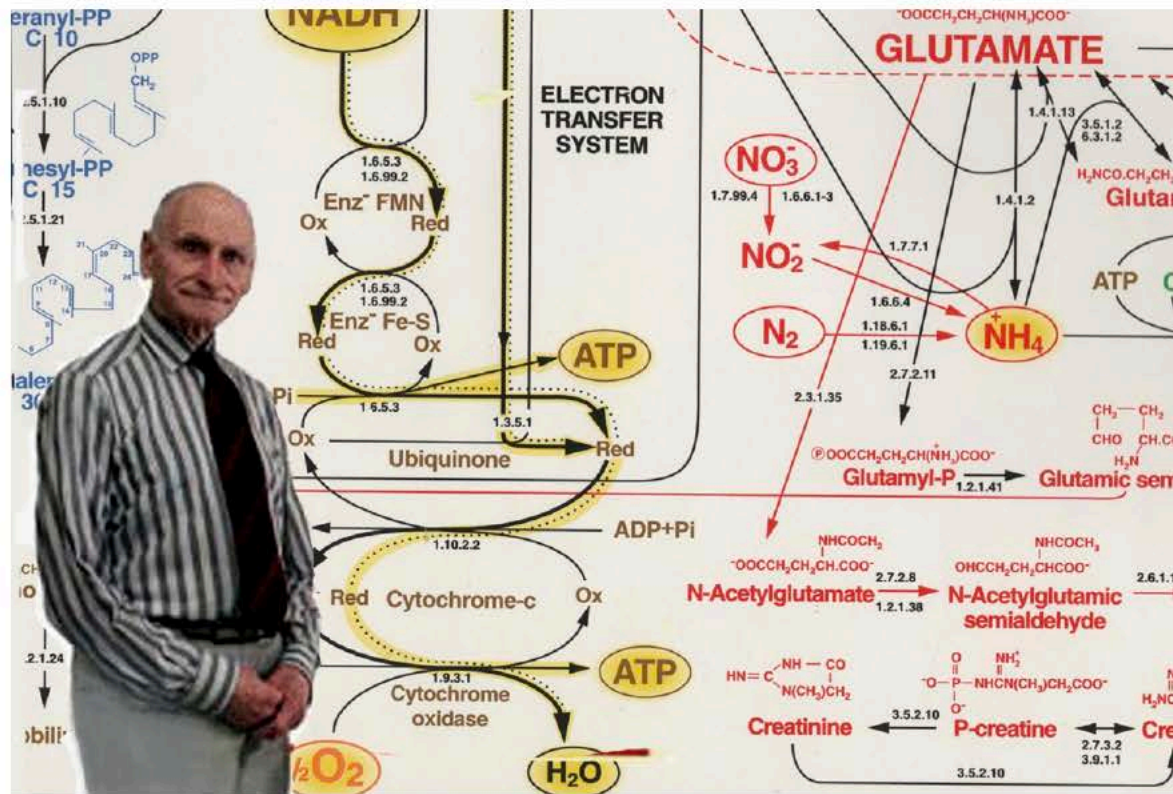


Donald Nicholson

Biochemist lauded by generations of students for his charts elucidating complex metabolic interactions

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Nicholson and one of his bestselling charts: eventually they showed the interlinking of dozens of separate chemical pathways and over 600 different reactions

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Open any textbook of biochemistry and you will find diagrams that look like road maps, with intersections and roundabouts, but with molecular structures instead of street names. These charts show the stepwise fashion in which molecules are created and destroyed within living systems — with each link in the network governed by a specific catalytic enzyme, acting in a similar way to a traffic policeman at the end of every street.

The charts themselves are complex, but to use them is simple. For example, explaining the effects of a genetic defect in a metabolic enzyme is, in principle, no more difficult than identifying which parts of a city become inaccessible when a particular road is blocked. These diagrams were Donald Nicholson's achievement.

Donald Elliot Nicholson was born in Leek, Staffordshire, in 1916. His father was a Methodist minister, so the family had to move every three years. Donald recalled it as a dreadful life. He could never put down roots and schooling was a nightmare. Things improved when he was sent to Kingswood School, for the children of Methodist ministers, in Bath. In 1932 he enrolled at Huddersfield Technical College for a London external degree in colour chemistry. This was doing it the hard way, and he found the practical examination gruelling. He scraped a pass degree and enrolled for a PhD at the nearby branch of ICI Dyestuffs.

Nicholson worked on fluorine compounds, which he found “exciting and stimulating”, but the downside was years of poverty. This was alleviated to some extent by part-time teaching (bakery science at first and more advanced chemistry later). He completed his PhD in 1941 and moved to the laboratories of Boots Pure Drug Company in Nottingham.

During the war he worked on the development of the large-scale process for producing sulphonamide drugs — “a wonderful, wonderful experience, hugely exciting and important”.

He left Boots in 1946 and took an ICI research fellowship in the department of bacteriology at Leeds University. Two years later when the fellowship ended he was appointed lecturer. He found himself thrown into teaching, at the deep end. As the only chemist in the department, he was inevitably given bacterial metabolism to teach. However, although he did not appreciate it when he was struggling to keep one lecture ahead, the pattern of the rest of his life was being set.

It was trying to make the subject understandable to undergraduates that led him to create the first chart. A sequence of reactions known as glycolysis had been completed around 1940 and this had stimulated research into others, to such an extent that by the mid-1950s dozens of other sequences had been described. "Some pathways were clearly related to each other but for organisms to live it was necessary for them all to be integrated into a living concerto." Nicholson reasoned that they must fit together like pieces of a jigsaw to give a global picture. Biochemistry was complex, but not infinitely complex.

He spent five years drawing charts on tracing paper and running off blueprints in the university architect's office. When the first copies appeared in 1960, they received an enthusiastic reception. The charts were then commercially produced by the company which produced that other iconic chart, Harry Beck's London Underground map.

As biochemical knowledge expanded, 22 successive editions were needed and more than a million copies have been printed. Eventually the charts showed the interlinking of dozens of separate chemical pathways and more than 600 different reactions.

It could have made Nicholson very rich but in 1996 he gave the copyright to the International Union of Biochemistry. An agreement with the biochemicals manufacturer Sigma-Aldrich secured the future of the maps and provided travel grants for young scientists.

Nicholson never stopped working. Twenty years after the formal age of retirement he was regularly in the university, updating and extending his charts. At the time of his death he was as excited as ever, producing computer animations of his charts.

He was a tireless, first-class scientist who had had a clearer vision of what biochemistry would become than any of his contemporaries. He was honoured by Huddersfield University (with an honorary DSc) and by biochemists throughout the world, and was one of only two Special Life Members of the International Union of Biochemistry and Molecular Biology.

His international fame always came as a surprise to students who had encountered him only as a kindly, caring figure. Lack of recognition bothered him not at all – his epitaph is to be found in every biochemistry textbook.

Nicholson's wife, Celia, died in 1996 and he is survived by two daughters and a son.

Donald Nicholson, biochemist and the creator of metabolic pathways charts, was born on January 16, 1916. He died on May 12, 2012, aged 96

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