



DAVID P. CUTHBERTSON

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Obituary Notice

SIR DAVID P. CUTHBERTSON

(1900-1989)

David Paton Cuthbertson CBE, MD, DSc, FRSE, a past President of the Nutrition Society, a previous Editor of the *British Journal of Nutrition*, and for 20 years Director of the Rowett Research Institute, died on 15 April 1989—a few weeks before his 89th birthday. He was born in Kilmarnock, Ayrshire, and educated at Kilmarnock Academy and the University of Glasgow from which he first graduated BSc in Chemistry in 1921, having been awarded the Doby-Smith gold medal. On graduation the Scottish Board of Agriculture awarded him a research scholarship to undertake work in chemistry in Dundee. However, this was initially deferred and then declined because he was influenced to study medicine by Professor E. P. Cathcart, FRS, well-known for his work in nutrition. He graduated MBChB in 1926, having won the Hunter medal in Physiology and a Strang-Steel scholarship for research. The latter enabled him to carry out research during vacations which led to his first publication, on 'The distribution of phosphorus in muscle', in the *Biochemical Journal* in 1925. Immediately after graduating in medicine in 1926 he was appointed to a Lectureship in Pathological Biochemistry at the University of Glasgow. The post was based at Glasgow Royal Infirmary to which he was appointed Clinical Biochemist. Sir David used to give an amusing account of an interview with the Principal of the University which took place shortly before he took up the post, which demonstrated that the history of differentials in salaries between clinical and non-clinical academic appointments is a long one.

During the 8 years that he held this post, results were obtained leading to about twenty-seven papers, most of which were related to the effects of injury, infection, bed-rest, or impaired mobility on metabolism. Two of these papers could now be regarded as the basis for his reputation for providing the foundation for modern nutritional therapy of seriously ill or injured patients (Cuthbertson, 1931, 1932). Although, as he shows in his literature references in these papers, he was not strictly the first to demonstrate the increased loss of nitrogen in the urine after trauma, he was the first to demonstrate that the tissue damaged could not have been the main source of the loss of N, and to follow its duration, showing that surgery to long bones or fractures led to a peak in urinary N excretion after about 3-8 d. He also found a link with increased energy consumption. Around this time his various measurements of potassium, phosphorus and sulphur excretion in the urine and the relation to N excretion and oxygen consumption led him to conclude that trauma stimulated net protein catabolism and that the main source of the increased excretion of N in the urine was skeletal muscle. His DSc, which he gained in 1931, was entitled 'Observations on certain aspects of metabolism with special reference to protein'.

He returned to the Physiology Department at the University of Glasgow on appointment to the Grieve Lectureship in Physiological Biochemistry in 1934 (this post is now a Senior Lectureship in the Biochemistry Department), and continued his research in protein metabolism, nutrition, and the effects of injury with various collaborators including H. N. Munro.

His MD, entitled 'Surplus food—its effect on protein metabolism with observations on

the metabolic response to injury' was awarded with honours and received the Bellahouston Prize in 1937.

In his Arris and Gale Lecture to the Royal College of Surgeons of England on the 'Post-shock metabolic response' (Cuthbertson, 1942) he summarized his views on the effects of trauma on metabolism. Here he introduced the concepts of the ebb and flow phases of metabolism after injury which are still widely accepted and taught, with only slight modification, and are among the reasons for his continuing to be held in such esteem more than 40 years later.

Although remaining in his post as Grieve Lecturer in Physiological Biochemistry he was seconded to the MRC Administrative Headquarters from 1943 to 1945, immediately after which he succeeded Lord Boyd Orr as Director of the Rowett Research Institute, and Consultant Director of the Commonwealth Bureau of Animal Nutrition, posts which he held until his official retirement in 1965 in which year he was knighted, having been honoured with the CBE in 1957.

On his secondment to the MRC in 1943 to work with Sir Edward Mellanby he became increasingly involved in consulting and advising on applied physiology and nutrition, so much so that it was only when on his way to take up his appointment as Director of the Rowett Research Institute, that he remembered to resign from his post as Grieve Lecturer in the University of Glasgow!

Others have suggested that Sir David had three careers: the first as an academic with his main interest in clinical research in metabolism, the second as Director of the Rowett Research Institute, and the third as a Senior Clinical Research Fellow after official retirement. The period with the MRC during the second world war must have been either a transition or the real beginning of his 'second career'.

Early in Sir David's Directorship it was agreed that the policy of the Institute should change to become mainly concerned with animal nutrition. Among the reasons for this were the general success of the advice on human nutrition given by various British nutritionists, including Lord Boyd Orr, which was applied during the second world war, and the increasing evidence of problems in animal nutrition which were having, or were likely to have, economic implications and which might eventually influence human nutrition.

The second world war and the country's economy in the preceding years had clearly impeded many of the plans and developments originally proposed for the Institute. From 1945 a period of considerable expansion of research began, accompanied by the essential new buildings and facilities. On reviewing this period the impression of encouragement and support by Government and direct and indirect assistance of some of its senior members makes an interesting contrast with the present. By 1951 there were at least nine sections or departments of the Institute including: protein and carbohydrate chemistry, microbiological chemistry, enzymology, applied biochemistry, physiology, animal behaviour, pathology and bacteriology, applied nutrition, statistics, and a farm which enabled large-scale trials to be carried out. Various developments continued and many were consolidated, including the high international reputation of the Institute, until Sir David's retirement from the Institute in 1965. When the Institute celebrated its Jubilee in 1963 the staff numbered four times as many as before the war; one of the staff, Dr R. L. M. Syngé, had been awarded the Nobel Prize for Chemistry jointly with Dr A. J. P. Martin, and facilities included those for handling radioactive isotopes, a gradient layer calorimeter and a new trace element building. During this period Sir David had maintained his interest in human nutrition and especially the metabolic response to injury, and had collaborated in a number of studies including one of the earliest applications of ^{14}C and ^{131}I to the study of plasma protein metabolism in experimental animals.

To use the conventional phrasing 'On retirement he settled in Troon' could give quite the wrong impression of his next 20 years. Three things were certainly however settled. One was his home, so admirably run by Lady Jean, the second was golf at Old (now Royal) Troon, and the third, so fortunately for many, a Research Fellowship in the Clinical Biochemistry Department at Glasgow Royal Infirmary. On retirement his travelling around the world must have decreased but to his new, and mostly junior colleagues, it still seemed considerable. For many years he continued to be involved in the International Congresses of Nutrition and many other international meetings, including Ciba Colloquia. Glasgow Royal Infirmary welcomed his return, and air-conditioned cubicles were provided which enabled the study of the effects of environmental temperature on the metabolic response to injury. He encouraged the installation of facilities for indirect calorimetry on patients and these studies continue.

During this third career his international reputation and recognition increased. In the early years there was a considerable flow of original papers on various aspects of the metabolic changes following injury. Several review articles were also published, either by him or in close collaboration with others. These made a considerable contribution to the knowledge of the nutritional requirements of patients after severe injury. Although he was awarded several honorary degrees and fellowships of Colleges and Societies, including the Fellowship of the Royal College of Physicians and Surgeons of Glasgow and the Royal College of Pathologists, perhaps the recognition which gave him the greatest pleasure was by the European Society for Parenteral and Enteral Nutrition (ESPEN) in its Cuthbertson Lecture. Since its inauguration he had always been present to hear it and congratulate the lecturer.

One of Sir David's favourite quotations was from John Hunter (1794) 'there is a circumstance attending accidental injury which does not belong to disease—viz that the injury done, has in all cases a tendency to produce both the disposition and the means of cure', and it is pleasant to reflect that at least towards the end of his life new evidence necessary to understand the various mechanisms was beginning to appear. Sir David's earliest work was carried out using techniques not dissimilar to those of Voit's in the previous century but he achieved an integrated concept of the metabolic events which follow accidental injury or surgery. Later, after new techniques made the measurement of various hormones practicable, a consensus formed of the role of the endocrine changes induced by injury (Barton, 1985). Broadly, this was that the increased cortisol, adrenaline and glucagon concentrations, together with the decrease in insulin, might account for the net increase in protein catabolism, the increase in energy consumption, and, in the early stages, the increase in blood glucose concentration. This concept however does not explain the changes in plasma proteins after injury on which he had made preliminary observations before the second world war. Recent work on the cytokines, interleukin 1 (IL1), tumour necrosis factor (TNF) and interleukin 6 (IL6) has increased our comprehension of the mechanisms of the increases and decreases in the concentrations of various plasma proteins after injury, and the pyrogenic effects of IL1 may account for the increase in body temperature which he had reported in 1932.

Although Sir David's considerable scientific work has been outlined, it may be that this is matched by another very significant contribution. This was encouragement of others, notably in his third career, of those in the early stages of their research. Sometimes this took the form of asking a question arising from, or in the area of, the project which entailed a lot of experimental work if it could be answered at all. Perhaps more often it took the form of fairly active encouragement to present results, or a review, at a scientific meeting. Such encouragement was never nagging and almost invariably led to a willing commitment to the undertaking, from which the individual profited initially by the clarification of thought

induced by the exercise but also from discussion at the meeting and from the contacts made. He had a marvellous ability to get things done and to get people to do things from which they benefited. This to a considerable extent may explain the general affection for him.

He had numerous other talents and skills. One was his stamina at social events, as those who were at his last ESPEN meeting in Leipzig in 1988 will remember. His liking of golf was well known and he played for many years in the golf matches between the Senates of the ancient Scottish Universities. He painted very pleasant water colours and those who were privileged to receive his personally etched Christmas cards much appreciated them.

‘He was a verrey parfit, gentil knight’. Chaucer (1387)

A. FLECK

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