministry of Agriculture Fisheries and Food to join their Food Advisory Committee (FAC) as a consumer representative in 1986. They had 15 members, five from academia, five from industry and five from the consumer world. I asked my Publisher if he thought I should accept this role. “Of course,” he said “That’s the first step on your path to Damehood”. Not quite, but I was thrilled to get my OBE at the end of my nine years’ service (three as a consumer rep and a further six years as an academic). Strange to get honoured for the role which has involved the least hard work in my whole life. I turned up, gave my opinions on the FAC and someone else got on and did the hard work.

**My greatest idea in my BNF years was to ask those great nutrition pioneers, McCance and Widdowson, if I could write a book about them.**



Getting to know Elsie Widdowson in the 1980s at Dunn Tea Clubs

I left GHI in 1988 and I then became Science Director of the British Nutrition Foundation (BNF). Well, dear reader, you will be pleased to know that eventually I had to learn something about nutrition. I could escape no more! BNF produce Task Force Reports and Briefing Papers on all aspects of nutrition, and I was involved in all of them. But most of the knowledge I gained was about macronutrients. I really enjoyed becoming a science communicator. I loved devising ‘The Round Table Model of Factors of Heart Disease’ – an ‘aide memoire’ to show how the dietary factors related to the physiological factors which in turn related to the pathological factors. The Model was based on the legend of King Arthur and his knights, the moral being that no one knight, and no one dietary factor, was more important than another. The Dietary Reference values (DRV) report came out in 1991 and I enjoyed giving talks about DRVs based on the story of Goldilocks and the Three Bears. Not too little, not too much but just the right amount. Functional food science started to become popular and so I used the story of the Emperor’s New Clothes to illustrate how easily the public could be fooled by inaccurate health claims.

My greatest idea in my BNF years was to ask those great nutrition pioneers, McCance and Widdowson, if I could write a book about them. Elsie Widdowson was the BNF President and, although I had known her since the 70s, this was when I really got to know her well as I accompanied her home from Council meetings on the train. Elsie’s immediate response was “Whoever would want to read a book about us? However, they were keen on the idea and gave me their ‘Christmas card list’ of all the colleagues who had worked with them over the years. I took the opportunity to talk to these people as opportunities arose at meetings around the world. The book was published at a BNF conference in 1993 just three days after it was announced that Elsie had been made a Companion of Honour. What timing! After the conference and until Elsie’s death in 2000, we would go on the ‘Elsie roadshow’, as I called it, and talk to audiences all over the country. And now, more than 20 years after Elsie died, I’ve had much fun doing ‘Elsie’ interviews on the radio and writing numerous articles about her. In March 2020, I started to organise a blue plaque for Elsie in her home village of Barrington in Cambridgeshire which culminated in not one, but three, unveiling ceremonies in June 2021 because of the COVID-19 pandemic restrictions in place at the time.

Princess Anne became the Patron of BNF in 1989 and I was fortunate to meet her many times. One particular occasion in 1991 always sticks in my mind. Princess Anne came to BNF offices to meet the staff in the morning and to meet Council over lunch. She was introduced to the staff one by one and then our Director General, David Conning, asked her if she would like a cup of coffee. “Yes please”, she said and turned straight back to me. “I understand coffee lowers sperm count” she said. “Is that true?” Well, I was completely gobsmacked. I had not heard whatever she’d heard on the radio the day before. I floundered for a reply. Years later in 2018, I attended the BNF lunch and was asked to be in the group to be presented to Princess Anne. Buoyed up by a nice glass of wine at



lunch and having examined the scientific evidence the day before, I dared to mention this question about sperm count to HRH. She threw her head back and absolutely roared when I told her that, 27 years later, I could answer her question with a firm “No”.

In 1994, David Conning asked if I could help MAFF by being one of their programme managers, David was already managing another of their programmes, and he said they needed someone to manage the micronutrients research programme.

Another boomerang moment! I’ve already mentioned that although I was rapidly learning nutrition on the BNF job, I was much keener on the science of the macronutrients than I was on the science of micronutrients. My goodness what a steep learning curve that was. As Malcolm Jackson remarked to me, the only thing the micronutrients have in common is that they occur in very small quantities in the diet, and they are essential for life. My first ‘site visit’ was to the Institute of Food Research (IFR) in Norwich to check on progress on six projects. On selenium, iron, copper, folic acid, vitamin E and carotenoids. My head was reeling that day.

My interest in fat distribution had not gone away during my BNF years. In 1994, the first Health Survey for England (HSE) was published, and I saw an opportunity to do some cross-sectional analysis with my friend from CRC days, Klim McPherson, who was up the road at the London School of Hygiene and Tropical Medicine (LSHTM). Sainsburys gave BNF some money to employ a young nutritionist/statistician (Sonya Le Jeune) to analyse the data. Sonya sent me her first results on a Saturday morning. I didn’t get a proper chance to look at them until the Saturday afternoon when I had taken my daughter to play hockey for her school and I sat in a nice warm café/bar while she played in the pouring rain. That was the first time I realised that waist-to-height ratio was a better predictor of health risk than BMI. Consequently, the first Ashwell® Shape Chart was drawn on the back of a beer mat!

When I was working in London, I saw a lot of June Schulkes who single handily ran The Nutrition Society office in Grosvenor Gardens House in Victoria



Sharing the joke with HRH Princess Anne 2018

before the Society’s move to Hammersmith. June had started in 1967 when The Nutrition Society was in Chandos House and only retired in 1994. The Society owes so much to this wonderful lady. I still miss her friendship and the jollies we would have together when we devised holidays after conferences, be they in Scotland or Australia.

### The ‘Ashwell and everywhere else’ years

I left BNF in 1995 to enter the world of self-employment, never realising it would be my status for ever more. In the first year, I was lucky that I continued as MAFF programme manager and that I very soon was asked to be nutrition consultant for Marks and Spencer and the Meat and Livestock Commission. But this still left me feeling rather adrift and missing teamwork. Time to get out that fishing net and instigate another network. I started to talk to friends like Mike Gurr, David Buss and Sigrid Gibson who were also self-employed and realised a network would be appreciated. I also had the inspiration to ask Chris Hawkins, an old friend from ASO days if she would be our administrator. And so in February 1996, the first meeting of SENSE was held. I dreamt up the acronym whilst drinking G&T in the bath. SENSE stands for ‘Self-employed nutritionists support and enlightenment’. Support was the running your own business element or, as I always say, what the plumber needs to know. The enlightenment was the latest in nutrition science. It’s very satisfying that SENSE is celebrating its 25th anniversary this year.

My self-employment years have divided fairly neatly into four sections. In part one I was mainly working for UK government and for industry. In part two I was heavily involved in EC projects. In part three I was mainly doing industry work on the substantiation of health claims. Part 4 is the present day. Lots of pro bono committee work and not so much paid work.

Some people have been really influential in my self-employed years and I’d like to take this opportunity to thank them. I called my company Ashwell Associates but when I started it was really just me and the cat. However, as I gradually became busier, I needed others to help on certain projects. My main collaborators have been Anne dela Hunty, Fiona Wilcock, Ursula Arens, Michele Sadler (all former BNF colleagues), Sigi Gibson and Janet Lambert.

It really is true that it’s not what you know, it’s who you know. Dr Christine Bouley ran the Danone Institute in Paris and contacted me out of the blue to see if I would pull together an EU wide consortium to put in a proposal for the EU Framework Five programme. She introduced me to Professor Bert Koletzko from the University of Munich and this led to successful EU projects in Frameworks 5, 6 and 7 spanning the years from 1999 to 2010. These were all on the theme of ‘Early nutrition and its later consequences’ and, once the proposal was funded, my colleagues and I acted as the partner responsible for dissemination

and exploitation in each of them. Christine also recommended me to various colleagues within Danone and this led to many successful projects where we were asked to provide scientific dossiers behind adverts and scientific dossiers to submit for health claims. At that time, Jacobs biscuits were owned by Danone and that was how I came to meet Jenny Walton. She subsequently moved to Kellogg's and then involved me in lots of exciting projects with that company.

Another important lady in the food industry was Carol Welch who first contacted me from Jordans cereals. Jordans were my ideal client. Their premises are located halfway between my home and my golf club! Carol subsequently moved on to work for Costa Coffee, part of Whitbread's so she got me involved in projects for the whole Whitbread group. Carol is now in the big boss at Odeon Cinemas and she even gave me a consultancy project on the foods and drinks sold in the cinema foyers.

Tricia Turner was one of the Cookery team who I managed in my job as Principal of GHI. We later crossed paths when I was consultant to M&S and she came to the 'Nutrition in a Nutshell' training courses which I did for M&S along with Fiona Wilcock. Tricia contacted us both many years later when she was Head of Food for Disney. Fascinating Disney projects followed. The most memorable was our trip to Euro Disney in Paris and a meeting held in the 'Mad Hatter Meeting Room'. Oh, how many meetings have I been to in my life which could have been suitably housed in a room of that name?

One of my aims during all my self-employed years, was to keep going to conferences, giving lectures and to keep publishing original research. In terms of publishing papers on the potential for waist-to-height ratio as a screening tool for health risk. This would not have happened with the analytical skills of Sigi Gibson. She has analysed data from the National Diet and Nutrition Survey (NDNS) and from the Health Survey for England (HSE) and we have continued to publish self-funded papers. My Ashwell® Shape Chart, first drawn on a beer mat, has never really changed with the boundary values still drawn at waist-to-height ratio 0.4, 0.5 and 0.6. But there is



Demonstrating the 'String Test' on Chris Bavin on the BBC documentary The Truth About Obesity, 2017

a lot more evidence to justify those boundary values now than there was in 1996 when I first produced it. For many years I was known as the 'apples and pears' lady because of my simple way to describe the two types of fat distribution. But more recently, I have been called the 'piece of string lady' because the boundary value between 'OK' and 'Take Care' corresponding to waist-to-height ratio = 0.5 can just as easily be measured with a piece of string to check if your waist circumference is less than half your height. Prof Ben Rickayzen from the Bayes Business School at City University, London has also been a good collaborator and it was an honour to be made a Senior Visiting Fellow of this Business School a few years back. Between us, I think we have come up with all the puns about my 'piece of string'. However, I have reached the conclusion that trying to 'make money out of old rope' is nigh on impossible.

One of the places who have asked me to give lectures to their students on a regular basis has been the University of Westminster and I should like to thank Dr Sally Parsonage and Dr Claire Robertson for setting up this arrangement. Even more importantly, for awarding me my Honorary Doctor of Science in 2018. Especially as the ceremony was held at the Royal Festival Hall on a July day which coincided with a fantastic RAF celebratory flypast up the River Thames.

Maybe the most pivotal conference in my career was the FENS conference in 1999 held in Lillehammer, Norway. I suggested to four other nutritionists that, as an 'out of conference lunchtime activity', we should do the Olympic Bobsleigh run with a wheel bob on the Olympic track with its 128mph and 4.5G on the 16 corners. One of the people I persuaded to join me on this mad venture was Professor Janet Cade from University of Leeds. It was the most horrific two minutes of our lives. Janet, who admitted she never even went on the white-knuckle rides at Alton Towers, swore she would get her revenge on me. Well, she did. In 2015, Janet approached me in the middle of another FENS conference, this time in Berlin and said "Margaret, we need a President". "President of what?" I enquired. The Association for Nutrition was the answer. Another boomerang moment. I have nearly completed my six years as President of AfN and I can admit that I now know a lot more about the regulation of our profession than I did when I started. Having taken four years to master the AfN ropes, these last two years with Helen Clark as our Chief Executive and Dr Glenys Jones as her Deputy have been a pure delight. One of the most important events to happen recently in the nutrition world has been the instigation of The Academy of Nutrition Sciences (ANS) in 2019, a joint venture between The Nutrition Society, the British Dietetic Association, the British Nutrition Foundation and AfN. Being an inaugural Trustee of ANS has been hard work but is great to be involved in something so important right from the start.

Writing while we are still suffering the consequences of the COVID-19 pandemic, I realise that the last real conference I attended in person was the Society's Winter Conference in December 2019. This was a particularly pleasant

experience because it was then that I was presented with my Honorary Fellowship of The Nutrition Society. This meant an awful lot to me, having been involved with the Society for so long. It has also allowed me to contribute to this volume and tell you my story in three objects: a boomerang, a fishing net and a piece of string.

### Important papers in my life

#### Inherited from others

##### My favourite paper on fat distribution

Vague J (1956) The degree of masculine differentiation of obesities: a factor determining predisposition to diabetes, atherosclerosis, gout, and uric calculous disease. *Am J Clin Nutr* 4, 20-34.

##### My favourite Elsie Widdowson paper

Widdowson EM (1951) Mental contentment and physical growth. *Lancet* 1, 1316-1318.

### Those I would like to pass on to others

#### A book I'd like to pass on to others

Ashwell MA (editor) (1993) *McCance and Widdowson – A Scientific Partnership of 60 Years*. London: British Nutrition Foundation.

#### A paper I'd like to pass on to others

Ashwell M, Gunn P, Gibson S (2012) Waist-to-height ratio is a better screening tool than waist circumference and BMI for adult cardiometabolic risk factors: systematic review and meta-analysis. *Obes Rev* 13, 275-286.



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## Honorary Fellow **Professor Geraldine McNeill**

BA MB ChB MSc PhD RNutr (Public Health) FAFN

My interest in nutrition was sparked by an undergraduate student project on the influence of diet on the prevalence of kwashiorkor vs. marasmus in different ecological zones in Nigeria, supervised by Dr Celia Greenberg at the MRC Dunn Nutrition Unit in Cambridge. This led me to a volunteer role with Save the Children in Burkina Faso in which I was responsible for child growth monitoring in the semi-nomadic population: locating a village which had moved to find water and suspending infants in culottes from the rare trees in the area were unforgettable experiences.





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This challenging experience did not lead to a brilliant thesis but gave me the skills and resilience to take on a post-doc position at the Rowett Research Institute in Aberdeen where Phil James had recently established a residential human nutrition unit. The Institute had unrivalled expertise in animal calorimetry but human nutrition work was a novelty. I was the first subject for the measurement of metabolic rate using a ventilated hood: the experienced technician reported to his animal nutrition colleagues that my results were 'just like a Soay sheep'. At this time I gave my first Nutrition Society short communication at a meeting in London. I had to stand at the lectern for what seemed an interminable time at the start as the slides which came up were for Andrew Prentice, one of my PhD examiners: when the carousel with my slides was eventually found the slides were upside down so all had to be re-loaded. In the audience were two founding fathers of human calorimetry, John Garrow and John Durnin, who I suspect saw me as a new kid on the block and posed me some very testing questions.

Much of the rest of my career was spent in the Medical School at the University of Aberdeen where I was coordinator of the MSc in Human Nutrition from 1991-2000. Although I enjoyed developing research in public health nutrition, one of the best things about a long career in nutrition has been watching MSc and PhD students progressing to leading roles in academia, clinical work and policy. During these decades The Nutrition Society meetings were a key opportunity to meet former students and to present work in progress, especially for my own

students and postgraduate research staff. I remember the at-the-time radical decision to hold a three day summer meeting, which gave a chance not only to experience the variable quality of student halls at UK universities but also to build relationships with colleagues outside the formal conference sessions.

My lecturer years were spent on a succession of short-term contracts which would thankfully not be permitted now. In these years I took two periods of maternity leave: the first was only paid for 14 weeks and in the second was a little longer but some benefits were recouped as I chose not to return full-time after four months because I was breast-feeding; again it's good to see how employment conditions have improved. At one contract renewal it was decided by the REF-focussed management that I was not producing sufficient high quality research output, leading to a gap in employment. This wake-up call propelled me to widen my experience so I stood for election as Nutrition Society Public Health Nutrition representative and was relieved to be successful as the announcement of the result was made in a summer meeting in a lecture theatre full of familiar faces. As Public Health Nutrition rep I had the chance to engage with a number of UK-wide bodies which helped me regain an academic post and later gain promotions. I suspect that my wider engagement with nutrition activities led to an invitation to join the Registration Committee of the Association for Nutrition, which I chaired until two years ago.

While I enjoyed leading a team of staff and PhD students at the University of Aberdeen, the demands of research and staff management did not sit well with some physical health challenges, so I reluctantly took early retirement in 2014 but continued to work part-time. As projects I was involved in gradually ended I was fortunate to find a new opening and finish my career in the field where I began, as visiting professor of Global Nutrition and Health at the University of Edinburgh. Having a chance to work with ecologists, animal production specialists, human rights lawyers and climate change modellers as well as nutrition and health experts from many countries has been a privilege as well as a welcome new challenge. Again I have enjoyed teaching and supervising talented students and mentoring early career researchers who I know will go on to achieve great things. Being elected as an Honorary Fellow of The Nutrition Society in 2020 was an unexpected honour but one which adds to a sense of coming full circle in my career. It also strengthens my resolve to find new ways to contribute to The Nutrition Society's activities in future years.



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## Honorary Fellow **Professor Paul Trayhurn**

DPhil DSc FRSE

Many of us who entered nutrition research have done so without receiving any formal training in the subject. A variety of scientific backgrounds are evident, including animal science and clinical medicine. Others have had a background in the basic biological sciences, and this is so in my case. My first degree was in physiology and biochemistry at the University of Reading.



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*“If one does not know to which port one is sailing, no wind is favourable”*  
Lucius Annaeus Seneca

When I went there in 1966 Reading was renowned for its strengths in agriculture and for being one of only two UK universities with a Fine Art Department. Fine Art was headed by Claude Rogers, one of the founders in the late 1930's of the Euston Road Group, and the distinguished staff included Terry Frost (later Sir Terry Frost) who was a leading exponent of abstract art. Although I was in the Department of Physiology & Biochemistry, the Fine Art Department was also a focus for me as my girlfriend (and subsequently wife) was a student there. This reflected another special feature of Reading in that there were equal numbers of male and female undergraduates, which at that time was highly unusual.

After Reading, I moved to Oxford for my DPhil at the Nuffield Laboratory of Ophthalmology where I worked on the metabolism of the lens in relation to cataract under the supportive supervision of Ruth van Heyningen. She was a founding Fellow of St Cross College, and died only recently just before her 102<sup>nd</sup> birthday. Not only did she inculcate, and the lab as a whole reflect, the highest standards, but I was given the sort of scientific freedom that would not occur now. In that environment and at that time there was nothing by way of formal training beyond the research itself, whether on how to search the literature or write a thesis – such things were absorbed by osmosis. As a consequence, I remain perplexed that universities now run multiple courses for graduate students on the basis that they will not know, and that their supervisors will not have shown them, the core skills required for post-graduate work. As a supervisor I have always regarded the training now taught centrally by universities to be a key part of my responsibilities to a graduate student.

My work at Oxford centred on energy and amino acid metabolism in the bovine lens, and the effects of anoxia together with the role of oxygen was a component of these studies. Little did I know that this would be a central part of my interests in the later stages of my career. A different example of career symmetry comes from the discussions which animated afternoon tea in Oxford departments in the late 1960s/early 1970s when Max Beloff (later Lord Beloff) and colleagues were arguing that an independent University should be established. There was general scepticism about the need for such a development, which I shared, the predominant view being that the UK Government funded universities in a not ungenerous manner and importantly did not interfere. Nevertheless, the University of Buckingham was founded in 1973, initially as University College

Buckingham. In 2009, after formal retirement from the University of Liverpool, I found myself being appointed an Honorary Professor there and subsequently took on the part-time role of Dean of Research Strategy. By then the attractions of independence were widely recognised, the State having increasingly intervened in the University sector with more and more regulation, and direct funding had been substantially reduced.

My first post-doctoral post was in Strasbourg where I worked on rhodopsin in the retina at the CNRS Centre de Neurochimie. I was funded through a NATO European Fellowship, and the referee for my application to the Royal Society for this award was the legendary Nobelist Sir Hans Krebs. Serendipitously, I had had an awe-struck interaction with Sir Hans each time I returned from the local slaughterhouse with cattle eyes for my work as he would personally collect the vitreous humour as a culture medium for his own studies.

Apart from the work on rhodopsin, I have one particularly strong memory of the time in Strasbourg, and that is of my wife and I circumnavigating the central island of the city in freezing temperatures on 1 January 1973 – the day the UK became a member of the European Union (Community as it then was). Strasbourg was, and is, the seat of the European Parliament, so we are part of the handful of British people living in one of the two major centres of the EU on the day that the UK joined – which made our departure following the 2016 referendum especially poignant.

A year in Strasbourg was followed by a return to Oxford for 18 months where I continued to work on vision. While there, I had some exposure to nutrition in that Antoinette Pirie, the Head of the Nuffield Laboratory of Ophthalmology, had a major interest in the impact of vitamin A deficiency on xerophthalmia and regularly visited India as part of her collaborative field studies on this disease.

## Moving into nutrition

### The Dunn

My formal engagement with nutrition began in 1975 when I joined the Energy Group being formed by Philip James at the MRC Dunn Nutritional Laboratory in Cambridge. The Dunn was founded in 1927 when Sir Frederick Gowland Hopkins, who won the Nobel Prize for Physiology/Medicine in 1929 for the discovery of vitamins, was Professor of Biochemistry at the University of Cambridge. Gowland Hopkins was not himself directly involved in research at the Dunn, although he did act as an adviser and was a member of the Management Committee. The Dunn was a remarkable place, with a distinguished history. When I arrived, Roger Whitehead – a former President of The Nutrition Society – was the Director, his predecessors being Leslie Harris and Egon Kodicek. One of the paradigm shifting contributions from the Dunn was the discovery that vitamin D



(1,25-dihydroxycholecalciferol) is a hormone formed by sequential hydroxylations in the liver and the kidney – discoveries led by David Fraser and Eric Lawson.

The Dunn was full of highly talented scientists, who benefited both from the substantial resources provided by the MRC and by the ethos of being associated with one of the world's great universities. There was the freedom to follow one's nose and go wherever the science dictated. My own research at the



The MRC Dunn Nutritional Laboratory, Cambridge, in the early 1980's

Dunn began with using animal models to examine the fundamental energetics of obesity. The Energy Group had been established as a response to obesity being recognised as an emerging public health problem. The initial focus of the group was on exploring whether there are important metabolic factors leading to a reduction in energy expenditure which underpin the development of the disorder. The prevailing view at the time was essentially Calvinist – that obesity was simply a consequence of gluttony and/or sloth.

The animal model that we initially employed was the genetically obese *ob/ob* (*Lep<sup>ob</sup>/Lep<sup>ob</sup>*) mouse. The particular attraction of these animals is that their obesity is severe (body weight up to three times that of lean siblings), develops early and rapidly (evident visually by one month of life) and is reducible to a mutation in a single recessively inherited gene. The link to a single mutant gene indicates that the profound phenotype of *ob/ob* mice results from an alteration in just one protein, with that protein clearly playing a critical role in the regulation of energy balance. It was well-recognised that *ob/ob* mice are hyperphagic, but there was also a view that they have an enhanced energetic efficiency, consequent to reduced energy expenditure. A series of studies that we undertook on resting metabolic rate in weaned animals, milk intake in suckling mice, and detailed energy balance in young *ob/ob* mice pair-fed to the *ad libitum* intake of lean siblings showed that this was the case. It became clear that the early development of obesity in *ob/ob* mice is caused by a lower energy expenditure (per animal) with hyperphagia subsequently amplifying the condition.

These observations led to an interest in thermoregulation and non-shivering thermogenesis (NST), catalysed by the observation that *ob/ob* mice exhibit a rapid and potentially lethal fall in body temperature when exposed to 4°C – in

contrast to lean mice which are able to maintain their temperature. This was accompanied by a reduction in the capacity for NST. Several possible molecular mechanisms for this form of thermogenesis were considered, but following the work of David Foster and Lorraine Frydman in Ottawa, brown adipose tissue (BAT) was emerging as quantitatively the key thermogenic organ in mammals. From 1978 brown fat became my central interest, and our group was one of the pioneers – together with Jean Himms-Hagen in Ottawa, and Michael Stock and Nancy Rothwell in London, who had made ground breaking observations – in exploring the link between the tissue and nutritional energetics, particularly in relation to the aetiology of obesity.

Our group observed substantial changes in the thermogenic activity and capacity of BAT in a number of energetically demanding conditions in rodents. These included fasting-refeeding and cold exposure, as well as in different types of obese model. An intriguing observation was a substantial suppression of BAT thermogenesis during lactation (in mice) coupled with an extensive atrophy of the tissue. This contributes to meeting the high energy costs of lactation in small rodents; it is not, however, an energy-conserving adaptation as such, but rather reflects the limited scope for dissipating the high heat production associated with milk synthesis. Other contributions from our group included the demonstration that BAT is a major site of lipogenesis, particularly in mice acclimated to the cold (fed a high carbohydrate/low fat diet) where it is much more important than the liver. In addition, we showed that the thermogenic responsiveness of BAT is markedly compromised by the development of insulin resistance in the tissue.

In a productive collaboration with Michael Stock and Nancy Rothwell, we were able to demonstrate a marked activation of the mitochondrial proton conductance pathway responsible for BAT heat production in rats exhibiting the high levels of diet-induced thermogenesis that they had observed with voluntary over-feeding on a cafeteria diet<sup>(1)</sup>. Thus BAT is a locus for adaptive diet-induced thermogenesis. This collaboration featured in a BBC Horizon programme in 1979 entitled 'The Fat in the Fire'.

Although the *ob/ob* mouse was our initial model of choice, we also established colonies of other obese animals, including the *db/db* (*Lep<sup>db</sup>/Lep<sup>db</sup>*) mouse and the Zucker *fa/fa* (*Lep<sup>fa</sup>/Lep<sup>fa</sup>*) rat, as well as maintaining both golden hamsters (*Mesocricetus auratus*) and Djungarian hamsters (*Phodopus sungorus*). Each was selected to provide a different model of nutritional energetics, based on the August Krogh principle 'that for many problems there is an animal on which it can be most conveniently studied'. The ability to maintain multiple colonies of animals without direct cost to the investigator was one of the impressive features of the infrastructure provided by the Dunn. I have noted previously<sup>(2)</sup> that I only realised how remarkable this was when I received my first billing (CDN \$20,000) in 1987 for a small colony of *ob/ob* mice that I had established at the University of Alberta.

## Alberta

I moved to the University of Alberta in 1986 as Professor and Heritage Scholar in Nutrition & Metabolism. Leaving the Dunn, and Cambridge, was a considerable wrench, but the offer of a full Professorship and several hundred thousand dollars to set up a new laboratory funded through the Alberta Heritage Fund for Medical Research was irresistible at that time for someone in his mid-thirties – coupled to the sense of adventure. The two major universities in Alberta were recruiting heavily internationally, the funding for which was from the Province's oil wealth. I had been encouraged to consider moving to Alberta as serendipitously a biochemist from the University of Calgary and his family were our neighbours for a year while on a sabbatical in Cambridge.

In Alberta, the main focus of my work continued to be on BAT and while there I took the opportunity to take a comparative approach, which included exploring whether the tissue is present in pigs – an issue that was much debated at the time. A particular interest was in exploring, with Larry Wang, changes in the thermogenic activity and capacity of BAT during the profound seasonally-induced obesity and hibernation cycle of the ground squirrels native to the region.

## The Rowett

I returned to the UK at the end of 1988 to take up the post of Head of the Division of Biochemical (later Biomedical) Sciences at the Rowett Research Institute in Aberdeen where Philip James was the Director. I was, in practise, moving from one oil centre to another in that Aberdeen was, and is, the oil capital of Europe. By chance, a further oil-related link occurred in 2014 when I was appointed to a Distinguished Scientist Fellowship at King Saud University in Saudi Arabia, this being funded through the Kingdom's oil wealth.

The Rowett, like the Dunn, had a highly distinguished history, and three Nobel Prize winners were associated with the Institute. It was founded in 1913 with John Boyd Orr (later Lord Boyd Orr), who won the Nobel Peace Prize and was the founding Director-General of the UN Food & Agriculture



At a COST meeting with colleagues Professors Saverio Cinti and Jan Nedergaard – late 2000's

Organisation, as the first Director. The Rowett had a strong tradition of agricultural research as well as substantial interests in human nutrition and health. When I went there Aberdeen was a major research centre, being home to several national research institutes, as well as the University of Aberdeen (founded in 1495) and what became Robert Gordon University. The Rowett had a number of highly motivated scientists who were major figures in their fields. Core funding came through what was then the Scottish Office who, although very supportive of the Institute, perhaps influenced the ethos which was somewhat 'civil service' in marked contrast to the Dunn.

During the early years at the Rowett my research continued to focus on thermogenesis and brown fat, again with a comparative perspective. This included studies on the thermogenic activity and capacity of the tissue in the newborn, and during the early postnatal period, of large precocial agricultural species, particularly lambs and goats. It also encompassed work on reindeer in collaboration with colleagues from the University of Oulu. In each case large quantities of BAT were identified in the newborn of these species, reflecting the initial thermal challenge that they face, but there is a rapid loss of the tissue and a transition to white fat over the first month of post-natal life. Access to species of agricultural importance was one of the multiple opportunities provided by the Rowett, while another was the wide range of facilities and expertise.

Shortly before Christmas 1994, my research programme switched abruptly from BAT to white adipose tissue (WAT). This followed the identification by Friedman and his group at the Rockefeller of the mutant gene in *ob/ob* mice and its encoded protein (later named leptin). The gene was expressed principally in white adipocytes, although other sites of expression were subsequently reported albeit at considerably lower levels. I vividly remember the issue of Nature of 1st December 1994 in which this work was published, the cover having a photograph of the *ob/ob* mouse. However, unusually I did not see that issue the day it appeared because of the arrival of a new Research Fellow and his young daughter. Indeed, it was only the following Monday morning on a plane to Birmingham that was I able to read the paper. By the Christmas break we had designed and validated a digoxigenin-labelled oligonucleotide probe to explore the expression of the *ob* gene.

The explanation for the immediate switch in my research programme is simple. Two years earlier a consortium of us in the UK, which included Mike Stock, had tried unsuccessfully to obtain funding to identify the mutant gene(s) responsible for the single gene obesities. The funding agencies had argued (correctly) that since groups in the USA were understood to be well advanced in the search for these genes, it was unlikely that we would be competitive. I therefore took the strategic decision that when the key genes were identified my group would explore the physiological role of the encoded protein(s). Some six months after we started to work on the *ob* gene our first paper was published in which we

demonstrated nutritional regulation of the expression of the gene, fasting leading to a major fall in mRNA level in WAT which was rapidly reversed on refeeding. We then demonstrated that acute cold exposure also suppressed *ob* gene expression in mice with the mRNA level being rapidly restored when the animals were returned to the warm. This cold-induced reduction in expression was primarily driven by the sympathetic system operating through  $\beta_3$ -adrenoceptors. The alterations in gene expression were shown to be accompanied by parallel changes in the circulating level of leptin, Laura Hardie in our group developing the first ELISA for the hormone.

Other key contributions on leptin from the Rowett included the work led by Julian Mercer in which the long form of the receptor was shown to be expressed in the hypothalamus, consistent with the hormone being a key peripheral signal in appetite. Also of note were the studies by Nigel Hoggard in our group on the murine placenta and foetus being sites both of leptin synthesis and action. Nevertheless, WAT is the key source of the hormone and its discovery resulted in a radical change in perspectives on the functions of WAT – as a major endocrine organ with white adipocytes as important endocrine cells.

After several years working on the biology of the leptin system, the focus of my research moved towards the broader endocrine and signalling role of WAT. By that time the leptin field had become highly populated with several hundred papers being published each year. My philosophy has been that when an area becomes quasi-industrial in scale it is appropriate to move on since in such

circumstances it is difficult to make a substantial contribution. At the Rowett, I began to consider what other proteins – collectively termed adipokines – are synthesised and secreted by white adipocytes. This developed during the year I spent in a Professorial position in the Institute of Nutrition Research at the University of Oslo; my move to Norway was part of the strategy for internationalisation by the University.

Leaving Aberdeen, and Scotland, at that time was a wrench and I consider myself to have been very fortunate to have worked at two of the 20<sup>th</sup> century's most internationally renowned nutrition research centres – the Dunn and the Rowett. Similarly, I feel privileged to have been in two of the world's great academic centres – Oxford and Cambridge.

## Liverpool

After Oslo I moved to the University of Liverpool to take up a Chair, which became named 'Nutritional Biology', together with the Directorship of the Obesity Biology Unit. At Liverpool, as in Alberta and Oslo, I was appointed for research with teaching being essentially through the supervision of Master's and Doctoral students. The central interest of the group I established in Liverpool was the discovery of novel adipokines together with exploration of their functional significance. By that time it was widely recognised that WAT is a pleiotropic organ with an extensive secretory role well beyond the release of fatty acids.

We were particularly interested in the inflammatory response that develops in WAT as it expands in obesity, this inflammation underpinning the development of the major obesity-associated disorders – particularly insulin resistance and the metabolic syndrome. Among the novel adipokines that we identified were the neurotrophin nerve growth factor, the lipolytic signal zinc- $\alpha$ 2-glycoprotein and interleukin-18. Zinc- $\alpha$ 2-glycoprotein, which was discovered to be an adipokine by my colleague Chen Bing, is a highly abundant protein released from white adipocytes and was shown to be over-expressed in tumour-bearing mice.

A question that greatly intrigued me was why inflammation develops in WAT as it expands in obesity. In 2004 we proposed in a 'Horizons' article in the *British Journal of Nutrition* that the answer might be hypoxia<sup>(3)</sup>; this is my most highly cited paper, with >1,500 citations (and the journal's third most highly cited paper of all time). The proposition was that as adipocytes increase in size, they become oxygen-deprived as the distance from the vasculature increases. We argued that this leads to a series of metabolic

**I have been a member for more than 45 years and it is the only Learned Society in which I have retained my membership throughout.**



The Obesity Biology Research Unit University of Liverpool – late 2000's



changes in the cells, centred on a switch from aerobic to anaerobic metabolism, and underpins the inflammatory response – adaptations that involve the key hypoxia-inducible transcription factor HIF-1. Following this hypothesis, a series of studies that Stewart Wood, Bohan Wang and I conducted over the subsequent few years demonstrated that hypoxia (1% O<sub>2</sub>) had a pervasive effect on the function of human adipocytes, most of our work utilising human fat cells in culture<sup>(4)</sup>. These ranged from alterations in the expression of >1,300 genes to substantial increases in glucose utilisation and disposal. Consistent with the initial hypothesis, there were major changes in the production of key adipokines, such as leptin (increased) and adiponectin (decreased), linked to inflammation and insulin sensitivity.

One of the outcomes of our hypoxia work was the recognition that adipocytes, like other cells, carefully titrate the local O<sub>2</sub> level and respond accordingly. Another is that the level of O<sub>2</sub> to which cells are normally exposed physiologically is considerably lower than that used to culture them *in vitro* (21% O<sub>2</sub>) with the implication that we may have a distorted view of cellular function based on results obtained under *hyperoxic* conditions. The hypoxia studies also highlighted that from the perspective of cell biology O<sub>2</sub> is very much a nutrient, though it is not regarded as such within nutrition. I have recently argued that O<sub>2</sub> is the ‘forgotten nutrient’ which should be considered alongside the other (macro) nutrients as part of the landscape of nutritional science<sup>(5)</sup>. The difference between O<sub>2</sub> and the other nutrients is the route of entry into the body – lungs rather than mouth and gastrointestinal tract.

Since my formal retirement, the cellular responses to hypoxia and the role of O<sub>2</sub> as a nutrient have continued to be of major interest to me.

## Engagement with The Nutrition Society

I applied to become a member of The Nutrition Society in 1975, a few months after arriving at the Dunn. In those days, three proposers/seconders were required and applicants were formally scrutinised. I had three distinguished sponsors, two of whom – Philip James and Roger Whitehead – are also currently Honorary



Dinner with Professors Ian Caterson and Alfredo Martinez (and other colleagues not shown) during the planning of the Scientific Programme for the 12th International Congress of Obesity, Kuala Lumpur, Malaysia 2014

Fellows of the Society. I have been a member for more than 45 years and it is the only Learned Society in which I have retained my membership throughout. I did join the Biochemical Society as a DPhil student in 1970, but let it lapse a few years ago when I completed my term as an Editorial Advisor to *The Biochemical Journal*.

When I became a member of the Nutrition and Biochemical societies, their functions were the publication of journals, holding meetings – encompassing focused symposia together with the presentation of ‘free communications’ – and providing opportunities to interact with those of similar interests. Free communications were exclusively oral and certainly seen as a place to present significant new findings. There were fewer international meetings than now (up to the Covid-19 pandemic) and communication was more limited before email, the internet and social media. A free oral communication to The Nutrition Society, as with a number of societies, had to be approved for publication by those attending and the full page abstract was regarded as a significant, citable, scientific contribution. Indeed, it was said that members of the Physiological Society regarded the published abstract of a presentation at its meeting as being equivalent to a paper in *Nature* (*Nature* papers were shorter and more limited in scope than now). Although there is a debate about the role today of Learned Societies, and what they do has certainly widened, the core functions remain unchanged.

Since joining The Nutrition Society, I have found myself assuming several roles within it including as a member of Council, Chair of the Scottish Section, and between 2013 and 2018 as the Trustee responsible for Publications. I have also organised specific meetings, the most substantial of which was the 1995 Summer meeting in Aberdeen, held in association with the l’Association Française de Nutrition. I particularly remember the meeting dinner, which was in Elphinstone Hall at the University’s King’s College campus. We were led into the dining room by a piper dressed in full Scottish regalia, and as was customary when all were assembled he ceremoniously presented the President (John Webster) with a large quaich generously filled with whisky the etiquette requiring that it be consumed in one go. This the President heroically did – since having worked at the Rowett previously, he was familiar with what was expected of him – though the expression on his face when he finished was something to behold.

A Nutrition Society role that gave me special satisfaction was as Editor-in-Chief of the *British Journal of Nutrition* – the Society’s flagship journal – from 1999 to 2005. During my tenure the number of submissions more than doubled, submissions moved online, and I take particular pride in instituting the policy of authors retaining the copyright of their article. More recently, I have served as Editor-in-Chief of the Society’s pioneering Open Access journal – the *Journal of Nutritional Science*. Full (gold) Open Access has, of course, become the destination to which journal publishing is headed, and I recall writing an editorial on the issue in the *British Journal of Nutrition* some twenty years ago when it was still a new, provocative proposition<sup>(6)</sup>.



I cannot finish this section without acknowledging my gratitude to the Society for awarding me the inaugural Gowland Hopkins Award in 2019 for ‘contributions to cellular and molecular nutrition’ and for making me an Honorary Fellow in 2020. I have also been privileged to receive recognition from other bodies, including the Wassermann Award from the European Association for the Study of Obesity (for lifetime contributions to obesity research) and election to Fellowship of the Royal Society of Edinburgh (the National Academy of Scotland).

## Perspectives

I am frequently surprised by the extent, beyond my engagement with The Nutrition Society, to which I have been identified with the nutrition field; I have noted previously that I have always seen myself as being at the periphery of nutrition<sup>(2)</sup>. There are several reasons for this perception, one of which is that as a basic scientist my emphasis has been on trying to understand fundamental physiological and metabolic systems. Another is that my research has focused on the mechanisms of energy balance and adipose tissue function in relation to obesity, with limited regard to nutrition per se. A further reason is that I have remained uncomfortable with the sense of evangelism that can colour nutritional discourse in some quarters. Despite these reservations, I have found myself representing nutrition in several national scientific committees, including the MRC’s Population & Systems Medicine Board, the BBSRC Food Directorate and the Royal Society’s Research Grants Board. At the international level, I chaired the Awards Committee of the International Association for the Study of Obesity (now World Obesity Federation) for a number of years and then that Association’s Scientific Committee, as well as serving on the Management and Advisory Committees of several EU-related groups.

As I look back on my career, some features are evident. First, my research on energy metabolism has been distinctly evolutionary, crossing



With Professor Suliman Alomar in Riyadh, Saudi Arabia, in 2015 while holding a distinguished Scientist Fellowship at King Saud University

traditional subject boundaries – from basic energy balance measurements, to whole-body thermal physiology, *ex vivo* tissue investigations, and then to detailed cellular and molecular studies, each encompassing a quite distinct range of approaches and techniques. The second is the extent to which I have changed institutions, having relocated several times – which has both advantages and disadvantages. The advantages include the stimulus of new settings with fresh opportunities and influences, while the disadvantages are the cost and delay involved in setting up a new laboratory on each occasion. I have been fortunate in that my moves have been facilitated by generous funding to establish my research programme. Institutions are themselves fluid, of course, and research centres are not necessarily permanent; the Dunn, regrettably, is no more, and the Rowett is part of the University of Aberdeen rather than an independent Institute. Universities themselves no longer inspire the loyalty that they once did with even the most senior academics being considered employees rather than scholars who constitute the university.

The managerial approach that has engulfed universities reflects the wider societal trend, but universities have undoubtedly embraced it with enthusiasm. Further cultural changes during my career include the direct interest that Governments now take in research, and indeed see it in terms of international competition and national prestige. A corrosive development is the importance now attached to the journal in which researchers publish, and this is linked in part to university managerialism. Indeed, University managements have pressured staff to submit their work to journals with a high ‘impact factor’ – despite the effect that this can have on individual behaviour and the sustainability of Society journals.

For most of my career, the choice of where to publish was essentially a decision based on the journals most appropriate for a given study, and on personal preference which included support of either a specific Society, or national/continental, forum. The emphasis on impact factor has changed this, particularly for younger scientists where publishing in high impact journals (especially *Nature* or *Science*) has become career defining. And what is now required for a *Nature* paper, for example, is very considerable with extensive supplementary data being normal. This is in marked contrast to my first *Nature* paper, published in 1977, which contained just two figures consisting of body temperature curves plus one table, the sole tool used for the study being a rectal temperature probe<sup>(7)</sup>.

I will end on the positive note that nutrition is undoubtedly taken more seriously now than when I first entered the field – it is no longer a Cinderella subject. This is partly because of the acceptance of its public health importance, and partly because there has been increased overlap with the basic biological sciences. Indeed, one can argue that nutritional science is the apotheosis of integrative biology. For the area to continue to flourish, however, it must be at the forefront of developments in the biological sciences and be able to attract the very best scientists. Finally, I am conscious of how privileged I am to have been engaged in

research during a golden age for the biological sciences – and nutrition, as with other areas of biology, has continued to build on the achievements of true giants.

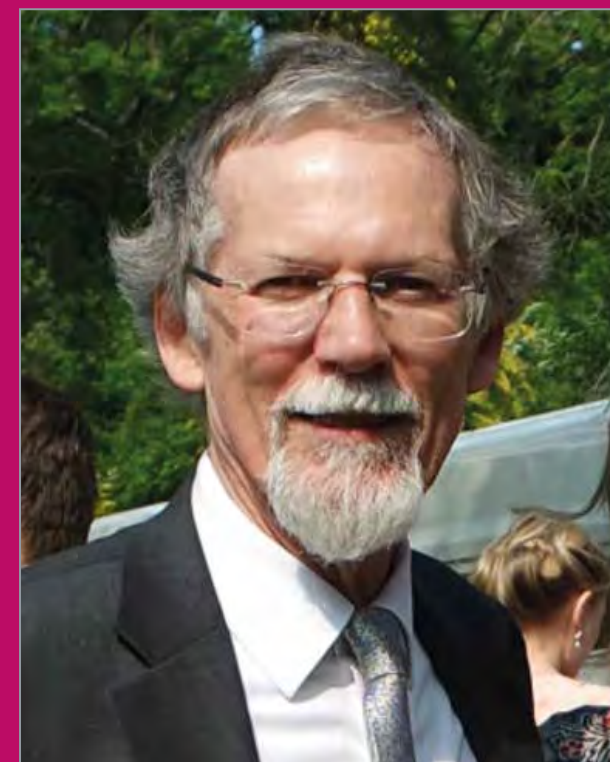
Finally, I would like to thank the many students, colleagues and collaborators with whom I have worked and apologise that for reasons of space they are mostly unnamed. I also wish to warmly acknowledge the unfailing support of my wife Deborah, not least for her willingness to embrace our multiple family moves as great adventures (where next?).



My wife and I with our much missed friend the late Professor Prakash Shetty at his daughter's wedding in 2016

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# The Nutrition Society 1941 – 2021

## Presidents and Honorary Members 1991-2021: Their Stories and Recollections

Compiled by Dr Margaret Ashwell OBE

As The Nutrition Society celebrates its 80th anniversary in 2021, this book presents the stories and recollections of the Presidents and Honorary Fellows who have shaped the Society, and nutrition science, in the past 30 years.

It is the sequel to the original ‘Presidents and Honorary Members: Their Stories and Recollections, 1941-1991’ compiled by Dr Elsie Widdowson to mark the Society’s 50th Anniversary.

Inspired by Dr Margaret Ashwell during the 2021 UK COVID-19 ‘lockdown’, this book is a collection of personal reflections written by leading figures in nutrition science. While their major scientific breakthroughs are well documented, this book also documents their inspirations, their journey into nutrition and the people and organisations that were behind their significant achievements. Not forgetting The Nutrition Society social events that have been the catalyst for many a successful collaboration!

