

Obituary

Elsie Widdowson (1906–2000)

For seven years before her death on 14 June 2000, Elsie Widdowson was the most highly honoured woman scientist in Britain. She is best known now for her work in nutrition, but, as she pointed out when I was preparing her biography, published in 1993: “Nutrition as a subject did not exist when I started. I have been a chemist, biochemist, plant physiologist, medical researcher and a physiologist.” When pushed, she conceded that the significance of genetic influences was the most important unanswered question in nutrition. But — sorry, *Nature* readers — she had a rather sceptical view of the enormous research effort into molecular biology, saying: “Why are they so keen to learn more and more about less and less?”

She gained her first degree in chemistry at Imperial College, London, in 1928. The turning point in her life came when, at the end of her PhD, in which she analysed developing apples for different carbohydrates, she decided to go to King’s College Hospital in London to learn about large-scale cooking before starting a dietetics course. “I didn’t really want to be a dietitian but jobs in research were hard to come by for beginners in the early 1930s,” she said. A trip to the kitchens brought her into contact with Robert McCance, who was analysing the carbohydrate content of plant foods to plan diets for diabetics. In an inauspicious start, she had the cheek to tell him that he was using the wrong methods to determine the sugar content of apples!

But no matter, this first encounter led to a scientific partnership that was to last 60 years. McCance and Widdowson helped to shape wartime rationing and the British loaf, paved the way for later work on the damage that poor childhood nutrition does to adult health, and provided the core for almost every nutritional database in use in the world today. Their book *The Chemical Composition of Foods* became so universal on its publication in 1940 that their names passed into the title, linking them forever with the field they had made their own. The sixth edition of *McCance and Widdowson’s The Composition of Foods* will be dedicated to Widdowson when it is published later this year.

Armed with these comprehensive ‘food tables’, Elsie realized that she was in a strong position to calculate the energy and nutrient intakes of individual adults. Her results, published in 1936, highlighted the large variation in these intakes between one individual and another of the same



Nutritionist who helped to shape wartime rationing

sex and age. Later she confirmed this finding by studying 1,000 children between the ages of 1 and 18 years. What she then identified as ‘nutritional individuality’ has now become the basis for detailed ‘functional genomics’ studies.

Widdowson shared McCance’s enthusiasm for self-experimentation, which started with their investigations into the way that the body handles the economy (absorption and excretion) of minerals. They tried to persuade the body to excrete iron by injecting quite large quantities intravenously into themselves. She thought it was a pity to go to all the trouble of balanced experiments just for iron, so they had injections of several other minerals at the same time. All went well until “that dreadful Saturday afternoon (in 1938) when we had injected some strontium lactate into each other just before lunch to find out how we would excrete it. After about 40 minutes, we both began to have the most dreadful pyrogen reactions. We lay rolling about on that floor in misery.” Fortunately for science, they were found.

When war was declared, McCance and Widdowson, who by then were working in Cambridge, decided to do research designed directly to help the war effort by establishing how far home-produced food could meet dietary needs. They drew up a scheme based on a weekly ration of just one egg, 1 lb meat or fish, 6 oz fruit, 5 oz sugar, 4 oz cheese and 4 oz fat. Brown bread and vegetables, including potatoes,

were not rationed, and a quarter of a pint of milk was allowed daily. But could anyone exist on that? To show that they could, McCance, Widdowson and several colleagues followed the diet to the letter for three months. They existed largely on bread, cabbage and potatoes, a combination that left them permanently full and strong. But would these experimental rations maintain fitness when the body was tested by much more severe conditions? They would find out.

Immediately after Christmas 1939 they set out for the Lake District. They hiked energetically across the fells for ten days with little to eat but bread. Their longest day in that fortnight was the one in which they covered 36 miles with 7,000 feet of climbing, at an average speed of 3.2 miles an hour including stops. It was a truly pioneering experiment, fastidiously recorded and confronting big questions in the practical, do-it-yourself way that was to typify their best work.

Throughout the war, more experiments on bread followed, the aim being to find out whether the more nutritious brown loaves being forced on a wartime population that preferred white interfered with calcium absorption. The results proved clear-cut: brown bread did reduce calcium absorption compared with white bread. As a result, every British loaf except wholemeal, which most needs it, is to this day fortified with calcium carbonate — wholemeal bread was excluded in deference to the pure-food enthusiasts who were vociferous even then.

McCance retired in 1968 but Widdowson continued to work for another 30 years, emerging at last from his shadow and, to the delight of her friends, achieving full public recognition in her own right. Innumerable honours and medals followed.

Elsie loved helping and encouraging young people. Her thatched cottage was a haven of tranquillity, replete with several pet cats, an extensive apple orchard and a vegetable garden, the latter providing practical nourishment for her many visitors.

What advice would Widdowson give to a young scientist? “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.”

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