

THE NARROW ROAD TAKEN

A review of *Nature's Oracle: The Life and Work of W. D. Hamilton* by
Ullica Segerstrale. Oxford: Oxford University Press (2013), 336 pages.
ISBN: 9780198607274

JOHN LAZARUS*

Newcastle University

Evolutionary behavioural science is not blessed with opportunities for concrete discoveries – a new planet, or the shape of a potentially interesting molecule, for example. Its empirical advance is driven instead by new ideas, and the 1960s and 1970s saw a revolution in the theoretical armoury of those working on the evolution of behaviour. Optimality theory, borrowed from economics, provided tools for testing the adaptiveness of non-social behaviour, and John Maynard Smith showed that to understand the evolution of social behaviours stable, rather than optimal, solutions must be sought. These methods helped to drag evolutionary thinking away from a naive species level, group selectionist, viewpoint and back to the individual and the gene as the units of importance. Crucially at stake here was the understanding of altruism and it was W. D. Hamilton who put the gene centre stage as the unit of selection with the concept of inclusive fitness, and who showed how to analyse the evolution of interactions between relatives. The concept of inclusive fitness was Hamilton's greatest achievement but he went on to make a number of strikingly original contributions to evolutionary biology before his untimely death in 2000 at the age of 63.

In her biography Ullica Segerstrale gives us both the man and his work. With sympathy and intelligence she seeks to understand how his evolutionary and genetic approaches to altruism, and other questions of pressing human concern, arose from his own personality and world view. Her account is enriched by letters to family and friends, and Hamilton's own commentary on his work as published in his collected papers, *Narrow Roads of Gene Land*.

William Donald Hamilton was born in Cairo in 1936, of New Zealand parents, and grew up in Kent, not far from Darwin's home, the second oldest of six children. He was a passionate naturalist from a young age, with an interest both

*Address for correspondence: JOHN LAZARUS, Centre for Behaviour and Evolution, Institute of Neuroscience, Newcastle University, UK

biological and aesthetic that was to remain with him for life. His parents' influence seems to have been formative: Bill and his siblings were encouraged to be creative and self-sufficient; books and ideas were discussed; and physical risk-taking tolerated to a degree. His childhood experience of the war and its aftermath, Segerstrale suggests, made Hamilton an individualist and anti-totalitarian, and – as an example of the influence of his life on his work – coloured his attitude to group selection.

After school and national service Bill studied zoology at Cambridge and here discovered Fisher's great book *The Genetical Theory of Natural Selection*, finding it "intensely provocative". It was the stimulus for his lifelong project, started during his undergraduate years, to understand the genetic basis of social behaviour; he was already writing of "my theories of ethics". But how did this deep interest in the origins of self-sacrifice emerge, with its intellectual allure and moral imperative? Segerstrale finds answers to this question, convincingly, in Hamilton's personality – already argued to be a function of parental influence – and the early moral teaching of his mother. Of course parental traits can be inherited as well as imitated, and adopting, rather than rejecting, parental guidance may rely on a secure family life, which Hamilton certainly enjoyed.

Hamilton pursued the problem of altruism as a postgraduate student at the London School of Economics and the Galton Institute, University College, London. Working largely independently he developed his inclusive fitness theory, and published it in 1963 and 1964. His less than purist mathematical techniques drew critical responses from mainstream population geneticists, but his conclusions were, eventually, vindicated. As is well known he went on to make major contributions to theory in several fundamental areas of social evolution: sex ratios; the role of parasites in sexual selection and the maintenance of sexual reproduction; senescence; gregariousness; dispersal; and cooperation between non-relatives. Late in his career he pursued some innovative hypotheses: leaf colours as a handicap signal, for example, and the controversial theory that human HIV may have been transmitted from non-human primates. He was collecting data to test this theory on his last field expedition.

Perhaps less well known to evolutionary psychologists is his fieldwork in Brazil; he was a formidable naturalist and returned many times to the Amazon to work on the adaptations of individual species and on larger questions of macroevolution. Hamilton's feeling for the natural world, and particularly the Amazon rainforest, was profound. As Segerstrale writes: "Bill Hamilton was more than a naturalist. He had an organic connection with the living world, which could sometimes take extreme forms. He wanted to understand how nature worked, . . . to become one with her" (pp. 286–287). These "extreme forms" exemplified his risk-taking personality, and included inviting wasps to