Obituary

Norman Pirie (1907–97)

Biochemist who characterized plant viruses and promoted leaf protein as food

Norman Wingate Pirie, invariably called Bill, died on 29 March aged 89. He was a biochemist trained in the pre-war Cambridge school of Sir Gowland Hopkins, but he had the mark of a polymath. His penetrating mind encompassed an encyclopaedic knowledge of scientific discovery and etymology, and his forceful writings on the origins of life, the biology of space travel, the related issues of world population, hunger and contraception, and the dangers of nuclear weapons, reflected the breadth of his scholarship, his socialist principles and his enduring concern for human welfare and world stability.

Bill was born in Stirlingshire, Scotland, the youngest child of Sir George Pirie, a noted painter. The family lived in a large house that allowed its members space to develop their own interests, and here Bill set up a boyhood laboratory. His early schooling was often disrupted, so much of his learning came from books and his intellectual home background, which nurtured self-reliance, independence of thought and frugality.

His practical researches had two main themes. In a highly creative pre-war period in Cambridge he studied the nature of plant viruses, then during a much longer stay at Rothamsted Experimental Station in Hertfordshire he ardently promoted extracted leaf protein as a supplementary, cheap and nutritious human food.

The virus work was a collaboration with Fred Bawden, who interested him in the problem of isolating, purifying and characterizing the viruses causing various diseases of potato. Together they obtained about a dozen viruses, or strains of viruses, in semi-crystalline or even crystalline form, including tobacco mosaic virus (TMV). Pirie demonstrated that the preparations contained small amounts of phosphorus and subsequently showed conclusively that all contained ribonucleic acid (RNA). This contradicted the early views of Wendell Stanley (a later Nobel laureate), who believed viruses consisted entirely of protein. Bawden and Pirie realized that RNA might be the infective component of viruses; but they were unable to confirm this experimentally, and it was left until 1956 for others to establish the infectivity of RNA. Pirie took delight in demonstrating the birefringent properties of suspensions of TMV, which exhibit wonderful coloured sheens when swirled in polarized light, due to the alignment of the rod-like virus particles. With characteristic flair, he entertained the audience at a Royal Society soirée by using goldfish and sea horses to stir virus suspensions, captivating fish physiologists and plant pathologists alike.

The leaf-protein work essentially began with his move to Rothamsted in 1940, and continued almost to the week of his death. Initially he responded to a government call for research that could contribute to Britain's wartime food needs. Bill's concept was that protein extracted from leaves, such as those of cereals and broad-leaf vegetables whose fibre content means they cannot be directly digested by humans, might be used to augment a restricted supply of normal foodstuffs. Subsequently the thinking broadened, and large-scale extracted leaf protein was envisaged as a solution to fill the 'protein gap' in the diets of the increasing populations of developing nations.

With a small team, Pirie developed a variety of machines to shear the leaves, express their juices, and coagulate and filter the protein. Probably the most useful of these 'mechanical cows' were the small, simple, cheap yet robust 'village units', intended for use in poor rural communities, that needed little maintenance. Equipment was installed in villages in south India and elsewhere, and associated feeding trials established the nutritive value of the protein concentrate.

Why, then, has extracted leaf protein not had a greater impact? The reason lies not in the concept, but in the fact that during the past 50 years global agricultural production has kept pace with world population growth. The technology lies latent and may yet come into its own in the next century as the Earth's peoples continue to multiply. For the present, as Bill realized, the fact that the protein is a rich source of β-carotene, or provitamin A, may be of greater importance, because dietary deficiencies of this carotenoid cause much preventable blindness worldwide.

Formal accolades came in the form of the fellowship of the Royal Society, the invitation to give the society's Leeuwenhoek lecture, and its most distinguished award, the Copley medal. But Bill probably gained more pleasure — and wry amusement — from the Rank Prize for Nutrition, worth £15,000, awarded to him in 1976. The cheque was immediately handed to Rothamsted with instructions to purchase an annuity on his life, the income and any accrued interest to be available to support his research in retirement. As he was then 68, the insurance company agreed an annuity of about £3,500. As each subsequent year passed, the greater Bill's pleasure became as the total approached £100,000. Rarely can a charity have made a better, or more astute, investment.

Bill's lifestyle was simple, to a degree austere. The weekly shopping was completed in five minutes on Saturday mornings, and for 57 years he lived in an estate cottage, a few minutes' walk from his laboratory where a normal working day began about 5 a.m. and continued until late each evening. This regime was maintained seven days a week, 365 days a year, except when attending conferences or advising overseas. Yes, he did work on Christmas Day, after joining Rothamsted's director and his wife and other neighbours for seasonal fare. After quickly downing two or three dry Martinis (three parts of gin and one of Martini) and various snacks, he would tender thanks and depart for the lab, usually adding the comment that he "could not understand why people spend time cooking a range of goodies when a bit of bread and cheese would be equally nutritious" — a truism from a real and rare character.

Leslie Fowden and Stan Pierpoint

Leslie Fowden and Stan Pierpoint were formerly at Rothamsted Experimental Station, Harpenden, Hertfordshire AL5 2JQ, UK.