

Review by Richard Dawkins of *Narrow Roads of Gene Land* by W.D.Hamilton
W.H.Freeman/Spektrum, Oxford, 1996

and

The Song of the Dodo by David Quammen
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"Imagine a circular lily pond." The memorable first sentence of W.D.Hamilton's 'Geometry for the Selfish Herd' (equally memorable and utterly characteristic title) presages his simple but productive mathematics. Hamilton is more naturalist and explorer than technical mathematician, but he has the larger imagination of a great mathematician and he is, in my not uninformed opinion, the most innovative evolutionary imaginer since Darwin himself.

He has never published a book before, and nobody has published a book like *Narrow Roads of Gene Land*. It is (Volume 1 of) his collected papers ('Geometry for the Selfish Herd' being one of the less important of them), bound together with an autobiographical thread. Distinguished scientists often publish their collected papers, especially when, unlike Hamilton, they have reached that time of life known as the philosophopause, but their papers sometimes turn out to have less in them than one had thought. Hamilton's papers invariably have more. To reread them is to be continually astonished, not by their main themes – which are now well known and have earned Hamilton the plaudits and prizes of the scientific world – but by their throwaway lines.

The byways of a Hamilton paper, written in his uniquely (for a scientific paper) reflective, meditative prose, are a kind of negative padding. "My God", we say, "He even thought of so-and-so but never bothered to make anything of it." To take just one of these narrow roads for example, there is a theory of the origins of sociality in termites which is universally attributed to an American author whom I shall call B. Quite recently I heard Hamilton referring to B's theory and I stopped him. "Bill, that isn't B's theory. You thought of it first. It's clearly stated in your 1972 paper." He denied it Eeyorishly, and I was forced to run to the library to fetch the paper concerned. Only when I thrust his own paragraph under his nose did he gloomily concede that, yes, apparently he had thought of B's theory nearly a decade before B.

His modesty is legendary, but the autobiographical passages of this book reveal a stubborn belief in the importance of what he was doing even during the wilderness years when scarcely anybody else saw any merit in the questions he was asking – let alone the answers he was discovering. Hamilton was working ten years before his time and that can be a lonely business. "I told you so" is not a naturally Hamiltonian phrase, but we can read it between the lines of his account of obscure and frustrating early years in Cambridge and London.

"Most of the time I was extremely lonely. Sometimes I came to dislike my bedsitting room so much that . . . I would go to Waterloo Station, where I continued reading or trying to write out a model sitting on the benches among waiting passengers in the main hall. . . or on a park bench in the gardens of Chiswick House or at Kew. . . But the beauty and the wild life of these gardens were at least as distracting as was the human pageant at Waterloo (the alcoholics sheltering or craving company like me . . .) Out at Kew I remember . . . only too often, the sun shining too brightly on my pages, the air being too cold, or the wind scattering the reams of my wretched and erroneous algebra across the grass."

Recognition has now come. Others, in their thousands, are tramping Hamilton's original narrow roads into broad highways of Kuhnian normal science. Still a prophet but no longer without honour, Hamilton is cutting new trails through the Brazilian jungle and through mathematical gene land. Still alone perhaps, but only in the sense of being without peer. Now he has the company of eager young scientists, anxiously watching to see where their subject is going to be in ten years' time.

Hamilton's papers are not easy, and this is not a book that even professionals will necessarily read

from cover to cover. But the autobiographical notes form a narrative that can be read on its own. Historians and philosophers of science must study this memoir for professional reasons. The rest of us can just enjoy it and, when we have acquired a taste for Hamilton's uniquely personal style, we shall recognize snatches of it as we flick over the papers themselves which will lure us in to make the worthwhile effort. Who, after all, could totally resist a paper called "Gamblers since Life Began: Barnacles, Aphids, Elms"?

Imagine – as Hamilton has probably written somewhere – a world without islands. Islands are not just small pieces of land surrounded by water. They are small pieces of anything surrounded by something different, surrounded by whatever serves as a barrier to animal or plant dispersal. To a fish, a lake is an island of water surrounded by land. In the world of the yellow bellied marmot, mountaintops can form an archipelago of islands jutting out of the plain. Islands, and the large consequences of their existence, are the subject of David Quammen's *The Song of the Dodo*.

A world without islands would be sterile. The Heaven of Rupert Brooke's Fish ("There shall be no more land, say fish") would not be fly-replete, would be destitute of fish themselves. An undissected waterscape, or landscape, deprives gene pools of the opportunity to diverge and form new species. No new species implies, on a larger time scale, no new orders, classes or phyla. Your ancestors and snail ancestors were once races of the same precambrian species, capable of interbreeding. But for some long-vanished barrier between two seas they would be interbreeding still, and evolution could not have progressed. Islands, in the broad sense and on the evolutionary timescale, are the spawning grounds of new species. Without them, life would be a single smear of uniformity or, more probably, extinct.

No wonder islands inspired both Charles Darwin and the co-discoverer of his principle, Alfred Wallace. No wonder islands provoked one of the most influential collaborations of modern ecology, between Edward O. Wilson and the late Robert MacArthur. Quammen gripes against Darwin but the others in this list are his heroes, together with a large collection of young, mostly American, field ecologists for whom he caddies across their various archipelagoes around the world.

You don't have to be American to enjoy this book, but it might help. English readers must grit their teeth through being gratuitously told that our normal way of pronouncing 'neither' is 'snotty'. In retaliation, I could note that Quammen's baseball-hatted cast are forever 'addressing' questions and indulging in that peculiar affectation of American field biologists of both sexes, the "real tough" language of the farm boy. A snake expert dons an old gardening glove because "I don't like being bit". And do you know what a size-nine hellgrammite is? Anything like a linebacker?

Never mind, it is all the more touching when one of these scientific tough guys breaks down in tears at the recollection of one of his favourite islands, now denuded to make a trailer park (caravan site) for Florida sunseekers. Quammen himself gives us a moving elegy for Bedo, boy naturalist of the Madagascar jungles, murdered out of jealousy for his professional success as peerless guide to the world's lemur watchers.

This is, finally, a moving book. It passes from evolution to that other aspect of island faunas, their vulnerability to extinction. Quammen's quest took him to the world's islands and archipelagoes, not to take a last look at the Komodo Dragon or the Mauritius kestrel, but to talk to the experts about why they may go extinct. There is an elaborate theory of island biogeography, of the mathematical equilibrium between colonisation and extinction. There are appropriately tough-talking controversies between rival island biogeographers. Quammen island-hopped around the world, listening patiently to them all, sharing in the privations and not inconsiderable hazards of their fieldwork. He is a science journalist who does not duck the responsibility to convey the complexities and the difficulties of science. Science isn't all fun, and journalists who represent it so diminish the subject and patronise their readers. The book is longer than I would have advised, but David Quammen is a good writer who has taken the trouble to master an important subject and do it justice.