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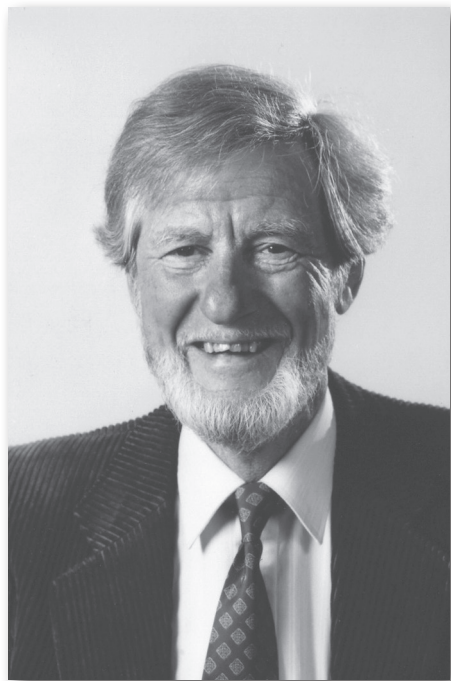
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## William Stanley Pierpoint (1930–2013)



Stan, as he was always known, joined Rothamsted Experimental Station (now Rothamsted Research), the agricultural research institution in Harpenden, Hertfordshire, UK, in 1954 beginning a 36-year career as a research biochemist and a lifelong association with Rothamsted. Stan studied, as he put it, "...biochemical entities, proteins, viruses and organelles, extracted from plants, mainly mature green leaves". A common theme in his published work was to overcome the difficulty "of extracting such entities, unaltered and in their functional state, from the complex milieu of disintegrated, homogenized tissue and the specialized compartments within cells." Stan succeeded and was the first to isolate intact mitochondria, capable of ATP synthesis.

Born in Stoke-on-Trent, the son of Ann and William Pierpoint, Stan completed his schooling at Morecambe Grammar School, Lancashire, UK, a co-ed (perhaps a good grounding for his social skills), in 1948. There a biology teacher, Mrs Pearsall, wife of a well-known ecologist, had considerable influence. However, he studied chemistry for his BSc in Sheffield, UK, from 1948 to 1951, obtaining a first: it seems that he was fascinated early by the atomic/molecular scale and mechanisms. Then followed a grant from the Medical Research

Council at the Unit for Research in Cell Metabolism in Sheffield for a PhD with Hans Krebs (he of the eponymous metabolic cycle in the mitochondria), Nobel Prize Laureate in 1953 and knighted in 1958. There Stan studied enzymes and metabolism mainly in bacteria. On Krebs' departure from Sheffield, Stan decided not to move with him and after the PhD in 1953 he joined the Biochemistry Department of Rothamsted Experimental Station, to work under William ('Bill') Pirie FRS (elected in 1949).

As those with experience of Rothamsted then and Bill Pirie attest, management and equipment were minimal, but individualism was encouraged and Stan was soon publishing, an activity he never gave up, writing in his lucid and erudite English style on technical and detailed science which gradually blossomed to include science-derived and related topics of historical interest. In the early 1960s Stan (together with his wife Maureen and children) had a 2-year sabbatical at the University of California, USA, with George Laties, forging a lifetime friendship. Stan served as the Membership Secretary of the Phytochemical Society.

Moving to a department interested in leaf proteins and metabolism, Stan looked for the Krebs cycle and did important work, particularly in isolating mitochondria and demonstrating that they oxidized Krebs cycle acids, producing ATP [e.g. Pierpoint, W.S. (1959). Mitochondrial preparations from the leaves of tobacco (*Nicotiana tabacum*) *Biochemical Journal* **71**, 518–528]. He was, however, somewhat disappointed at not identifying the peroxisome.

Significant advances were made on the effects on proteins of substances released during cell disruption, e.g. flavonoids and phenolics and the products of their oxidation, including *o*-quinones. Stan showed that these reacted with the amino acids and thiols in proteins, including potato virus X, forming characteristic coloured products [e.g. Pierpoint W.S. (1969) *o*-Quinones formed in plant extracts. Their reactions with amino acids and peptides. *Biochemical Journal* **112**, 609–616], reactions still important in food processing and storage. This expertise resulted in reviews

[e.g. Jervis, L. and Pierpoint, W.S. (1989) Purification technologies for plant proteins. *Journal of Biotechnology* **11**, 161–198]. One title encapsulates Stan's wry humour 'Phenolics in foods and feedstuffs: the pleasures and perils of vegetarianism'. There were also many careful experimental studies of cell components, phosphatases, phosphoesterases, ribonucleases and N-acylamine acid acylase, which were of importance in DNA replication. There was a very strong regard for scientific rigour in Stan's research, with considerable emphasis on solving technical problems, but always with the aim of using the methods to resolve a larger-scale scientific question.

Another important interest of Stan's lay in understanding the effect on plant metabolism of viruses and pathogens, a strong point in the Rothamsted of Pirie and the then director, Sir Frederick Bawden FRS. Stan's pioneering work (in collaboration) led to identification of specific proteins resulting from infections, called pathogenesis-related proteins [Pierpoint, W.S., Robinson, N.P. and Leason, M.B. (1981) The pathogenesis-related proteins of tobacco: their induction by viruses in intact plants and their induction by chemicals in detached leaves. *Physiological Plant Pathology* **19**, 85–97]. Later, in retirement, this expertise led Stan to editing (together with Peter Shewry) and contributing a chapter in *Genetic Modification of Crop Plants for Resistance to Pests and Diseases*.

From studies of mechanisms of pathogenesis Stan developed an interest in salicylic acid ('Aspirin') and its role in regulating metabolism in infected cells; after retirement he published not only on its biochemistry, but also on the history of its discovery and the discoverers and eventual exploitation. He had, it seems, fun with papers such as 'Why *should* plants make medicine – don't they do enough for mankind already?' [W.S. Pierpoint (2000) *The Biochemist* **22**(1), 37–40].

Stan's humour and writing are illustrated by this extract from a letter, "The reminder in the article by [author's name] of the 100th birthday of the Aspirin must have provided celebratory street parties all around the country; let's hope that the analgesic properties of the little white pills coped adequately with any consequential hangovers". Then, after an analysis of more

technical points about the synthesis of aspirin by plants, he concludes: "But if plants don't make Aspirin itself, they could be persuaded to do so, as fortuitous juxtaposition of this article with one on Genetic Engineering might suggest. The thought of seeing fields of Aspirin-containing potato plants scattered across the Home Counties might give people headaches, but at least, the remedy would be close at hand".

Stan was awarded a DSc for his outstanding work and research record in 1990, the year of retirement. He continued reviewing the literature related to cell metabolism and responses to pathogens. Also, Stan wrote an obituary of Pirie and a paper on Edward

Stone for the Royal Society. His later writings continued to be more historical, including a study of a doctor, Henry Stephens, inventor of high-grade ink, from Redbourn where Stan and Maureen lived. A book entitled *The Unparallel Lives of Three Medical Students: John Keats (1795–1821), Henry Stephens (1796–1864) and George Wilson Mackereth (1793–1869): Pencraft, Poetry and Persistent Practice* appeared in 2010, and an article on Charles Severn, a fellow medical student of Keats, in the Keats–Shelley Review in September 2012. These gave him a little pride and much pleasure as did his life-long membership of the Labour Party and a term as Parish Councillor in Redbourn.

Stan was a man of great integrity: in science he pursued his interests, which were focused but not narrow, to the great benefit of the subject and to the intellectual life of Rothamsted, with rigour, persistence and eloquence. He was unfailingly courteous, helpful and positive towards PhD students, not only his own, and to younger scientists as well as the more established. He is survived by Maureen, whom he married in 1957, their children, Judith and Nicholas, and five grandchildren, to whom he was inspirational and caring. ■

**David Lawlor**

(Rothamsted Research, UK)

## On the passing of Fred Sanger, Michael Neuberger and Sir John Cornforth

The Biochemical Society is saddened to learn of the passing of Fred Sanger, Michael Neuberger and Sir John Cornforth, three internationally renowned biochemists whose work inspired and continues to inspire researchers throughout the world.

A brilliant biochemist and a modest man whose passion lay in laboratory life, Fred Sanger was awarded two Nobel Prizes in Chemistry and was only the fourth person ever to be so honoured. The first, in 1958, was for his work 'on the structure of proteins, especially that of insulin' and the second, in 1980 shared with Walter Gilbert and Paul Berg, for work on base sequences in DNA. Fred Sanger kindly donated his laboratory

notebooks (1944–1981) to the Society providing an important snapshot in the history of science and a record of experiments leading to his award-winning work.

Michael Neuberger's elegant research into antibodies did much to increase our understanding of how the body defends itself against microbes. He was awarded the Novartis Medal by the Society in 2002. Michael Neuberger was a Fellow of Trinity College, Cambridge, where he was a director of studies in Natural Sciences, and deputy director of Cambridge's Medical Research Council Laboratory of Molecular Biology.

Sir John Cornforth was born in Sydney, Australia, and earned his doctorate from

Oxford University in 1941. After the war, he moved to the Medical Research Council's National Institute for Medical Research in London where, with George Popják, he went on to devise a complete carbon-by-carbon degradation of the 19-carbon ring structure of cholesterol and to identify, by means of radioactive tracers, the arrangement of the acetate groups from which the system is built. Alongside Vladimir Prelog, John Cornforth won the 1975 Nobel Prize for Chemistry for his research on the stereochemistry of enzyme-catalysed reactions.

Full obituaries for Fred Sanger, Michael Neuberger and Sir John Cornforth will be published in the future issues of *The Biochemist*. ■