

## R L M Synge

1914 – 1994



**R**ichard Laurence Millington Synge was born at Liverpool on October 28th, 1914, as the son of Laurence Millington Synge, of Liverpool Stock Exchange, and Katharine Charlotte Swan. He grew up in the middle of the legacies of his great, great, great grandfather William Roscoe's legendary parliamentary efforts towards the abolition of slave trade and had religious upbringings. Young Richard made a clear distinction between the religious and philosophical views of his parents and his own attraction for materialism. Richard was an unusually intellectual person since his school days. This is evident from his mother's letter to Richard's friend John Humphrey, 'I know I have an unusual son, when he was quite small he was so absent minded (really thinking of other things) that he was not safe to let walk the village street alone'. Another friend commented on this aspect of Richard by saying to his mother, 'intelligent and absent minded, you've a genius on your hands'.

Young Richard attended Winchester College in 1928-1931 studying classics and there his first love for proteins was developed under the tutelage of Rev. S. A. McDowall, who taught him biology including physiology and biochemistry. McDowall taught him that proteins are made up of amino acids and are the building blocks of living machines. In a letter written in 1988, Richard recalled an incidence about his organic chemistry teacher in Winchester College, F. W. Goddard. One day, Goddard asked him and his friend, Humphrey (John Humphrey), 'Hey, Humphrey and Synge! Mr. McDowall tells me that you are interested in proteins. You'd better synthesize glycine and then prepare its copper salt'. Richard remarked about this incident later in 1988 saying 'I think that set us both going'. In 1933 he entered Trinity College, University of Cambridge and studied physics, chemistry and physiology for Part I of the Natural Sciences Tripos (1935) and biochemistry for Part II (1936). During 1936-1939 he was a research student under supervision of Mr. N. W. Pirie in the University Biochemical Laboratory headed by Sir Frederick G. Hopkins and during 1939-1941 at the Wool Industries Research Association at Leeds. He obtained his Ph.D. degree at Cambridge in 1941.

The evolution of molecular biology could be traced back to the development of biochemistry, genetics and crystallography in the Cambridge University in the 1930s. The department itself was an exciting place to be with galaxies of talents like Joseph and Dorothy Needham, Marjory Stephenson, Malcolm Dixon, Bill and Antoinette Pirie and Robin Hill. In addition, the faculty included a number of distinguished German scientists like E. B. Chain, Ernst Friedmann, H. A. Krebs and H. Lehmann. These scientists are the pillars of modern plant and animal biochemistry. In addition intellectual interactions with personalities J. D. Bernal and M. Perutz helped young Richard to grow. While working under the supervision of Pirie, Synge wrote a historical review "Fractional

distillation and the countercurrent principle”, but never published it. This review covers contributions as far back as the 16<sup>th</sup> century and highly appreciated by his mentors. Richard studied the separation of amino acids by means of different solubilities of their acetyl derivatives between chloroform and water. By that time Syngé had developed a great expertise about the choice of acetyl derivatives based on their partition coefficients and in this work, routine measurements of optical rotations were needed. In Pirie’s view, Richard’s memory was at least as good as those of Bernal and J. B. S. Haldane as he remembered all the values of optical rotations and never had to look up in the notebooks. A sea-change in Richard’s work came when he met A. P. J. Martin on the advice of Sir Charles Martin. A. P. J. Martin at that time was known to his friends as ‘Nutrition lab Christ’ as he was worked on nicotinic acid, which is a growth factor for pigs and he had just stopped wearing a beard. Martin, a highly talented person, was at that time working on the use of ‘steady-state’ liquid-liquid countercurrent distribution for concentrating vitamin E from various extracts. Martin introduced Syngé to simple countercurrent theory, and together they developed ‘steady-state’ countercurrent machine with central feed for handling chloroform-water phases. In 1941, first demonstration of successful use of partition chromatography was published in a paper entitled ‘A new form of chromatogram employing two liquid phases’ by Richard and Martin. These results were used for sequencing of pentapeptide Gramicidin S using partition chromatography. This method was later used in a variety of fields and led to the award of a Nobel Prize to Richard and Martin in 1952. Prof. Syngé was made a Fellow of the Royal Society in 1950 and of the Royal Institute of Chemistry in 1952. He was an honorary member of the American Society of Biological Chemists. Richard later used paper chromatography to work out the exact structure of the simple protein molecule gramicidin S, which helped to pave the way for the English biochemist Frederick Sanger’s elucidation of the structure of the insulin molecule. Syngé did research at the Lister Institute of Preventive Medicine, London (1943- 48), and at the Rowett Research Institute, near Aberdeen, Scot. (1948–67). During this period, at the Rowett Research Institute, directed by D.P. Cuthbertson, he has been particularly concerned with the digestion of proteins by the ruminant animal and its associated micro-organisms. In 1958-1959, he spent a year at Ruakura Animal Research Station, Hamilton, New Zealand, working with E. P. White on isolation of the toxic fungal component sporidesmin. He became a biochemist at the Food Research Institute, Norwich (1967–76), and was also an honorary professor of biological sciences at the University of East Anglia (1968–84). Richard lived his life as full time researcher.

Richard Syngé since childhood days was very much attracted to plants. It might have had stemmed out from her mother’s views on diet and dietary principles. She had unusually advanced ideas about diet. This interest led Richard’s mother to join Soil Association and as a result, to see that brown bread, never white, was always on the dining table of the family. By the time, Richard was at Cambridge and well into biochemistry research- his mother had come to accept that Richard’s views on diet were well founded on contemporary scientific literature. So, we find her following what Richard had to say. In 1948, Richard entered in to the ‘mud on the boots’ world of agriculture by taking up a job at the Rowett Institute near Aberdeen. It is during this period, Richard traveled to Indian Statistical Institute four times. In 1965, Professor Syngé stayed as guest scientist in ISI during the period

of 19 April – 08 May. evaluated the work of the biological sciences division and suggested that ISI should do research on the fate of the aromatic and other plant derived compounds in the soil and their fate on ion exchange capacity in soils and the effect of the plants products in human and animal nutrition. In 1966 (17 July- 02 September), he visited ISI again and suggested research on mixed cropping will be important in Indian Agriculture and this kind of research should be done by the Botany Research unit and this legacy still continues. In 1967, during his third visit to ISI, he helped the Biological Sciences division to organize research work on plants and soils towards more productivity in the resource poor agricultural lands of India. During his fourth trip to ISI (18-30 January 1970) delivered convocation address entitled “Poison in plants: Some biological and human implications” and had a great role in shaping up research in the biological science division of ISI. To his end, he gave support to the Norwich Peace Council of which he was treasurer and to the World Peace Movement. Professor Synge died on August 18, 1994 In Norwich, Norfolk.

In 1943 he married Ann Stephen, daughter of the late Adrian and Karin Stephen, psychoanalysts. They have four daughters and three sons, in order of decreasing age: Jane, Elizabeth, Matthew Millington, Patrick Millington, Alexander Millington, Charlotte, and Mary.

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